# Colonizing the climate?: A decolonial critical analysis of the global scientific discourse on solar geoengineering

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## SUMMARY

Solar geoengineering (SG) has emerged within scientific research circles as a potential technological solution to address global climate change, with critical contestation arising from different disciplinary fields given concerns for inadequate governance, technical uncertainties, research inequities, and challenges for democracy. The development of SG research is dominated by a homogenous community of Western actors and the proliferation of uneven research raises concerns for critical climate justice given the exclusion of a plurality of interests, values, and norms in the formulation of the research landscape and the construction of SG as a socio-technological imaginary. While commitments to critically investigate the positionalities and subjectivities shaping the knowledge grow more numerous, less explicit investigations exist that expose the ways in which the current discourse normalizes climate imaginaries that belong to a singularly Western tradition of thought. This research seeks to expose the ways in which the current epistemic climate engineering community totalizes a Western imaginary and thus entrenches discursive and material forms of 'climate coloniality'. Using a decolonial analytical frame to construct and interpret a critical discourse analysis, I examine the most prominent (powerful) scientific literature on SG and its governance for the presence of narratives that institute climate coloniality. The findings reveal those dominant discourses within the field that totalize Western conceptions of climate change, earth, the role of science, the future, and humanity. By naming the genealogy of these discourses in Western modernity, the research challenges their universality that currently obscures colonial histories, reduces complexities, enables certain justifications, and reifies power imbalances. The research emphasizes the limitations of this investigation as situated and partial in its subjective and limited application of decolonial theoretical praxis, emphasizing the need for further research on climate coloniality that is critical of this research and its intended contributions.

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# PREFACE

I preface this research by locating myself and acknowledging the ways in which this research necessarily bears the mark of my own positionality and subjectivity. In the late 1990s I was born in Aspen, Colorado, an affluent American town and the site at during which the same time solar geoengineering emerged as a topic of discussion among scientists at the Aspen Global Change Institute – as a potential strategy to 'fix' climate change. Further, with this research I conclude my master's education in the country in which the concept of the 'Anthropocene' was invented and within the institution where notions of earth system governance take root. Critically, I am able to engage in this research and to write from afar about global notions of solar geoengineering and climate change *because* I am not facing my own territorial or political struggles against projects of extraction and destruction, and doubly, I am not facing such struggles *because* of my ability to look upon climate change from afar. Most fundamentally, this research is an outcome of my own personal journey to engage with the decolonial theoretical praxis, for as teachers Walsh & Mignolo, (2018) describe, "when you realize that as a citizen of the First World you belong to a history that has engendered coloniality and disguised it by the promises and premises of modernity…" (p. 5), you become implicated in the struggle to build a radically different world. I have grappled with, failed, misunderstood, mistaken, mistreated, swallowed, and been fundamentally altered by the challenge that is decoloniality and the process of re-engaging an understanding of myself, one deeply entangled with the systems I criticize from the safety of shiny desks.

# ACKNOWLEDGMENTS

An angry red covers the sky, the waves are rough, the water is rising, the birds are panicking. Swirling winds wrap around the destruction of the Earth's ecosystems, the enslavement of non-humans, as well as wars, social inequality, racial discrimination, and the domination of women. The sixth mass extinction of species is underway, chemical pollution is percolating into aquifers and umbilical cords, climate change is accelerating, and global justice remains iniquitous. Violence spreads through the crew, chained bodies are thrown overboard, sinking into the marine abyss, while brown hands search for hope. The skies thunder loudly: the world-ship is in the midst of a modern tempest. In the face of this storm, which finds horizons hidden behind the clouds, vision blurred by the salty waters, and cries covered up by unjust gusts, what course can be taken?

Malcom Ferdinand

It's an engineering problem, and there will be an engineering solution.

Rex Tillerson

# 1. INTRODUCTION

Climate change is not an event. It is not an environmental phenomenon to be scientifically probed. It is necessarily a practice of reckoning for the dominant systems of exploitation, development, and endless growth – a reckoning that has already been known by the majority of the world's organisms, species, and populations, for centuries. Climate change is the lived, embodied manifestation of violence and destruction against life in all its forms, a project put in place with the advent of the modern, industrial world. The making of 2023 and the current socio-ecological moment is the accumulation of our and our ancestors' histories and the embodiment of our very different entanglements with the making of climate change via the projects of colonialism and globalization. To see climate change not as a symptom but as the ongoing vitality of global histories of violence is to understand that "colonialism haunts the past, present, and future *through* [emphasis added] climate" (Sultana, 2022, p. 10). Decades of prominent scientists and politicians have presented climate change as first and foremost an observable, atmospheric phenomenon of global temperatures, which are projected to exceed 1.5° C above pre-industrial levels, warming at which high risks of severe impacts from climate-related hazards and limited adaptation pose numerous threats (IPCC, 2022b). While climate change is certainly about future risks associated with projected global temperatures, this lens is only partial, for to reckon with climate change must fundamentally be a "restructuring of relationships to ecologies, waters, lands, and communities we are intimately, materially, and politically connected to" (Sultana, 2022, p. 10).

Even in the dominant frame in which climate is reduced to its aggregate indicators and predictions of future risk, proliferating calls for stronger emissions reductions targets and subsequent efforts have manifested no progress to deliver necessary mitigation trajectories. The Intergovernmental Panel on Climate Change (IPCC) cautions the "rapidly narrowing window of opportunity to secure a liveable and sustainable future for all" (IPCC, 2022, p. 33), as the world is headed for 2.4 C of warming based on current 2030 targets (Climate Action Tracker, 2022). Most critically, just 23 countries constituting approximately 12% of the global population are responsible for approximately 80% of the historical carbon emissions that accrued over 161 years, from 1850 to 2011 (Ritchie, 2023), a critical relationship I refer to as 'the 12%–80%'. It will not be forgotten that the world's top 1% of emitters produce over 1000 times more CO2 than the bottom 1% (Cozzi et al., 2023). Critical climate justice makes central the differentiation in both the causation and materialization of climate change, as climate risk in this warmer world will not unfold evenly as developing countries are much more vulnerable to impacts and possess lower coping capacity (Eckstein et al., 2021). Problematically, as the urgency of climate action grows and the once auspicious aggregate temperature target of 1.5° C established under the Paris Agreement falls out of reach, justice and human rights concerns augment as more drastic mitigation efforts threaten the rights of lower-income nations to continue to develop, to be allocated differentiated responsibilities, and

to be fairly included in the global discussion. Thus, while pursuing a pathway to zero carbon emissions by 2050 is vital for climate justice (Robinson & Shine, 2018), it is equally imperative that such mitigation pathways entail democratic processes for inclusion, recognition, and reparation.

Critically, according to the IPCC, both public and private finance levels for fossil fuel practices still outweigh the amount being spent on climate adaptation and mitigation, both public and private finance levels from developed to developing countries are still below the established goal set by the Paris Agreement, and total tracked climate finance still falls short of the levels needed to limit warming in line with temperature targets (IPCC, 2022). While more rigorous mitigation pathways still clearly exist, however, most IPCC model scenarios that successfully limit warming to the 1.5° C target count on a preliminary overshoot of the emissions threshold and the subsequent generation of negative emissions to lower global temperatures back down by 2100 (IPCC, 2014; Wieding et al., 2020). Generating negative emissions implies compensating for those GHG emissions that cannot be mitigated, addressing the 'emissions gap' that currently exists between realized and required reductions (Wieding et al., 2020). Accordingly, an outlet of the scientific climate community has pursued research on the compensation of residual emissions via "technologies operating on a large scale that aim to deliberately alter the climate system in order to alleviate the impacts of climate change" (IPCC, 2014, p. 89), a scenario included in several IPCC models themselves. Such interventions fall under the category of geoengineering, the most large-scale of these being solar geoengineering, most commonly in the form of solar radiation modification. This form of solar geoengineering, "the intentional modification of the Earth's shortwave radiative budget with the aim to reduce climate change" (IPCC, 2014, p. 127), has been increasingly recognized, researched, and developed within both private and public circles of science, academia, business, and government as a potential strategy to address emissions overshoot scenarios, as seen in *Figure 1*.
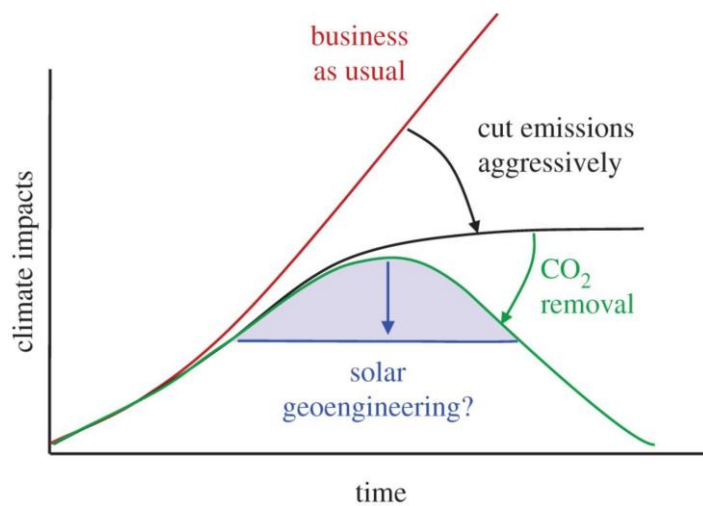


*Figure 1.* Solar geoengineering as part of an overall strategy to reduce (conceptual) climate impacts during a period of overshoot, from MacMartin et al. (2018)

Proponents of research on solar geoengineering strategies including stratospheric aerosol injection – the process of injecting aerosols into the stratosphere to enhance planetary albedo – assert the potentially feasible and effective role solar geoengineering could play in addressing current climate inaction. However, solar geoengineering has proven a contentious subject as a wide range of disciplinary studies have criticized the emerging field of research based on a wide range of concerns, but principally on the uncertainty of the technology and its risks, the implausibility of its governance and implementation, and the prevailing need to decarbonize in 10 to 20 years (Biermann et al., 2022).

The landscape of SG research and its governance grows in contestation with the multiplication of concerns for justice at the local, national, and global scales. Current solar geoengineering research and advocacy is dominated by experts from largely North American or European think-tanks, affiliated institutes, and private research councils (Biermann & Möller, 2019; Sikka, 2012). Further, the 'intended beneficiaries' of SG are argued as the most climate vulnerable communities that reside in developing, low-income, geographically vulnerable areas – populations that are largely excluded from the research field or the larger societal discussions on climate governance (Frumhof & Stephens, 2018). Even the dominant technical entity on climate science and governance (the IPCC) urges the importance of drawing on "diverse knowledge and values includ[ing] cultural values, Indigenous Knowledge, local knowledge, and scientific knowledge" (IPCC, 2022b, p. 25) in addressing climate change and pursuing solutions. A growing range of interdisciplinary research asserts the coloniality of climate change, identifying not only its disproportionate causes and effects but also the epistemological and material coloniality within the dominant structures of knowledge production for climate governance by which corporations, powerful states, and elite Western entities perpetuate tactics of control and disposal of marginalized communities (Agarwal & Narain, 2012; Chakrabarty, 2012; Dehm, 2016; Stein, 2019; Sultana, 2022b; Whyte, 2018; Wilkens & Datchoua-Tirvaudey, 2022). Understanding how decisions on large-scale intervention into the climate system are constructed and which actors, values, and interests are represented in the current processes of knowledge production is imperative to avoid the lock-in of irreversible, Western technological interventions and the potential resulting lock-in of colonial processes of marginalization, erasure, and dispossession – of climate injustice. Critical analysis of the systems of knowledge production for solar geoengineering is urgently needed not only to expose the mechanisms of 'climate coloniality' (Sultana, 2022b) within discourses on solar geoengineering, but also to make visible the plurality of perspectives by which a 'collective resurgence' (Walsh & Mignolo, 2018) of knowledges, epistemologies, ontologies, and experiences can direct efforts to address climate change *so to* achieve critical climate justice.

## 1.2. SCIENTIFIC PRECEDENT

To preface an investigation of the solar geoengineering (SG) discourse and its implications for climate coloniality, I first establish the important historical context of the knowledge production on SG and its

political development as an emerging socio-technological imaginary. Studies on the potential of SG to halt future pile-on of radiative greenhouse effects proliferated with increasing concern for global emissions in the early 2000s (Crutzen, 2006; Govindasamy & Caldeira, 2000; D. W. Keith, 2001). As wider-scale studies and modeling research conducted within Europe by the United Kingdom Royal Society and from the United States by the National Research Council began to assess whether aerosol engineering could be employed to not only prevent further warming but reverse existing warming, research on SG as a globally scalable strategy was increasingly advocated in scientific circles (Caldeira & Bala, 2017). What has been noted by authors as the 'climate engineering community' (Blackstock & Low, 2018) contains two rather distinct groups reflecting two general stances towards the subject of SG and its governance in line with Caldeira & Bala's (2017) observation of two general trends after 2006: "1) A broader range of physical scientists felt that studying solar geoengineering was a worthwhile pursuit. 2) A large number of social scientists, legal experts, economists, political scientists and philosophers started assessing the governance, ethical, legal, economic, political and moral issues of solar geoengineering" (p. 12). The current landscape of SG research diverges accordingly into two main subfields: research that continues to discern the feasibility of the technology and its governance at the scale required and that supports further research, and research that criticizes the ambition of such research and opposes its proliferation. While authors in both fields recognize the risks and overall limitations of SG, authors in the first sub-field see further research and development as necessary and ethically justified. For authors of the second sub-field, the legitimacy of the endeavor and of the research itself has become increasingly questionable, with such assertions that SG research lacks salience, impartiality, credibility, and accessibility (Frumhof & Stephens, 2018).

This first group, sometimes referred to as 'the geoclique', is characterized by those who are aware of the societal implications of SG but who prioritize "technical knowledge as a basis upon which stakeholder engagement and policy can be built" (Blackstock & Low, 2018, p. 246). This group takes a more advocacy-type position towards the advancement of research on SG and its governance, based fundamentally on its subscription to an 'actionable evidence paradigm' (Blackstock & Low, 2018). These proponents possess a more natural science focus on the feasibility and efficacy of SG in more hypothetical scenarios. Importantly, actors in this group assert a strong distinction between advocacy for research and that for actual development and deployment of the technology. Caldeira & Bala (2017) assert that all scientists engaged in research across the entire community have "reservations about its implementation," and that for these scholars, "the distinction between supporting solar geoengineering research and supporting solar geoengineering deployment should be appreciated" (p. 14). These authors stress that they remain neutral on whether SG should ever be pursued (Rahman et al., 2018), and that the main goal is not to advocate the technology but "rather to understand whether its use has the potential to limit climatic injustice" (Svoboda et al., 2018, p. 5). However, even scholarship contributing to this research field recognizes the problematic vision of SG and its implications within a highly complex historical, political, socio-ecological world, acknowledging SG as unaligned with preferences for climate action that

redistributes power and wealth, instead aligning only with goals for the pragmatic reduction of risk (Reynolds, 2019a).

The second group is made up almost exclusively of social scientists who are more critical of and opposed to the proliferation of research along the general convictions that SG is "*ungovernable* because there is no plausible and legitimate process for deciding who sets the world's temperature" (Hulme, 2014, p. xii). Actors in the first group refer to this second set of attitudes as those who oppose research on SG and actors in the first group assert the necessity that this critical group prove either the injustice of SG or find a better alternative (Horton & Keith, 2016). According to Buck et al. (2021), there are two common angles of critical analyses on SG: deconstructing the discourse, and countering the ethical challenges posed by the technologies. While research on the potential injustices advanced by the actual implementation of SG is numerous, fewer critical studies have focused on the epistemological injustices surrounding the uniquely problematic, homogeneous production of knowledge on SG. Further, Buck et al. (2021) claim that, problematically, "such analyses approach the subject from within scientific discourse and institutions and can therefore only push the critique so far" (p. 8). The historical proliferation of SG research over time is highly concerning in that most of the discourse has been produced in the same Eurocentric, Western, developed, elite, and white centers of knowledge production, with little inclusion of other perspectives or methods. Attention to the study of discourse to investigate the role of agency and power dynamics in contexts of climate governance and research has increased, with a fundamental concern of research to determine what visions of and values surrounding climate change are implicated in dominant processes of knowledge production for SG and its governance.

## 1.3. RESEARCH GAP

Critical research has exposed the problematic dynamics within the makeup of the SG research as a field made up of mostly white, European and North American men from wealthy institutions and organizations – a makeup that necessitates ascribing limitations to the legitimacy of the logic and knowledge that is being advanced as the central body of knowledge on SG and its governance. While critical studies have acknowledged that the SG research landscape is thus dominated by Western actors and ways of knowing (Buck et al., 2021), most studies contend that this is a *contextual* problem that poses obvious challenges to concerns for justice, equality, diversity, and inclusion. While most research – both that which identifies as critical social science-based and that which identifies as self-reflexive natural science-based – is critical of the contextual aspects of the SG research landscape and the domination of a certain kind of actor and perspective, only some studies have sought to assess what perspectives are normalized in the research as *content*. Within the self-reflexive natural science-based field, analyses on the problematic makeup of the research community usually stop at criticizing the lack of inclusion of other actors and voices in the field, with less assessment as to how this context impacts the knowledge being produced itself.

Scholarship critically assessing the myriad discourses of climate governance is a steadily growing arena of research within which investigations into the power dynamics within discourses behind particular issues and topics within climate governance can take root (Adger et al., 2001; Bäckstrand & Lövbrand, 2019; Stevenson & Dryzek, 2014). For such studies, discourse analysis is employed to assess the imaginaries at play and how dominant discourses "take form, gain hold and ultimately render the problem of climate change knowable and governable in particular ways" (Bäckstrand & Lövbrand, 2019, p. 5). Critical investigations from the fields of climate justice, political ecology, ecofeminism, and others have revealed the relationship that the contextual homogeneity of actors and perspectives of the SG landscape has with the discourse itself, with assertions that "the predominance of certain perspectives in producing knowledge and discourse can lead to blind spots" (Kravitz & Sikka, 2023, p. 4) and that 'narrow perspectives' resulting from the narrow range of actors in the research "have led to mistaking modeling feasibility for real-world feasibility…; normalizing particular topics of discourse, which shapes policy… or de facto governance…; and the enshrinement of particular values that are then imposed more broadly" (Kravitz & Sikka, 2023, p. 4). However, while these critical analyses problematize the impact that the makeup of the SG research field has on the dominant framings and narratives that emerge, these analyses less often extend their investigation to assess what underlying ways the normalization of these framings and narratives work to systematically erase other perspectives from the discourse.

At large, social science-based research that is more critical of the content of research on SG and its governance has so far aggregated as a fundamental warning of the need to dive deeper into the ways in which the knowledge production surrounding SG is marked by power dynamics and thus coloniality. While research that draws on the context of the SG community to expose and critique the central themes and patterns of the research in its treatment of SG itself, only a few studies have explicitly investigated the ways in which the discourse itself works to totalize certain conceptualizations and framings related to SG, and even fewer have connected these patterns of totalization to greater systemic workings of modernity/coloniality. Anshelm & Hansson (2014) analyzed the public debate discourse surrounding SG to reveal dominant metaphors and storylines, those groupings of narratives that enable certain conferences of meaning that play "a key role in creating the social and moral order in a given terrain" (p. 105). While this research contributes to a critical understanding of the discursive dynamics being advanced in the SG research, it leaves open two important gaps. First, while the authors pointed to the postmodern tendencies behind the identified storylines, their analysis "assume(s) no strong link between storylines and discourse coalitions" (Anshelm & Hansson, 2014, p. 105), asserting that while they identify storylines characteristic of the advocacy side of the debate, specific actors and coalitions cannot be so clearly connected. I argue that as a result, the research does not sufficiently assess the important connection between the discourse and its socio-political context by excluding this link between actors (and their respective coalitions) and the storylines being normalized. Second, the authors understood their analysis of storylines as revealing "a group of central, well-disseminated, and influential clusters of meaning" (Anshelm & Hansson, 2014, p. 107). I argue that by focusing on this conceptualization of

storylines to be identified in the discourse, the research does not allow for assessment of the ways in which more subliminal narratives can, on the contrary, be decentralized, obscured, and inconspicuous.

Addressing this gap and connecting more directly the discursive dynamics of the SG discourse with the underlying socio-political context and the actors and coalitions behind the SG discourse, Sikka (2012) "examine[d] the discursive field of geoengineering by unpacking how particular members, associates and academics allied with private institutes frame, treat and discursively construct a justification of geoengineering technologies" (p. 163). For Sikka (2012), the historical, socio-political context of the SG research landscape marked by the domination of particular institutes and entities "makes a study of their strategies and framings imperative" (p. 163), asserting the necessary connection between discursive constructions and their socio-political context. In using critical discourse analysis, Sikka (2012) extended the kind of investigation by Anshelm & Hansson to connect the presence of ontological and epistemological assumptions with their "hidden motivations" (p. 164) and those actors who perpetuate them thus. The resulting analysis pointed to the dominant discursive conceptualizations of 'geoengineering advocacy' as based on "historically conditioned" (Sikka, 2012, p. 166) articulations of the world, referencing the relevance of systemic dominance of certain perspectives but without naming or connecting these directly, making no specific mention of Western tradition as the genealogy of such perspectives.

While Anshelm & Hansson (2014) implied that the dominant storylines in the public discourse are attributed to the "use of a particular kind of language that rests on common definitions, judgments, assumptions, and contentions" (p. 105) by actors within the discourse, there is a need to investigate the relationships, the socio-political context, and the underlying, subliminal imaginaries that maybe do not come together to form blatant, well-disseminated judgments or perspectives on SG itself. Similarly, as Sikka (2012) investigated "the discursive grounding of justifications of geoengineering" (p. 166), she focused on those discursive framings and narratives that make up the more robust, central lines of advocacy-type knowledge on SG employed more dubiously by those actors or institutions. In determining what kinds of discursive frames are employed *in order to* "limit, shape and mold the current debate surrounding geoengineering" (p. 173), the assessment of what other kinds of subliminal imaginaries and narratives are perhaps advanced in the discourse that are not attributable to such identifiable, robust intentions or purposes are precluded. The focus for both these studies on the discursive frames of SG itself and less on the subtle epistemologies or ontologies that are normalized between or external to these frames and dominant lines of logic has left a gap in the research for an assessment of these more embedded, fundamental moments of power asymmetry and epistemological violence.

Further, given the uniquely controversial nature of SG and its governance and its novelty on the world stage in more formal spaces like climate negotiations and policy discussions, critical investigation has focused largely on the discourse being advanced in less formal reports, media publications, opinion pieces, and public arenas. Sikka (2012) analyzed the discourse across "speeches, articles, research, media submissions and policy reports" (p. 167), while Anshelm & Hansson's (2014) analysis of the geoengineering

advocacy discourse in the public debate in mass media solely focused on public articles. While this research is critical given the potential for certain framings to dominate informal dissemination of knowledge on SG and its governance to the greater public, there have been no critical discourse analyses focusing on the discursive patterns being subliminally advanced in the most cited or most accessed – and thus the most powerful – scientific/academic climate research or climate governance research on SG. Knowledge is power, and thus not only examining the dominant discourses but identifying those discourses within those most accessed, cited, and powerful knowledge being produced is of critical importance. Further, the analyses by Sikka and Anshelm & Hansson both only focused on and provided critical examination of those discourses that align with the advocacy-type coalition of research on SG. While this is important given the homogeneity and dominance of 'the geoclique' in the field, a more holistic investigation into the most prominent knowledge produced on SG requires an analysis of all knowledge that is currently most powerful, regardless of its stance in the debate on SG.

Finally, explicit connections to modernity/coloniality are important. Sultana (2022) urged critically: "epistemological and ontological work is needed to confront the universalization and Eurocentrism in how climate is presented and un−derstood, filtered through colonial science and gaze, differential valua−tion of human and non-human life and systems across Eurocentric and Other spaces" (p. 8). The important research examined in this section that serves as precedent leaves a critical gap in investigating the discursive mechanisms and subtleties regarding not only SG itself but of the world, of history, and of climate change. A critical research gap exists in the lack of approaches that connect dominant discourses and storylines in the knowledge on SG and its governance to underlying imaginaries and their genealogy in Western tradition. Fundamental to this explicit approach is Sultana's notion of climate coloniality, the most critical precedent that urges research on how discourses of climate and its solutions entrench Western imaginaries and disguise coloniality over 'Others'. While scholars, climate justice activists, and social and environmental organizations have pointed to and politically resisted the coloniality of geoengineering as within the arsenal of 'false solutions' to climate change that disguise Western projects of preservation, analysis of the ways in which this coloniality is epistemologically disguised within powerful, exclusive, scientific research can perhaps add (at least) scientifically to the more critical political and social mobilization against climate injustice and climate coloniality.

## 1.4. RESEARCH FRAMEWORK

In response to the aforementioned gap, I developed a research framework that hopes to contribute to the critical research on the discursive aspects and patterns of power within the scientific research on SG and its governance. To contribute as such, I incorporated a decolonial analytical framework that enabled an assessment of the discursive mechanisms by which the SG research totalizes a view from modernity and disguises coloniality, further critically enabling a speculation of the decolonial moment – a framework

to be elaborated upon in *Section 2.3*. To achieve this research objective, the following central research question was developed, demarcated by five sub-questions:

*In what ways does the prominent scientific discourse on the governance of solar geoengineering (SG) entrench modernity/coloniality and what would a decolonial analysis reveal for knowledge production on SG as a global climate change solution and its implications in reality?*

*SQ1. What is the situated, historical, socio-political context of the global scientific discourse on SG as a global climate change solution?*

*SQ2. What narratives of modernity are common in discourses on global climate change governance and how would the presence of these narratives in the scientific discourse on SG indicate the dominance of certain imaginaries?*

*SQ3. Whose knowledge on SG and its governance is the most prominent and therefore the most powerful?*

*SQ4. What narratives of modernity are normalized in the prominent scientific discourse on SG and its governance?*

*SQ5. How is the prominent scientific discourse on SG and its governance situated in Western modernity, how does it establish a universal claim to knowledge thereby erasing and concealing other ways and ideas, and what plurality exists?*

## 1.5. RELEVANCE

The political landscape of research and development of SG has intensified with justice concerns magnifying notably since in 2021 the Saami Council, representing Saami Indigenous peoples' organizations in Sweden, Norway, Finland and Russia, sent an *open letter* to Harvard University to call off its Stratospheric Controlled Perturbation Experiment (SCoPEx) in which test flights related to research and development of stratospheric aerosol injection technologies were planned over Saami Indigenous territory in Sweden – a project co-funded by Bill Gates, a notable actor contested as a servant of Western, market-based, technological solutions. Further, this year Mexico became the first country to place a *national ban* on SG experimentation in response to a United States-based startup's unapproved launch of a stratospheric aerosol injection balloon over the Mexican state of Baja. Not only does the material development of SG technologies present serious concerns for justice and patterns of colonial imposition represented in these place-based struggles against unprecedented, ungoverned technological experimentation by Western actors, but the epistemological development of geoengineering in climate discourses poses serious concerns. Geoengineering is becoming normalized in dominant scientific framings of and approaches to climate change – in global IPCC reports, in international climate negotiations, in national policy positions, in private sector agendas, in public debates, and in individual minds. The very idea of geoengineering is influencing how climate change is understood, normalized,

and approached, and decisions on the development of research for and governance of SG are already being made based on a very limited, homogenous, Western pool of research. As climate inaction mounts, pressure from developments by scientists and researchers becomes a driving political force, with major recent developments including polarized groups of researchers signing an *open letter* calling for a balance in research, an *open letter* in support for research on SG to reduce climate risks, and an *open letter* calling instead to stop research and development. The scientific relevance of critical research on SG *is* societal, as "in a topic like solar geoengineering, which literally involves modifying Earth's climate, the humility to recognize and address blind spots is of paramount importance" (Kravitz & Sikka, 2023, p. 4).

The fundamental historical, present, and future injustices that *are* climate change demands critical investigation of the ways in which historic processes of exploitation, marginalization, and subjugation that have occurred at the expense of the formation of the modern, developed world are preserved in and perpetuated by actors and systems in the present. The imaginary that conceives of or examines an engineered climate as a response to climate change is not one shared by the majority of the world. The development of research and discourse on the proliferation of SG as a potential solution in the face of climate change threatens the irreversible, global imposition of certain values, perspectives, and subjectivities in the form of technological interventions – thus posing serious challenges for those who see climate justice as the ultimate goal of addressing climate change. Fundamentally, conceptions of and approaches to climate change are political as they involve the complex histories of development and globalization that are constitutive of colonialism and destruction. For a critical climate justice approach to climate change, these fundamental relationships and histories are central, requiring attention to and recognition of climate change as a site of political struggle with its own complex, interconnected dimensions of race, gender, class, ability, and nation (Fiskio, 2012). Instead, a "Western hegemonization of climate narratives" (Sultana, 2022, p. 6) disavows the justice perspective of climate change, normalizing understandings of and approaches to climate that are apolitical, ahistorical, and uncritical. Climate coloniality begins from the fundamental reality that "since Euro–centrism internalized racism and colonialism, this system of power is hegemonic globally now in how climate is talked about, planning that is pursued, and dominant education around it" (Sultana, 2022, p. 6). To understand this origin of climate coloniality enables the subsequent recognition of the ways in which this system of power works to normalize certain approaches and understandings of climate change that are partial in that they are Western, claiming and offering them as universal. For Sultana (2022), the "uncritical adoption and internationalization of colonial gaze of assumptive Western superiority and techno-fetishism are ever-present" in the dominant discourses on climate (p. 6). To locate the idea of SG as a construct within this political and historical place of climate governance makes relevant the investigation of the ways in which SG originated in relation to climate coloniality and in the Western hegemonization of climate narratives.

Because of this fundamental need to investigate SG as a construct within the Western, Eurocentric system of climate governance and as in relation to climate coloniality, the theoretical praxis of decoloniality becomes relevant. If climate coloniality exists, to decolonize climate is to necessitate a

conception of climate change that repairs the erasure of histories, of politics, and of lived experiences by the Western hegemonization of climate narratives. To engage the decolonial in the context of climate change is to resist these dominant narratives that universalize a Western approach, it is to recall and re-exist the plurality that has been silenced through climate coloniality. To engage the decolonial in the context of SG itself is to investigate the ways in which SG embodies and reinforces the Western imaginary of a singular climate *future*, instead opening up space for the plurality of *futures* that exist in the context of climate change as a political, historical, social, racial, gendered, classed, embodied reality and struggle. While I acknowledge that decoloniality as a praxis must and does rightfully stand on its own as a lived, political endeavor and as an epistemological disobedience that does not seek to benefit via the application to other phenomenon or fields (*especially* by actors in the global North), the fundamental struggle belonging to the decolonial theoretical praxis can respond to climate coloniality by making visible an 'otherwise' – "another space for the production of knowledge – an other way of thinking, *un paradigma otro*, the very possibility of talking about 'worlds and knowledges otherwise'" (Escobar, 2007) – thus challenging the universality of Western climate narratives that are currently being constructed and normalized. To dismantle climate coloniality to make possible climate justice futures, this research seeks to contribute to that which raises alarm and adds resistance to the dangerous universalization of Western climate narratives.

## 1.6. ETHICS & POSITIONALITY

According to Walsh & Mignolo, "we are where we think" (2018, p. 2). I acknowledge the principal limitation of this research, a limitation to be remembered and reflected upon throughout – this research is situated in its production by a white, privileged, global North researcher originating from the United States, conducting research behind the shiny desks of a formerly colonial institution within the former colonial empire of the Netherlands. I recognize this research as both situated and partial in its production from a European, Western center of knowledge. As Lugones (2003) urged, I am implicated in the mix of privileges and violences that decoloniality fights against. My implication is that I, and those whose histories I descend from, benefited from colonialism and benefit from ongoing coloniality. Without knowing coloniality and instead only knowing modernity, in the words of Catherine Walsh, "I carry a privilege that I cannot negate" (Walsh, 2018). In conducting this research, and even more broadly in engaging and grappling with decoloniality and its necessary unsettling and discomfort, I recognize the ethical limitations of this endeavor and my personal journey to attempt to engage decoloniality. I recognize here I can never know coloniality, and instead, I can only try to unlearn modernity. I recognize that my research takes many epistemologies, ontologies, practices, ideas, and ways for granted, and this research is thus limited in its validity to explore decoloniality and all the important, political weight that it carries and requires. I acknowledge the following fundamental challenge that I do not claim to resolve: "how to write without reinscribing and reproducing what we rebel against" (Anzaldúa, 2015, p. 8).

While I commit here to recognize and reflect on my privileged place along the colonial difference, I also commit to the responsibility my privilege carries to think with those places from which I can never know and to write, think, and act from my own place within modernity to make cracks. I accept that power and privilege are not inherently horrible, it is what you do with it that matters (MLDSS). I do not claim to 'decolonize' anything with this research. Instead, as it is conducted from within Western academia and within modernity's walls, "it seeks a decolonial understanding of modernity" (Vázquez, 2012, p. 2). Decoloniality and its application to an existing field or discipline is a sticky task, as efforts to bring decolonial approaches into existing regimes of thought and research can work to appropriate the decolonial pursuit and instead undermine the true aims of decoloniality (Mignolo, 2007, 2017; Opara, 2021; Tuck & Wayne Yang, 2021). I hope that by recognizing the critical situatedness and partiality of this research and of myself, I am able to explore how modernity/(de)coloniality can contribute to critical discussions on climate justice in the context of solar geoengineering research and governance, without claiming decoloniality of this research itself. I recognize that through engaging with this topic of SG, one that is highly removed, abstract, global, hypothetical, technological, and inaccessible, I am contributing to a field of research that *talks about* climate justice and climate change without sufficiently engaging its principal place: the lived, embodied experiences and perspectives of those who *live* climate change. As stated importantly by Vázquez (2022):

> "We must not see decolonial thinking or the museum or the university as the edge of the struggle, because it is very clear that the edge of the struggle is with communities and social movements fighting to defend their land, earth-beings, and knowledges in their territories. We are doing our work as companions because we know that the university, the museum, and the state are complicit with that violence." (p. 29)

I hope that this research, in its situatedness and partiality, despite its contradictions and biases, can account for this limitation and adhere to the importance of these lived struggles that are and continue to be decoloniality. This research is not a decolonial effort by any means, but is an attempt, based on my privilege and responsibility from within the institutions that modernity built and that coloniality protects, "to open, widen, intercede in, and act from the decolonial fissures and cracks, and to make cracks within the spaces, places, institutions, and structures of the *inside*" (Walsh, 2018, p. 84). I acknowledge the need for this research to be critically examined by other thinkers from both within the places of modernity and from modernity's 'otherwise' to reveal the ways in which my attempts at making cracks must be reflected upon and either encouraged or criticized.

## 1.7. RESEARCH OUTPUT

Because of the principal limitation of this research in its situatedness and partiality, I claim to offer an accordingly limited and subjective research output. I do not claim to contribute meaningfully to the field

of decoloniality itself, as a theoretical praxis and as a practical theory. Instead, this research hopes only to contribute to the current body of *applications* of a decolonial conceptual and analytical frame, in this case to the critical examination of discourses of climate coloniality. As I seek to uncover the level of enunciation within the colonial matrix of power (a concept introduced in the following section), an endeavor which "is always already a decolonial task and a contribution to the decoloniality of knowledge and being" (Mignolo, 2018, p. 149), I acknowledge the limitations of this endeavor as within a global North framework. As a research output, therefore, I claim only the contribution of my own subjective approach to the application of a decolonial analytical methodology. As asserted by Stein (2019), decolonially-informed analyses of climate change are a field of critical scholarship that are often marginalized within the larger discussion on climate change not simply due to their identification of the modern/colonial system as its root cause but in their exposing and challenging of the ongoing coloniality of climate via Western hegemonization of its discourse and its politics. By lending decolonial principles and analytical frameworks to analyze the current research on SG as a global climate intervention, this research will contribute to the expansion of the critical field of scholarship that normalizes the fundamental connection between climate change and ongoing processes of coloniality. Principally, this research will add to the limited field of studies that critically analyze the discursive field of SG and of large-scale climate intervention more broadly. Importantly, this study will lend a critical perspective to a timely debate about research for the development of SG, a topic expected to gain further scientific-societal relevance in the coming decades.

## 2. THEORETICAL APPROACH

To outline a theoretical approach suitable to facilitating the research objective, I drew on a range of interdisciplinary fields and spaces of thought. While the historical, scientific background of research on SG and its governance were developed via a literature review of the contextual aspects of the SG arena, this section establishes the theoretical background from which the research was critically oriented – an approach combining an interpretation and application of the decolonial theoretical praxis and concepts of climate governance, critical climate justice, political ecology and ecofeminism. In constructing such a theoretical approach, this section seeks to justify and clarify the selected application of the decolonial analytical frame to the investigation of the scientific discourse on SG and its governance and illustrate how such a theoretical approach can answer the following research sub-question:

> *SQ2. What narratives of modernity are common in discourses on global climate change governance and how would the presence of these narratives in the scientific discourse on SG indicate the dominance of certain imaginaries?*

First, I elaborate on the critical perspective framework within which the theoretical approach is based. Next, I present a (rudimentary) overview of decolonial theoretical praxis/practical theory, within which the central concepts belonging to decolonial thought are interpreted. Next, I present the conceptual framework by which I organize the central theoretical concepts, followed by the theoretical delineation of twelve narratives that are inductively developed via the literature review and that are part of the analytical framework of the research – to be introduced in *Section 3.4*.

## 2.1. NOT A CRITICAL GOVERNANCE PERSPECTIVE

This research is produced within the institutional walls of the Earth System Governance Project and the intellectual domain of earth system governance research which "explores political solutions and novel, more effective governance mechanisms to cope with the current transitions in the biogeochemical systems of the planet" (Burch et al., 2019, p. 2). The earth system governance research framework advances the recognition of a plurality of worldviews that in the face of complex earth system changes requires a constellation of four powerful contextual conditions within which such research takes place and five sets of interrelated research lenses that are engaged within these intersecting contexts (Burch et al., 2019), as seen in *Figure 2* below.
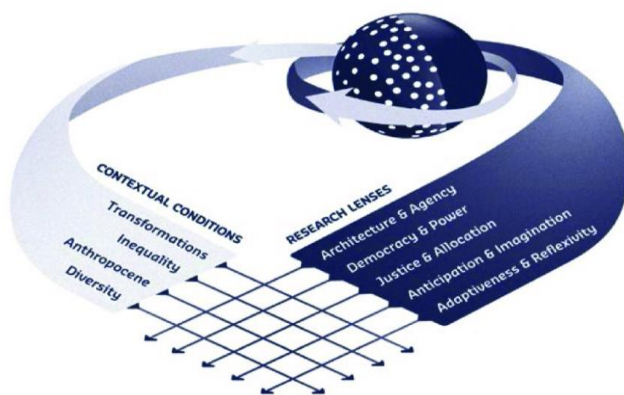


*Figure 2.* The Earth System Governance research framework including intersecting contextual conditions and research lenses, from Burch et al. (2019)

Within the contextual condition of inequality, relevant research acknowledges inequality as a theoretical concept with direct contextual implications on the research itself, and when intersected with the research lenses of justice and allocation can enable a myriad of scientific developments related to concepts of justice within topics of earth system transformation and climate change. Within the earth system governance research framework, the justice and allocation research lens can be approached through several types of research, where that done 'critically' is that which investigates "who is deciding, shaping, and benefitting from certain transformations and why" (Burch et al., 2019, p. 3). Within this intersecting domain can be located the fields of political ecology, ecofeminism, and climate justice – three fields

whose concepts and approaches are central to the theoretical framework established in this section. The theoretical conviction common to all three fields is the socio-political link behind 'ecological' problems, emphasizing the socio-political construction of such problems themselves.

For political ecology, ecological problems cannot be separated from the disempowerment and dispossession of people pushed into political, socio-ecological marginal spaces, the privileging of certain forms of knowledge over others, the construction of (gendered and racialized) identities, and the systemic power dynamics that are intrinsically linked to and drivers of environmental struggles and whose historical acknowledgment of and reparation for must be of critical focus. In line with political ecology and in the context of climate change, critical climate justice acknowledges a similar focus that thus "demands systemic changes to address structural inequalities and destabilize power systems that produce various climate injustices" (Sultana, 2022a, p. 119). Critically, ecofeminist theory similarly connects the oppression of the earth to the gendering of marginalized 'Others' and nature, identifying the common oppressor as the prevailing economic and globalization structures that service a patriarchal domination of the world (Mies & Shiva, 1993; Plumwood, 1993; Salleh, 1997). Importantly, each of these three theoretical spaces can be extended to the task of a decolonial ecology, a decolonial climate justice, and a decolonial feminism, enabling more targeted investigation of the systemic power dynamics within knowledge production behind ecological problems as protectors of the hierarchical logic that is central to modern, colonial, capitalist thinking (Lugones, 2010). Ferdinand (2021) identified the limitations of the political ecology, climate justice, and ecofeminist fields alone, in that each fails to address "modernity's colonial and environmental double fracture" (Ferdinand, 2021, p. 6). This double fracture he identified as "the thick wall" (Ferdinand, 2021, p. 8) between the environmental fracture and the colonial fracture, two fractures that are intrinsically linked and in the other mentioned domains are largely held as separate. In Ferdinand's observation of critical approaches to matters of environment and social justice:

> "One either questions the environmental fracture on the condition that the silence of modernity's colonial fracture, its misogynistic slavery, and its racisms are maintained, or one deconstructs the colonial fracture on the condition that its ecological issues are abandoned. Yet, by leaving aside the colonial question, ecologists and green activists overlook the fact that both historical colonization and contemporary structural racism are at the center of destructive ways of inhabiting the Earth." (Ferdinand, 2021, p. 11)

This double fracture allows for a one-sided treatment and analysis of the current moment of 'earth system transformation' – extinction, biodiversity loss, climate change – without a double critique of the societal systems and forces that are their perpetrators. Importantly Ferdinand (2021) asserted "the urgency of the struggle against both global warming and the pollution of the Earth is intertwined with the urgency of political, epistemic, scientific, legal, and philosophical struggles to dismantle the colonial structures of living together and the ways of inhabiting the Earth that still maintain the domination of racialized people, particularly women, in modernity's hold" (p. 14). In his epic depiction of a decolonial ecology

by which racial and colonial issues are included in the critical analysis of environmental destruction, Ferdinand defined the need to move beyond these theoretical boundaries, and for this reason, these three fields act as the theoretical foundation upon which I extend my analysis to include elements of the decolonial theoretical praxis/practical theory. Though within the theoretical boundaries currently defined and categorized by the earth system governance research framework one can locate the fields of political ecology, ecofeminism, and climate justice, I assert the limited applicability of such a framework for categorizing this research and for categorizing a decolonial development of the three fields. Importantly, as I seek in this research a decolonially-informed theoretical framework, I reject the idea that the decolonial lens be envisioned as a critically oriented research lens. Decoloniality is not a critical research perspective. While the following sections elaborate on a theoretical framework derived from the literature on political ecology, ecofeminism, and climate justice, I claim here a limited interpretation of this research as the application of a decolonial theoretical praxis *must not* be interpreted as part of a critical research approach. I do not attempt to 'apply,' 'use,' or 'ascribe' a decolonial ecology, a decolonial feminism, or decoloniality in general. Instead, I encourage the reader to reject any interpretation of the theoretical approach taken here as part of a critical research perspective, and in turn reject the notion of this research as contributing to earth system governance.

## 2.2. DECOLONIAL THEORETICAL PRAXIS/PRACTICAL THEORY

To attempt in my research a theoretical approach that combines the critical perspectives of political ecology, ecofeminism, and climate justice with aspects of the domain of decolonial thinking, an interpretation of decoloniality itself and its central ideas were necessary. However, before this could be done, I preface the spaces and places from where I derive my knowledge on decoloniality and the current landscape of thought that informs my personal elaboration on its concepts as part of an important, complex, sensitive, situated, *political* praxis. Decoloniality as a theoretical praxis and practical theory informs the central conceptual approach within this research, however, most importantly, decoloniality is not a *theory* – it is a lived, continuous struggle that "attends to the lived concerns of dignity, life, and the survival of the planet" (Walsh & Mignolo, 2018). As coloniality refers to the long-term power dynamics that emerged from colonialism as both direct and indirect processes of subjugation located in the global expansion of a European cultural worldview, "de-coloniality, then, means working toward a vision of human life that is not dependent upon or structured by the forced imposition of one ideal of society over those that differ" (Mignolo, 2007, p. 459). For teachers Walsh and Mignolo, theory and praxis are not separate, and instead are rooted in and flow to each other. Decoloniality as a theoretical praxis is entangled with and constructed through the living of the colonial difference and the struggle of resurgence and insurgence that interrupts the modern/colonial and that theorizes praxis for the decolonial 'otherwise' (Walsh & Mignolo, 2018). Thus, decoloniality as practical theory requires the reexamination of longstanding 'epistemologies of mastery,' (de Sousa Santos, 2015) emancipating the colonial world order

by recalling and re-existing those ways and beings that theorize decoloniality as praxis. While decoloniality is not a theory, theorizing helps (MLDSS). Decolonial theoretical analyses challenge historical Eurocentric narratives and urgently call for the contextual consideration of colonial histories rooted in the emergence of the modern world (Bhambra, 2014). The call of a decolonial practical theory for the active, epistemic repositioning of the modern/colonial subject has been identified as the 'decolonial turn,' as authors in numerous fields and disciplines seek a way of knowing beyond the dominating context of modernity/coloniality (Maldonado-Torres, 2016).



*Image 1.* Mis manos son mi corazón, by Gabriel Orozco (1991)

The efforts of thinkers who have cultivated the writings, beings, and teachings that have come to define and illustrate the decolonial struggle have together been termed the "collective modernity/coloniality/decoloniality" – thinkers who appear frequently in my research. However, these same thinkers assert critically that decoloniality "is not a new paradigm or mode of critical thought. It is a way, option, standpoint, analytic, project, practice, and praxis" (Walsh & Mignolo, 2018, p. 5). It "is not an academic discipline, which doesn't mean that it cannot be enacted in the academy" (Mignolo, 2018, p. 106). They denounce the confining of the pluriversal struggle of decoloniality to one group, 'belonging' to some and not to others, warning that "a danger is the commodification of decoloniality as the property of a group of individuals… and as a canon of sorts" (Walsh, 2018, p. 82). So, while I acknowledge this 'collective' as the principal source of my interpretations on the decolonial praxis, I derive a decolonial practical theory that is only one possible interpretation. My participation in the 2023 María Lugones Decolonial Summer School (MLDSS), 'Recalling Earth: Decoloniality and Demodernity', is one of the major sources of my interpretation of and grappling with these concepts. There is no one decoloniality,

and while it is impossible to 'apply' decoloniality as a theory alone, I hope to avoid this here, even though I have already adulterated it from its important situated context as a way that does not belong to modernity. I encourage the reader to remind themself that while the theoretical and conceptual aspects of decolonial thought are interpreted, decoloniality as a theoretical praxis rejects its own contribution or proposition of "new abstract universals" (Walsh, 2018, p. 1), and instead, what is presented in this research is my own interpretation of a decoloniality which must be seen in relationality. I do not claim a decolonial theoretical framework, I only claim to recognize (from afar) decoloniality's central sentiment, struggle, and vision to guide my theoretical approach from a place of stirring with, sitting with, and grappling with – not knowing in my own heart – the political struggle that is exposing modernity/coloniality and re-existing its 'otherwise'.

## 2.3. CONCEPTS FOR A DECOLONIAL PRACTICAL THEORY

This section presents my interpretation of the central ideas and concepts of decoloniality – an interpretation that provides a theoretical structure upon which this research extends analysis into the specific arena of SG and climate coloniality. The inclusion of concepts to be included in and guide this research, while helpful, is highly limited by its positionality, as those conceptual logics within a decolonial practical theory do not seek to describe universal designs or notions, and on the contrary, "all theories and conceptual frames… can aim at and describe the global but cannot be other than local" (Walsh & Mignolo, 2018, p. 2). While I necessarily attribute the following conceptual interpretations to the interpretations of those authors and thinkers to whom I owe my personal journey of understanding and grappling with the concepts of decolonial thought, I assert that these concepts are certainly part of a plurality of meaning, and I invite reflection on their numerous implications for different groups of people and contexts, including in particular the context of this research as situated within and from modernity's side of the colonial difference.

### The global South

The global South does *not* refer to a conglomerate of countries, often conceived of as a set of 'under-developed' or emerging economies belonging to the Southern hemisphere – an enunciation of the term belonging to the global North (Mignolo, 2011c). I preclude this Northern conceptualization of the global South as a geographic part of the world, a conceptualization that perpetuates misrecognition and reinforces 'othering.' Instead, I implicate the Southern enunciation of the term: "the epistemic global futures that are being forged by delinking from the colonial" (Mignolo, 2011, p. 184). This enunciation invokes "the Souths of the world" (Walsh, 2018, p. 24) including the South in the South and the South in the North as the areas of the *world* – not the *globe* – that have endured coloniality and have born the colonial wound as past and present and future, and "from that experience the spiritual and decolonial options are contributing to build a non-imperialist and non-capitalist world" (Mignolo, 2011, p. 185). In

these Souths one locates the struggle for global justice, as these civilizations are the location of unlearning and relearning and the only place from which the decolonial turn can envision "how to turn the dominant civilization of death towards a civilization of life" (Mignolo, 2011, p. 185).

In referring to the Southern enunciation of the global South, I do not implicate the "colonial fracture (that) separates humans and the geographical spaces of the Earth between European colonizers and non-European colonized peoples, between Whites and non-Whites, between the masters and the enslaved, between the metropole and the colonies, between the Global North and the Global South" (Ferdinand, 2021, p. 6). Critically as well, while the global South can be in the North, the global North can conversely be in the South (Mignolo, 2011c), and thus an enunciation of global North necessitates more than a geopolitical understanding of the globe as fractured by North-South and instead the understanding of global Norths as those locations in which the dominant epistemologies and ontologies of Western modernity are preserved and adhered to (examined further as the concept of a Western imaginary). Instead of implying the North-South divide, I implicate the global South as those identities and locations both in the North and in the South within which the cultures of solidarity and of 'otherwise' were always existing but that through coloniality have been fractured to the dominant cultures of destruction (Escobar, 2004b). The global South is thus the epistemologies and ontologies of difference, described as "the wind of the South" by Kumar (2010) "as civilizations,···as voices and movements,···as visions and wisdoms,···as the discovering of new paradigms, which challenge the existing theoretical concepts and categories breaking the mind constructs,···as the discovery of other cosmologies···other knowledges that have been hidden, submerged, silenced" (p. xii). The global South is a political imaginary, necessitating a fundamental recognition of those realities that are not always 'outside of' but always in relation to the modern/colonial order of the West, demanding reconsideration of the positionality of our fundamental local and global relationalities.

### modernity/coloniality

In referring to the global South as the spaces of epistemic disobedience against the dominant orders of a global European hegemony, the two indivisible flows of modernity and coloniality come into play. Modernity/coloniality is the compound concept fundamental to decolonial theory as the central thesis of decoloniality: that there is no modernity without coloniality, and that coloniality is constitutive of modernity thus. Introduced first by Quijano (1992) in *Colonialidad y modernidad/racionalidad*, the concept of modernity/coloniality identifies the necessary detachment from the hegemonic, Eurocentric matrix of power and the knowledge that is asserted in the name of modernity. The concept forms the basis of the epistemic struggle that is decoloniality, one that aims to confront long-standing linear thinking and de-link from dominant paradigms by emphasizing the positionality of all things in relation to the colonial matrix of power (Mignolo, 2011b). Only by understanding modernity/coloniality as constitutive (coloniality of modernity) and inseparable can their aspects be conceived:

"...we write 'modernity/(de)coloniality' and we understand this to be a single concept not three different ones. If you are used to the relations between 'words and things,' you may have difficulties understanding to what 'thing' these three words, united and separated by the slash '/' and the brackets '(),' may represent. They do not in fact 'represent' anything. They are a signpost of conflicting enunciations: the rhetoric of 'modernity,' and its continuing promises of salvation; and the logic of 'coloniality,' the continuing hidden process of expropriation, exploitation, pollution, and corruption that underlies the narrative of modernity…" (Mignolo & Vázquez, 2013, p. 1)

As a single concept in flux, in our own positionality and historical entanglements we are each located somewhere along the concept 'modernity/coloniality', with some knowing only from the side of modernity and others knowing only from the side of coloniality (MLDSS). Modernity in decolonial literature and in this research refers *not* to "an ontic historical period of universal history," but instead "a self-fashioned idea created by the assembly of European institutions and narratives (arguments, images) managed by actors that run the institutions and format the narratives" (Mignolo, 2023, p. 73). Modernity as an idea became conceived between the Renaissance and the Enlightenment with the appropriation of history, locating Europe as the point of global reference, the point of the 'present', the point of reality (Mignolo, 2011, p. xiv). As not a historical period in time but an idea universalized, mutated, and sold to the world, modernity must not be seen as a linear moment of human existence on the planet. Modernity thus refers to the *idea* held, normalized, and universalized by one subset of the human species that "made it possible to create the belief that the present was the point of arrival of the imagined universal history" (Mignolo, 2011, p. xiv). The constitution of modernity is the disavowal of everything outside of modernity and the imposition of one reality by one minor subset onto the rest, and thus the beginning of the colonial matrix of power (CMP).

To conceive of modernity as an idea advanced and imposed as universal reveals the CMP and the concept of coloniality (coloniality of power): "This Man/Human who created and managed the CMP, posited himself as master of the universe and succeeded in setting himself apart from other men/humans (racism), from women/humans (sexism), from nature (humanism), from non-Europe (Eurocentrism), and from 'past' and 'traditional' civilizations (modernity)" (Mignolo, 2018, p. 163). The subset of Man/Human who universalized modernity thus entrenched coloniality, for any narrative – 'rhetoric of modernity' – and action legitimizing itself via such rhetoric – 'logic of coloniality' – requires an assemblage of stories and deeds that hide the colonial difference (Mignolo, 2018). According to this conception of modernity/coloniality, this research seeks to understand coloniality as the matrix of power that takes hidden forms by which "a minority of the human species rules the life of the majority of the human species" (Mignolo, 2018, p. 114). So, while colonialism encompasses the material, physical, economic, geopolitical domination by European imperialism, "coloniality illuminated the cultural aspects and, of course, the epistemic and hermeneutical principles upon which Western religions, science, and philosophy were built" (Mignolo, 2018, p. 167). Thus, the coloniality of power as constitutive of

modernity by which the European reality was and is imposed on the total world order invokes an investigation of what this European reality holds.

### *Western imaginary*

Eurocentrism refers to the processes of globalization that asserted Europe as the enabler of the modern world under which the experiences, histories, resources, and cultures of the non-European world were misrecognized and centered around a European hegemony (Quijano, 2000). Thus, Eurocentrism is the hegemonic structure of knowledge and beliefs claimed and asserted as universal and that belong to the European worldview and imaginary. The global expansion of a European cultural worldview as universal (coloniality of power) was and is a strategy of modernity and the function of Europe's hegemonic role in the production of knowledge. Important here is the process of the forming of Europe as the interior through its expansion of its cosmology – Christianity – beyond 'Europe', "beyond the Mediterranean", to its exteriority (Mignolo, 2009, p. 22). Central to this understanding is the reality that "stripped of its pretended universality, Europe's cosmology would be one of many cosmologies, no longer the one that subsumes and regulates all the others" (Mignolo, 2018a, p. x). Critically, the modern dynamic of colonial power was formed via the coming together of the historical processes of social classification of the world's population based on the new idea of race, and proliferation of a new structure of labor and its control (Quijano, 2000), processes enabled by the expansion of a European cosmology and its indissociable project of capitalism. Eurocentrism led critically into the emergence of the colonial horizon of the Americas, a relationship critical to understanding the formation of 'the West' and the imaginary of the modern world:

> "The fact is that Latin America today, in the new world order, is a product of the originary colonial difference and its re-articulation over the imperial difference that gestated from the seventeenth century in Northern Europe and was constituted in the emergence of a neo-colonial country like the United States." (Mignolo, 2009, p. 47)

With the advent of Western civilization in the expansion of Europe's interior and new 'internal exteriors' (Mignolo, 2009), Europe as West became the managing force of knowledge-making, deriving two frames for modernity – theology and science – that work "to disqualify forms of knowledge beyond these two⋯ frames" (Mignolo, 2011, p. 125). Thus, modernity was/is the endeavor by which a particular system of knowledge, referred to by Mignolo as 'the Western code', "serves not all humanity, but only a small portion of it that benefits from the belief that in terms of epistemology there is only one game in town" (Mignolo, 2011, p. xii). Thus, while European thinking is contained within Western civilizations, Western thinking is not similarly contained within European civilizations. Similar to the enunciation of the global South, the concept of 'the West' does not refer to a regional west as an area geographically delineated within which only Western actors advance only Western ideals. Instead, this research refers to the decolonial theoretical enunciation of 'the West' that borrows from Subaltern studies, which acknowledges "an imaginary though powerful entity created by a historical process that authorized it as the home of

Reason, Progress, and Modernity" (Prakash, 1994, p. 1485). Importantly, thus, while modernity is not necessarily a Western phenomenon exclusively, it becomes Western in its constitution as related to "a non-European alterity" (Mignolo, 2007, p. 457). According to Mignolo (2011), "modernity—the Trojan horse of Western cosmology—is a successful fiction that carries in it the seed of the Western pretense to universality" (p. 125). It is critical to understand the workings of the Western imaginary from which modernity originated as European and how the CMP universalized this modernity, rendering a conception of reality "embedded and living in a Western imaginary" (Mignolo, 2018, p. 147).

What becomes critical to understand is the notion of the Western imaginary as that fundamental self-conception of the West which extended from a European cosmology and through its universalization as the point of arrival of civilization in relation to the non-European world, is maintained as the global system. The concept of a Western imaginary is constructed in its position in relation to the non-European world, as "the modern world system is only conceived from its own imaginary, and not from the conflictive imaginary that rises up with and from the colonial difference" (Mignolo, 2009, p. 22). In this sense, a Western imaginary is Western modernity's framework of knowing and understanding itself: the symbolic world via which it defines itself and also by which it ascribes itself geopolitical meaning (Mignolo, 2023). By understanding modernity/coloniality as an endeavor of a Western system of knowledge ('the Western code') to universalize its own imaginary, the concept of knowledge as a mechanism by which the CMP was enacted and sustains itself becomes of critical importance.

### Knowledge & narratives

The preceding sections have outlined the coloniality of power as a forced total control of culture and subjectivity by a European world order, most importantly in the production of knowledge. Critical scholarship from a wide range of disciplines addresses the power and knowledge nexus, sharing a fundamental recognition that "He who has the privilege of naming and implanting His naming is able to manage knowledge, understanding, and subjectivity" (Mignolo, 2018, p. 139). The Western imaginary is that framework of knowing and understanding as the derivative total of Western cosmologies, epistemologies, and ontologies, where ontologies are the "cosmologic/epistemic creations (storytelling about the creation of the world (cosmologies) and principles of knowing within a given cosmology (epistemology)" (Mignolo, 2018, p. 135). If a Western imaginary is those ways of being and knowing via which the West comes to know itself and the world, the very foundation of a Western epistemology and ontology must be questioned. Critical is the recognition that the dominant Western system of science and knowledge has not been the liberating force of human progress that it so claims to be, and instead has only served to preserve by universalizing the imaginary of Western civilization and thus the dominant form in which the CMP extends itself. For decolonial thinkers, "modernity/coloniality is above all a question of knowing and knowledge" (Mignolo, 2018, p. 175), as it is through knowledge that beings and relations are perceived and constructed. Western modernity created and universalized its own preferred set of methods of knowing and interpreting the world, advancing knowledge not as a reflection of the

world as it is but as how the Western imaginary and its projects perceive it.

Stemming from the concept of a Western imaginary, decolonial theory emphasizes the role of knowledge in enabling the hegemony of this imaginary, as "one of the main assumptions guiding the actions of European Man/Human in the New World was the universality of his knowledge and his belief" (Mignolo, 2018, p. 175). Knowledge as a force by which modernity/coloniality operates leads to the endeavor of identifying and exposing its different forms, its drivers, actors, languages, and institutions. For decolonial theorists, "knowledge has a privileged position: it occupies the level of the enunciated, where the content of the conversation is established, and it occupies the level of enunciation, which regulates the terms of the conversation" (Mignolo, 2018, p. 144). Thus, knowledge as power is both so in terms of content and in context. The concept of knowledge in this research refers to the power by which "epistemic demarcations in the production of knowledge of societies that have been colonizing or colonized and the power that this provides in the apprehension of knowledge and deconstruction of reality particularized and mediated by it" (Passada, 2019, p. 1). As coloniality was and is perpetuated as a strategy of preserving modernity, the enunciation of modernity as a particular rhetoric by its Western actors enacts and transforms existing knowledge systems in new and ongoing ways (Mignolo, 2018, p. 175). This brings about the fundamental role of knowledge in the workings of modernity/coloniality:

> "The intellectual conceptualization of the process of modernity produced a perspective of
> knowledge and a mode of producing knowledge that gives a very tight account of the character
> of the global model of power: colonial/modern, capitalist, and Eurocentered." (Quijano, 2000, p.
> 549)

According to Mignolo (2018), "modernity names a set of diverse but coherent narratives" derived from a Western Christian version of humanity "complemented by secular de-Goding narratives of science, economic progress, political democracy, and lately globalization" (p. 139). Similarly, Shiva (1996) asserted that the dominant theory of knowledge is one that sees modern scientific knowledge and economic development as sacred. Walsh attaches to this totality "the difference imposed through a hierarchical classification based on the ideas of race, anthropocentrism, heteronormativity, and gender" (Walsh, 2018, p. 25). To conceive of modernity/coloniality as a process of control over knowledge, one recognizes those familiar, dominant Western accounts of the world and of itself as those narratives that produce and protect knowledge and its systems as universal. If narratives are a set of rhetorical discourses "aimed at persuading you that the world is as the field of representation tells you it is," then the narratives of modernity are those that are produced "in order to advance its overall project, hiding, destroying, demonizing, and disavowing whatever gets in its way" (Mignolo, book, p. 142). Importantly, the narratives sustaining a Western imaginary "make us believe that ontology is represented by epistemology," when in fact, "it is epistemology that institutes ontology" (Mignolo, 2018, p. 147), and thus the creation of ontological domains by Western modernity is all about control of epistemology – control over knowledge. As knowledge is power and is the principal mechanism by which Western

modernity preserves its universality, the normalization of narratives of modernity work to generate inequalities and domination in not only the production and function of a Western imaginary, but in the legitimization of what counts as knowledge, bringing about Foucault's (1972) notion of 'subjugated knowledges' and what the re-emergence of those knowledges and those imaginaries disqualified in modernity/coloniality implies as decoloniality.

### *Decoloniality*

If modernity/coloniality is above all a question of knowledge, so too is decoloniality. Building on Quijano, Mignolo (2018) asserted that "decoloniality is first and foremost liberation of knowledge" (p. 146). Fundamentally, decoloniality is not a concept, it is not an emergent strategy or theoretical application, it is the ongoing struggle to understand the formation and transformation of the CMP – "toward decoloniality's otherwise" (Walsh, 2018, p. 29). In simpler terms, "the end of modernity would imply the end of coloniality, and, therefore, decoloniality would no longer be an issue. This is the ultimate decolonial horizon" (Walsh & Mignolo, 2018, p. 4). But modernity/coloniality lives on. And what emerges is not a struggle to negate or oppose modernity/coloniality and its narratives, but to unlearn its narratives and promises, and thus, the process of re-existence:

> "'Decoloniality' appears in between modernity/coloniality as an opening, as a possibility of overcoming their completeness. Decoloniality refers to the variegated enunciations springing from global-local histories entangled with the local imperial history of Euro-American modernity, postmodernity, and altermodernity." (Mignolo & Vázquez, 2013, p. 1)

Decoloniality as the infinite and varied struggles for re-existence is a process that moves in two simultaneous directions: the analytic and the programmatic (Mignolo, 2007). The focus of decoloniality on knowledge points to the epistemological strategies of those who control knowledge and its systems as disguising colonial differences as cultural differences, and thus a task of decoloniality must be to expose this coloniality of knowledge (Mignolo, 2007). To decolonize knowledge is to question the very foundation of Western epistemology, making up the analytic of coloniality that enables in one direction the decolonial struggle. According to Mignolo & Vázquez (2013), the decolonial analytical frame offers as a methodology three interconnected moments of analysis on dominant concepts and ideas by which the analytic of decoloniality can travel:

> "1) To show their genealogy in western modernity that allows us to transform the universal validity claims of western concepts and turn them into concepts historically situated; 2) To show their coloniality, that is how they have functioned to erase, silence, denigrate other ways of understanding and relating to the world; and finally 3) To build on this grounds the decolonial option, as a non-normative space, as a space open to the plurality of alternatives. These three steps are in my view, the three moments of what we can call a decolonial method." (pp. 8-9)

For decolonial scholars, 'epistemological decolonization' is one of the principal sites for decolonial

struggle, as the pretension of universality by one Western imaginary can and must be unlearned and denaturalized (Mignolo, 2011a). Decoloniality is thus first the naming and originating of Western concepts, thus situating them, removing them of their universality. By revealing the historical situatedness of dominant concepts, whole conceptual fields that totalize a Western imaginary can be denaturalized, making up the analytic direction of decoloniality (Mignolo, 2007). By first identifying modernity and second revealing coloniality, decoloniality as analytic seeks to change both the content and the terms of the conversation. Exposing the universal irrationality of a Western imaginary is to reveal the coloniality of knowledge in the disguised erasure of Southern epistemologies and the global 'ecology of knowledges' that have existed and exist (de Sousa Santos, 2015). Revealing the logic of coloniality masked by the rhetoric of modernity enables the third critical moment of the decolonial analytical frame and the simultaneous programmatic direction of the decolonial struggle: de-linking.

Exposing the unchallenging, universal rhetoric of modernity/coloniality is the continuous struggle toward a vision of life unstructured by the imposition of a Western imaginary over the rest. By identifying the situatedness, singularity, and thus the limitations of Western knowledge, the programmatic of decoloniality as de-linking from the logic of coloniality and the CMP becomes visible. First unlearning and second de-linking from the logic of coloniality locates the true multiplicity of 'exteriorities' to modernity and thus the plurality of worlds and ways of being and knowing that have always existed – moving from the universe to the pluriverse (MLDSS). Critically, the programmatic of decoloniality does not seek to offer a canon, a set of answers or designs by which modernity/coloniality can be overcome, "but rather to allow for the recognition of the plurality of ways to relate to the world of the sensible that have been silenced" (Mignolo & Vázquez, 2013, p. 8). The analytic of coloniality liberates a pluriversal humanity, one in which border epistemology and border thinking – *cruzando fronteras* – thinking from the border places of modernity/coloniality, offers strategies for de-linking. Decolonial or de-Western border thinking "locates destituted actors in the borderlands and in the borderlines between the constitution of local Western global designs (rhetoric of modernity) and the destitution of local non-Western praxis of living and thinking (logic of coloniality)" (Mignolo, 2007, pp. 454-455). In this sense, the analytic and programmatic of decoloniality, theory and praxis, converge and flow to each other as a de-linking and a re-existing:

> "···decoloniality is a perspective, stance, and proposition of thought, analysis, sensing, making, doing, feeling, and being that is actional, praxistical, and continuing. Moreover, it is prospectively relational in that it looks, thinks, and acts with the present-future-past, including with the peoples, subjects, and situated and embodied knowledges, territories, and struggles that push toward, advance, and open possibilities of an otherwise." (Walsh, 2018, p. 100)

The notion of decoloniality as re-existence, as a collective resurgence, as "renewal, restoration, revival or a continuing after interruption – of knowledges, life practices, and re-existences" (Walsh, 2018, p. 18), converges as the unlearning of modernity's rhetoric and the dismantling of coloniality's logic, recalling

plurality and thus making possible global futures of 'otherwise'. Importantly, unlearning the epistemic singularity of Western modernity and delinking from its logic of coloniality reveals and restores the epistemic force of local histories and the praxis of subaltern groups that live decoloniality not as theory but as praxis, for "decoloniality starts from other sources" (Mignolo, 2007, p. 452). The project of decoloniality *has always existed* as the lived embodiment of the colonial difference by those people, groups, identities, knowledges, and imaginaries in whom the 'otherwise' exists. The programmatic of decoloniality is thus to think with the always existing configurations of ways, beings, and knowings 'otherwise,' to re-exist in this multiplicity, to think with those living the decolonial insurgency: the political, epistemic, and existence-based revival, "from the ground up and from the margins, other imaginaries, visions, knowledges, modes of thought, other ways of being, becoming, and living in relation" (Walsh, 2018, p. 34).

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**2.4.** CONCEPTUAL FRAMEWORK

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The central concepts for a decolonial theoretical praxis interpreted in the previous section make up the conceptual foundation from which this research derived a critical understanding of the particular forms modernity/coloniality take in the context of climate change as climate coloniality. As knowledge is one of the key forces by which power dynamics are perpetuated along the CMP, the role of knowledge production in the governance of climate change and the universalization of Western enunciations of and control over knowledge is critical. As Western modernity advances a set of diverse but coherent narratives, the rhetoric that hides coloniality can be revealed as that which totalizes and universalizes these narratives. Most fundamentally, "power matrices of control are exerted over narratives on climate change" (Sultana, 2022, p. 1). Narratives, defined as narrations of "sequence(s) of events, experiences, or actions with a plot that ties together different parts into a meaningful whole" (Feldman, 2004, p. 148), appear in the context of climate change governance as generative mechanisms by which the coloniality of knowledge is entrenched. If discourses are those practices that constitute and determine social relations within a specific framework of meaning, narratives are those generative subjectivities within larger discourses (Bettini, 2013). In the context of knowledge production on climate change, the following conceptual framework was established:
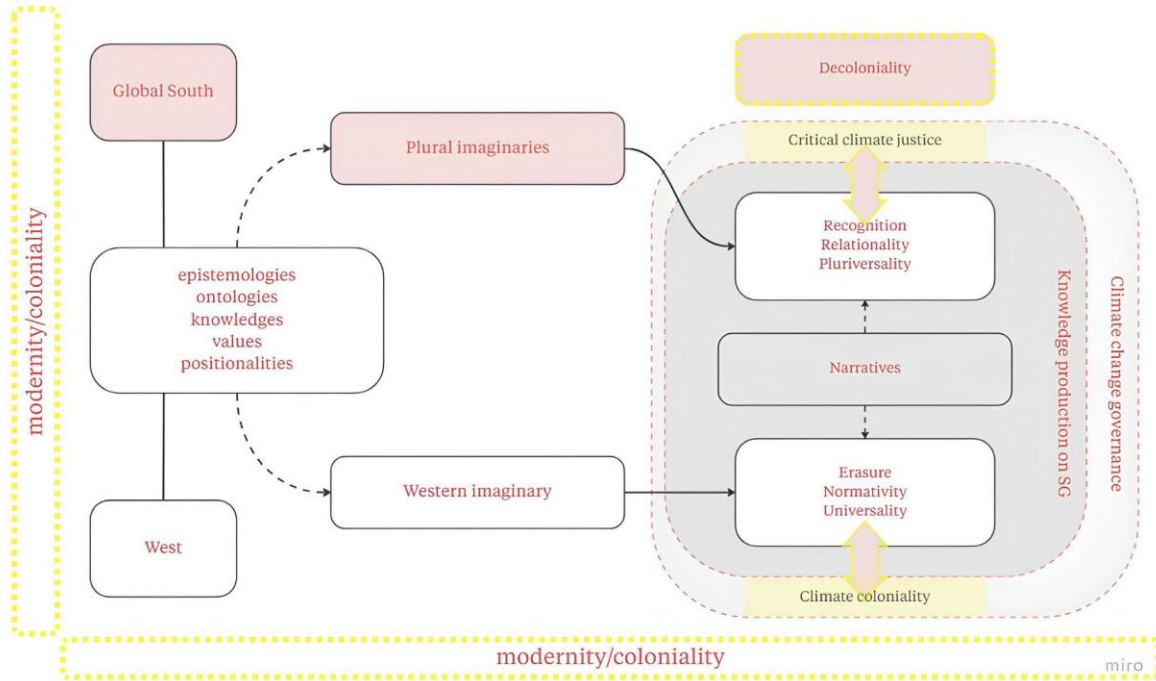
Figure 3. Conceptual framework for the potential embedding of a Western imaginary in climate governance

The proposed conceptual framework shown in *Figure 3* depicts the (interpreted) relationship between a Western imaginary with respect to the context of SG as within the climate governance regime more broadly, and thus as a function of climate coloniality. As seen in *Figure 3*, the non-tangible boundary of modernity/coloniality works to entrench the universalization of its knowledge through the use of narratives (within discourses) that align with a Western imaginary. Further, the relationship between the production of knowledge and the decolonial moment is shown only in connection with the concepts of recognition and relationality, through which critical climate justice is located.

## 2.5. NARRATIVES OF MODERNITY

Drawing on the proposed conceptual framework within which the decolonial analytical frame is positioned in relation to knowledge production on climate change governance and on SG in particular, the subject matter of the narratives arises. To answer the correlated research sub-question and determine what narratives of modernity within knowledge production on climate change would indicate the universality of a Western imaginary within discourses on SG, I first had to determine what narratives are most relevant. Drawing on the literature that informed the contextual and conceptual frameworks, I present twelve narratives that I discerned as entrenching a Western imaginary regarding either the problem, ethos, modes, or subjects of climate change governance – a categorization to be explained in the analytical framework in *Section 3.4*. The narratives were inductively derived from the literature review

process and further formulated based on knowledge gained from the MLDSS. Discerning these twelve narratives as those most common and most generative of a Western imaginary based on literature from climate justice, climate governance, political ecology, and ecofeminism, I transport these narratives to the analytical context of SG: I assert that each narrative derived in this section is independently indicative of a Western imaginary relevant for the discourse on climate change and therefore for knowledge production on SG and its governance. This section outlines the twelve narratives, explaining for each its theoretical origins, important contextual considerations, its functions concerning modernity/coloniality as connected to a Western imaginary, and its (speculated) relevance for the scientific discourse on SG. This is by no means a complete list, and while the application of some of these narratives to the context of SG is more developed in precedent, this is less explicit for others. In deriving them inductively, I hypothesize these twelve narratives as those most relevant for the context of this research, leaving a critical gap for future exploration of other narratives not included in this research.

### *The nature/humanity narrative*

The first narrative I identify is the fundamental separation between 'nature' and 'humanity'. The "fictional ontology of nature" (Mignolo, 2018, p. 159) is one of the central dualisms marking the proliferation of a global Western imaginary, its fictional ontology being the creation of the concept 'nature' in small letters, the primary result of modernity's 'great divide' (Ferdinand, 2021). No other cosmology makes a similar distinction between what is natural and what is cultural, and therefore 'nature' is a word only of the colonizers (MLDSS). Extending from a Western cosmology, the Western Man/Human invented the concept of 'nature' as a separate entity from humanity "to separate their bodies from all living (and the very life-energy of the biosphere) organisms on the planet" (Mignolo, 2018, p. 154). Western cosmology and its acceleration of rationality during the Enlightenment and the Industrial Revolution saw the invention of 'nature' as separate, and so began the universalization of the degradation of life (Mignolo, 2018). This moment of fracture between culture and nature saw the creation of a superiority and an inferiority, where those on the 'superior' side can be represented as reason, and those on the underside can be represented as 'nature' (Plumwood, 2001). According to feminist theory, this fracture of nature is central to the imaginary unique to "the dominant, white, male Eurocentric ruling class" as "a way of dividing up the world that puts an omnipotent subject at the center and constructs marginal Others as sets of negative qualities" (Hartsock, 1987, p. 192). Thus, contemporary Western conceptions of nature all derive from this dichotomy between humanity and 'nature', and further between Western man and its 'Others,' between man and woman, and between reason and emotion (Shiva, 1996).

The nature/humanity dualism is examined in many different fields as the falsely universalized separation of humanity from the planet, one that usually begets attitudes of extraction, dominion, and mastery of humanity over earth and its ecosystems. According to Shiva (1996), with this central fracture "it removed all ethical and cognitive constraints against its violation and exploitation" (p. 266). The nature/humanity

dichotomy thus not only perpetuates this ontological fracture, but problematically enables the attitude of domination towards the natural world:

> "Coloniality wrapped up 'nature' and 'natural resources' in a complex system of Western cosmology, structured theologically and secularly; it also manufactured an epistemological system that legitimized its uses of 'nature' to generate massive quantities of 'produce,' first, and massive quantities of 'natural resources' after the Industrial Revolution." (Mignolo, 2011, p. 13)

The Western imaginary's invention of 'nature' and its subsequent likening to resources, wealth, and materials was a critical starting point of CMP and normalized fracture of society from earth that enabled the centuries of environmental degradation and death that have culminated in the current moment of climate change, biodiversity loss, mass extinction of species, and extreme global inequality. With the nature/humanity fracture, 'nature' became an "objectified, neutralized, and largely inert materiality that existed for the fulfillment of the economic goals of the 'masters' of the materials" (Mignolo, 2011, p. 13).

In the context of climate change, authors grapple with the continuation of this duality within climate discourses and governance as not only the fundamental enabler of 'environmental' problems but also of the impossibility for their alleviation. The reductionist logic of Western reason that enabled the nature/humanity fracture has "reduced the capacity of humans to know nature both by excluding other knowers and other ways of knowing" and has "reduced the capacity of nature to creatively regenerate and renew itself by manipulating it as inert and fragmented matter" (Shiva, 1996, p. 273). Critical studies urge that the modern projects of environmentalism, conservation, and sustainability governance fall short in their failure to transcend this Western imaginary by which 'nature' is still seen as separate from and inferior to humanity. As (Escobar, 1999) powerfully asserted: the crisis of nature is a crisis of nature's identity, pointing to the inability to address historic and ongoing degradation by still seeing 'nature' in small letters. This recognition extends into climate discourses in the observation of 'epistemologies of mastery' (Adelman, 2015) by which this singularly Western duality between man/nature is advanced in environmental policy and research agendas with assumptions of controllability and governability of the planetary system, ecosystems, and the climate. In climate discourses, the isolation of climate change as a *natural* phenomenon to be diagnosed and treated as such is an enunciation that removes it from its fundamental historical, socio-political context and perpetuates the erasure of the history, lived embodiment, and relationality of climate:

> "Dominant discussions around climate change tend to make it seem apolitical, as a physical phenomenon to be fixed with technology and finance, instead of a restructuring of relationships to ecologies, waters, lands, and communities we are intimately, materially, and politically connected to." (Sultana, 2022, p. 10)

In climate governance and discourses on SG, it is important to identify what imaginary is being presented and how climate as 'nature' is being framed, as framings of the climate system and our role as a species in the face of climate change are powerful in their ability to normalize Western dichotomies. In its role

here as a narrative that informs the context of SG governance, the nature/humanity dichotomy would occur as discourse that frames the problem of climate change as a purely 'earth-as-machine' problem (Lambert, 2019) that can be remedied as such, enabling a framing of SG in isolation of its societal context as a determinable solution. Perceptions of the planet as a 'global subject' to be diagnosed and remedied as one separable, natural entity enables the planet to be reduced in complexity, intricacy, and relationality – "confusing the globalized Earth with the world" (Ferdinand, 2021, p. 79). As asserted by Vázquez (2017), the conception of earth as a pale blue dot, as a reduced object of representation and thus in the eye of Western modernity a prison within which human society finds limits to growth, is the fundamental anthropocentrism by which we have come to lose our relation to earth – what Vázquez (2017) calls 'earthlessness': the negation of earth that is required for modernity's anthropocentrism and fracturing of nature and its subsequent worldlessness by which we have lost the diversity of relational worlds, the decolonial horizon thus seeks to repair such loss. This loss of earth via its objectification occurs in climate discourses as actors seek solutions from within this space of thinking:

> "...authors in the field of political ecology warned of the dangers implicit in an imaginary of Earth as distinct bounded, blue-green sphere, a collective "life-boat" suspended in a vast universe, that demands collective responsibility and threatens collective vulnerability or annihilation." (Dehm, 2016, p. 144)

The Earth according to a Western imaginary in the context of climate change governance obscures other conceptions of earth as home, as connected, as relational, instead enabling the legitimization of further Western enunciations of fracture with regards to its solutions. To identify the nature/humanity fracture in the SG discourse as representations and linguistic portraits of nature, the planet, and the climate system as separate, reducible objects will reveal the ways in which climate change is methodically separated from its historical/societal frame, for certain disguised purposes. Climate change is a problem of Western modernity's making, and thus any rhetoric that reduces climate change to a set of predicted, future 'environmental' impacts works to erase "the destruction that has been caused," unjustly portraying it instead "as very 'environmental' against a very 'human' socio-political background" (Ferdinand, 2021, p. 38). The nature/humanity fracture may also work to erase lived alternatives to this fracture, using rhetoric of collectivity and commonality to erase the lived difference of climate change and the reality of 'Others' – of place-based, specific, embodied, feminine connections to earth that were never severed for other populations as it was for the West (Whyte, 2018). Basic assumptions of the ability to investigate climate and SG as separate from its fundamental historical, socio-political context would reveal a hidden form of the CMP by which Western modernity disguises its erasure of 'Others' in its claims to validity.

### *The scientific neutrality narrative*

The nature/humanity narrative central to a Western imaginary advances the fundamental reductionist logic of separability via subject/object knowledge structures of modern science in which knowledge is asserted as truth. The framing and treatment of problems according to their reduction and separation

allows for the 'context-free' abstraction of knowledge and creates criteria of validity based on alienation and nonparticipation – projected as 'objectivity' (Shiva, 1987). The advent of modern science with the Enlightenment and the Scientific Revolution enabled a new enunciation of the role of knowledge, with modern science becoming the unquestionable pursuit of reason removed from sentiment, reason removed from values, the person removed from the research, and subjectivity removed from knowledge. The 'fact-value dichotomy' built by a Western imaginary enabled the modern paradigm of reductionist science, characterized by ecofeminist scholarship "as the discovery of the properties and laws of nature in accordance with a 'scientific' method which generates claims of being 'objective,' 'neutral,' and 'universal'" (Shiva, 1996, p. 277). Modern science validates itself through its claims to a value-free system of knowledge by which Western epistemologies and ontologies are universalized as neutral and objective, and importantly, as on behalf of universal human progress. Most fundamentally, however, the value neutrality claim to science is *not* neutral, and instead "has displaced all other belief and knowledge systems" (Shiva, 1996, p. 268).

The myth of value neutrality has been exposed by feminist, decolonial, and other critical thinkers as a specific tool of Western man and one of the many faces of the CMP by which coloniality of knowledge is disguised. Fundamentally, the scientific gaze decides which subjects matter, which subjects have meanings, and how subjects materialize. Decolonial authors examine the idea of 'objectivity' and the false, Western creation of the figure of the 'expert' that has aided in the coloniality of knowledge over time (Mignolo, 2018). Science or research that does not enunciate and make visible the researcher and their thinking perpetuates "the scientific precepts of distance, neutrality, and objectivity, but also importantly the Western modern/colonial frames of theory, knowledge, research, and academic thought" (Walsh, 2018, p. 28). Critical to a decolonial perspective is the recognition that:

> "theory – as knowledge – derives from and is formed, molded, and shaped in and by actors, histories, territories, and place that, whether recognized or not, are marked by the colonial horizon of modernity, and by the racialized, classed, gendered, heteronormativized, and Western-Euro-U.S.-centric systems of power, knowledge, being, civilization, and life that such horizon has constructed and perpetuated." (Walsh, 2018, p. 28)

Fundamentally, because other ways of knowing and being exist, all knowledge is situated and constructed as partial. Within decolonial thinking, this necessary recognition of non-neutrality and of subjectivity becomes the praxis of relationality or 'vinicularidad' by which knowledge is situated and positioned *in relation*, thus unsettling "the singular authoritativeness and universal character typically assumed and portrayed in academic thought" (Walsh & Mignolo, 2018, p. 2). This demarcation between an objectivity-without-parentheses being advanced under a Western logic and an objectivity-with-parentheses that as such rejects neutrality claims is echoed by critical feminism which emphasizes a conception of objectivity that "quite literally means *situated knowledges*," asserting that language of objectivity-without-parentheses is indicative of "science tied to militarism, capitalism, colonialism, and male supremacy – to distance the knowing subject from everybody and everything in the interests of unfettered power"

(Haraway, 1988, p. 581). Critically, not only is the scientific neutrality narrative and its enabling subject/object knowledge structure a form of subjugation of sensing, emotion, theory, myth, difference, and relationality by 'fact', but it is therefore a subjugation of entire traditions of knowledge (Shiva, 1996). Modern science's technical reliance has become a resulting strategy for coloniality by which notions of controlled experiments and modeling are political tools for exclusion via the denial of the lived experiences, ways to knowledge, and perspectives of 'Others' that are "denied access to the status of the scientific" (Shiva, 1996, p. 280). For ecofeminists, the domains of natural science provide particular reliance on objectivity, as "the controlled experiment and the laboratory are a central element of the methodology of reductionist science" (Shiva, 1996, p. 279). Importantly, the slow violence of neutrality logics is not a function of scientific procedure, but is a political process of erasure against the global plurality of perspectives, epistemologies, and experiences that exist and that could produce different kinds of knowledge.

In the context of climate change, the fracture between 'nature' and society and the delusion of scientific neutrality come together to enable a specifically Western enunciation of the problem and its solutions. The nature/humanity dichotomy enables a dominant framing of climate change that advances an objectivity-without-parentheses and that epistemologically and materially precludes understandings 'otherwise' from the climate discourses:

> "...it is necessary to first problematize the ways in which climate change coalesces into specific representations as 'scientific phenomenon,' as an 'object' of governance and as a 'problem' for international law. The modes by which the 'problem' of climate change is framed is not neutral; they are themselves effects of specific assemblages of material and discursive power, that create a 'field of intelligibility' that has the effect of enabling certain forms of actions and actors while constricting and marginalizing others." (Dehm, 2016, p. 148)

The dominant scientific framing of climate change as a natural, knowable phenomenon enables the logic of scientific neutrality by which climate scientists as experts can arrive at objectively observable facts, producing what are claimed as neutral, certain truths about climate change on behalf of the world's interests and perspectives. In the indissociable historical, socio-political context of climate change, however, research must "develop methodologies that move beyond a mere measuring, monitoring and classifying, and overcome the role of the researcher as a neutral, invisible and disengaged observer" (McEwan, 2021, p. 349). Climate change is not an emergent, problematic, natural phenomenon. It is the byproduct of Western modernity's subjugation of life via a universalized system of actions, patterns, and relations with the earth and with each other that have been and continue to be legitimized in the universal progress of modernity. However, dominant approaches to climate change prioritize masculine, technical, expert-based knowledges that reinforces Western dichotomies of superiority that work in disguise to preserve modernity and its narratives (Arora-Jonsson, 2011), thus deriving validity of modernity's 'epistemologies of mastery' by representing them as truth.

According to ecofeminist theory, a Western enunciation of knowledge that self-ascribes validity based on objectivity obscures the place of violence in knowledge production, taking the problematic view "in defense of modern science that it is not science itself but the political misuse and unethical technological application of it that lead to violence" (Shiva, 1996, p. 280). Thus, *especially* in the case of highly exclusive, highly technical research for a highly complex domain of SG as a global climate solution, a decolonial feminism urges critical investigation of this obscured location of violence. Given the contested nature of SG and the debate on the proliferation of research as separated from opinions on actual deployment, actors may obscure the location of the threat of violence, perhaps justifying calls for further research into SG claimed as beneficial and innocent while condemning its potential *use* as the only location of violence. Further, according to relevant precedent, studies challenging the underlying assumptions of objectivity/neutrality in the realm of SG have only thus far been remanded to the desks of social scientists, while natural scientists advancing research on SG instead produce knowledge with a "perceived level of scientific neutrality" (Sikka, 2012, p. 170). The divide between natural and social science that marks the SG landscape is an important place to locate the ways in which neutrality operates and extends coloniality. While climate modeling is an integral part of climate science and thus to the discourse on SG, an overreliance on the objectivity and certainty to be derived from modeling may reveal the neutrality narrative whereby the climate system is "arbitrarily isolated from its···surroundings, from its relationship with other objects and the observers" (Sikka, 2012, p. 279). Technical climate knowledge as 'truth' in the context of SG determines what knowledge is to be included in the discourse on SG, privatizing knowledge via claims to objectivity:

> "First, (and most obviously) future practices produce truth-claims about what geoengineering could be or do. We call this truth-making work in that it not only puts forward claims about what geoengineering and the climate system is like, but thereby also establishes a 'truth regime' that allots epistemological authority to particular actors and methods, that in turn circumscribe the range and types of climate technologies 'on offer'." (McLaren & Corry, 2021, p. 22)

Kravitz & Sikka (2023) urge caution of the dominance of certain tools such as earth system models that perform such 'truth-making' and that "have their own uncertainties, biases, and assumptions," in addition to the normalized removal of the researcher from the tool itself (p. 7). A potential reliance of the SG discourse on these aspects of technical certainty may perpetuate disembodied knowledge that portrays and universalizes a technical construction of climate change removed from its historical, socio-political context and history, relying on subject/object conceptions of the problem and perhaps of the actors implicated. Such a subject/object knowledge structure is not neutral as in such enunciations the agency of the object known is denied, according to fundamental feminist theory enabling a relationship of power over the one conceived as object, removing potentiality for reciprocity and ethics of care (Plumwood, 2001) – an ethic that many understand as crucial to addressing climate change so to achieve critical climate justice.

Stemming from the fracture of nature/humanity and the objectivity-without-parentheses of knowledge production as beneficial contributions of universal truths – a third critical rhetoric belonging to a Western imaginary arises. As Western science and its actors universalize reductionist logic, it normalizes a certain set of priorities and values that present a certain perception of the goals for a global humanity: the prioritization of profit maximization (Shiva, 1996, p. 278). In exclusion of the plurality of relations to earth and values for life held by other imaginaries, the project of economic growth became intrinsically linked to and bolstered by reductionist epistemologies at the advent of modern science and Western civilization. According to ecofeminist scholarship, "the ultimate reductionism is achieved when nature is linked with a view of economic activity in which money is the only gauge of value and wealth" (Shiva, 1996, p. 276). The projects of development and growth that emerged from the confluence of Western civilization's central fractures/dichotomies are, according to decolonial thought, the central "promises made in the name of modernity··· the prison houses of coloniality" (Walsh & Mignolo, 2018, p. 10). As Western man declared universal a notion of human progress "centered on the sacredness of two categories: modern scientific knowledge and economic development" (Shiva, 1996, p. 264), he universalized a Western enunciation of progress and life. The idea of progress as defined by the universalized project of capitalist economic growth is one of the most powerful, violent faces of the CMP:

> "...the 'unity' of the colonial matrix of power, of which the rhetoric of modernity and the logic of coloniality are its two sides: one constantly named and celebrated (progress, development, growth) and the other silenced or named as problems to be solved by the former (poverty, misery, inequities, injustices, corruption, commodification, and dispensability of human life)." (Mignolo, 2011, p. xviii)

The global imposition of the progress narrative by Western modernity is constitutive of the coloniality of that same project, as modernity's exterior 'Others' are subjugated in relation to Western enunciations of progress and enabled as subjects to adopt the project not as their own, but as an 'exterior' iteration of the West. The normalization of a Western notion of progress occurs as neoliberal discourses work to frame economic growth as "inevitable and irresistible, and something we must simply learn to live with and adapt to" (Fairclough, 2001, p. 128). The notion of progress at issue for decolonial thought is not capitalism as a type of economy, but as the global imperial design of capitalism as a Western lifestyle that became the single and primary modernity (Mignolo, 2011). Most fundamentally, such critical theory takes central the reality that "before 1500 the world was polycentric and noncapitalist" (Mignolo, 2011, p. 28), and the emergence of Western civilization as the global design to be adopted everywhere enabled a project of capitalist expansion as a means to control and manage global forms of knowledge and subjectivities. Decolonial thought points to the fundamental link by which the CMP was constructed first from the coloniality of knowledge and enabled second by economic coloniality which imposed a new global conception of labor, one constructed and maintained according to the interests of the holder of capital – the West (Quijano, 2000). Importantly, modernity's progress narrative has worked to subjugate

the plurality of conceptions of life and of progress 'otherwise' and disguise its economic coloniality in many different forms.

The subjugation of 'otherwise' by this economic coloniality can be seen within struggles for 'decolonial liberation' from such forms of control over the progress narrative. Notably, the Zapatistas (Ejército Zapatista de Liberación Nacional), who since the 1990s have sought political change in Mexico via the collective construction of an alliance for dignity and for indigenous autonomy and who are acknowledged as an exemplar of decolonial praxis and liberation against the violences of the global neoliberal agenda (Harvey, 2015), powerfully understand capitalism as the war against all of life and call on exposing the many faces of the 'capitalist hydra' (Ejército Zapatista de Liberación Nacional (Mexico), 2016):

> "...the present-day challenge is to understand both how and in what ways capitalism - described as a multiple-headed hydra - continues to mutate and change, as well as what has not changed. Is it the main head of the hydra that remains the same, or is it the hydra itself and its infinite greed and capacity for regeneration?" (Walsh, 2018, p. 46)

The coloniality of capitalism – 'coloniality-capitalism' (Walsh, 2018) – as a global imperial order importantly takes very different, hidden forms of the 'capitalist hydra', a central one being the project of development. Development as one head of the 'capitalist hydra' has maintained the colonial difference and the CMP by first inscribing inferiority to those lacking development, the Souths of the world, and second by, in response, offering progress narratives by which promises of salvation centered on economic growth work to divide and disempower the non-European world, simultaneously justifying Western intervention in and control over such trajectories (Dehm, 2016; Escobar, 1995; Mignolo, 2011). The Western definition of poverty presented by the World Development Report conceived of poverty as a "sign of degeneracy" that can be policed by the project of Western supremacy and it is from such global discourses that the classification of the 'Third World' was created and the global South was rendered a backward and static 'Other' (Biccum, 2002, p. 47). Recognition of the 'capitalist hydra' in the discursive rendering of the South as a continuous recipient of treatment have been problematically located in global discourses on sustainability and climate change.

Progress narratives in the context of climate change find foundation in the normalization of the vague notion of sustainability, molded as a concept by Western scientists and politicians and presented as a global agenda to be implemented by the United Nations (UN) that serves the illusion that substantial reform to the modern economic/development project is not needed to ensure environmental stability (Escobar, 1995). The logic of coloniality is located in the framing of the concept of sustainability and the diagnosis of global poverty as the central issue in the face of climate change and its limitations to and risks for societies, and thus the resolution of poverty as a central solution, a solution that can only be pursued via economic development (McEwan, 2018). Dominant framings of climate change treat poverty as a cause rather than a symptom of unrestrained economic growth, allowing the developed North to avoid questions of systemic change by emphasizing development discourses as central to climate change

(Adelman, 2018; Ziai, 2015). Critically, new faces of the 'capitalist hydra' are embodied in the institutional discourse on climate change, with specific attention to the market-oriented approach characterized by the UN Framework Convention on Climate Change in its focus on market interventions and solutionist discourse that normalizes Western enunciations of poverty, growth, and development that suit state and private sector interests (Dehm, 2016; Hope, 2021). Accordingly, the dominant institutional structures of climate governance have been designated by critical scholars as "theaters of climate colonialism" (Sultana, 2022, p. 2) in which corporations, powerful states, and elite Western entities perpetuate colonial tactics of subjugation and disavowal of Southern communities and a plurality of epistemologies via the discursive preservation of economic growth as a universally beneficial imperative.

Within the concept of climate coloniality, SG as a proposed solution *itself* has been criticized as an enunciation of Western capitalism, with claims that "countering the damage caused by one technological dinosaur with another gargantuan engineering venture reflects the characteristic technological hubris of modern industrial capitalism" (Hamilton, 2013, p. 163). While SG as a solution to climate change itself has been considered by some to be an 'epistemology of mastery' and a Western reaction to preserve limitless capitalist growth, progress narratives within the knowledge on and epistemologies behind SG also work subliminally to totalize economic coloniality. Progress discourses that frame SG as a climate solution reduce the problem and its solutions to Western enunciations of costs, risks, benefits, and growth, and prioritizes market-based, technological solutionism – discursive strategies that delegitimize other conceptions of climate change. According to Sikka (2012), the SG debate is marked by Western conceptions of progress, a dominant epistemological frame that works to exclude other narratives and self-ascribe validity:

> "Cumulatively, it is this fusing of faith in the market, economic growth and technology to fix climate change that discursively limits resistance to geoengineering and, as a result, leads to this opposition being seen as self-interested, juvenile, misguided and against human prosperity." (Sikka, 2012, p. 171)

This 'discourse of the market' may be indicated by an asymmetrical focus on costs and benefits that works to entrench a neoliberal, Western imaginary that centralizes the relevance of economic interests and markers of efficiency in discussions on SG (Sikka, 2012). Importantly, the pervasiveness of such a frame can work to "solidify the 'disorientation and disarming of economic, political and social forces committed to radical alternatives" (Sikka, 2012, p. 172). Other than 'discourse of the market', the progress narrative may also occur as ethical justifications regarding SG or its research based on notions of justice linked to economic growth or development, where the global South is subjugated to a realm of destitution for which promises of progress are intended to alleviate this destitute, poor world. In the context of SG, the 'capitalist hydra' may take part in the rhetoric by which actors seek to legitimize, justify, and defend positions on SG on the basis of global progress as a common interest of humanity.

Following from the economic coloniality of modernity that disguises the Western preservation of the global capitalist imperial order within promises of universal human progress, the enunciation of this global recipient – 'humanity' – is called into question. A central method behind the systemic subjugation of the world by its Western subset is the discursive control over the image of humanity and the human. With the expansion of Western cosmology, the concepts of 'human' and 'humanity' "were···created by agents who considered *themselves* humans and who were in a position to project their own image of themselves as humanity" (Mignolo, 2018, p. 168). Like the fictional ontology of the small-lettered 'nature', the concept of the human became "a fictional noun pretending to be its ontological representation" (Mignolo, 2018, p. 155). In inventing the concept of the human, Western Man enacted the creation of the colonial difference, both ontological and epistemological, with a universal and imperial concept of humanity being universalized from the perspective of the Western bourgeois conception (Wynter, 2003), importantly, with the modern European (masculine) subject becoming "the point of reference for racial classification and global racism" (Mignolo, 2011, p. 19). Thus, fundamental to the Western imaginary is that differentiated place that the selectively elected humanity takes above the rest of the world and who possesses ongoing control of who is included or excluded from this fictional ontology of 'humanity'. In overrrepresenting himself as *the* 'Human,' Western Man claimed himself as representing a universality of epistemologies and ontologies of the human species (Wynter, 2003), and thus, "we need to problematize what it means to be human and the praxis of being human" (Sultana, 2022, p. 6).

The coloniality of the enunciation of humanity is observed fundamentally as one category of human became the point of reference to which those falling outside its domain were subjugated, suffering in ever new forms the consequences of Western man's control over the narrative of the human. Critically,

> "[T]here is nothing more consistent than a racist humanism, since the European has only been
> able to become a man through creating slaves and monsters." (Sartre, 1961)

Further, a decolonial feminism recognizes this hierarchy between human (Western man) and the non-human (colonized males and females) as the 'coloniality of gender' – the central dichotomy of modernity that became a normative tool for subjugation and control of the West's civilizing mission (Lugones, 2010). As modernity's 'great divide' established a vertical scale of values, asserting society as reason and Western man as human, the projects of modernity – globalization and development – perpetuated this conception of 'humanity' in their subjugation of 'Others' as those exterior to Western modernity's interiority (Ferdinand, 2021). These two central projects of modernity/coloniality relied on the long-standing fracture of humanity across the colonial difference and thus the subjugation of humanity's 'Others', projects that led to and cultivated the ongoing project of destruction, extraction, exploitation, degradation, and death that have proliferated *as* climate change. Decolonial literature emphasizes the coloniality of Western man's fictional ontology of the 'human' that preserves its own ethnoclass "at the expense of other humans, living and nonliving beings (plants, animals, microbiota), and collectives

(Wynter, 2003, p. 260). Also emphasized, however, is the simultaneous erasure of this fictional ontology by Western man, as those in control of the fictional ontology of 'humanity' cam invoke at modernity's convenience a contrasting, collective 'humanity', undifferentiated and unfractured in the face of global problems. Humanism as a strategy of selective perspectivism is a strategy for dispossession and erasure that is actively performed and disguised within dominant discourses for global problems like climate change (Wynter, 2003; Yusoff, 2018). Humanism as the humanity narrative is first located in the framing of Eurocentric globalization as 'the age of humans' and the resulting form of 'speciesism' that serves to disconnect the subjugation and degradation of life and earth from its primary root causes: Western capitalism and colonialism (Chakrabarty, 2012). Almost in direct opposition to the fractured creation of humanity that underlies modernity/coloniality as the colonial difference, the humanity narrative appears as a Western enunciation of collectivity that serves, in select contexts, to disguise this difference and the historical subjugation of 'Others', erasing and dispossessing entire histories – for certain purposes.

In the context of climate change governance and research, reductionist scales and historicities such as 'global subject', 'whole Earth', and 'humanity'' dominate the rhetoric, working to strip 'humanity's' historical fracture from the frame (Ferdinand, 2021). Of concern are such planetary conceptualizations that invoke an "undivided 'natural' space rather than a differentiated political space" as they seek to inscribe a notion of universalism to modernity's projects of development and globalization (Spivak, 2015, p. 290), and later, to climate change. Such a humanist enunciation "conceals a horizontal homogenization and hides internal hierarchizations," therefore promoting "a narrative about the Earth that erases colonial history" (Ferdinand, 2021, p. 5). As climate change poses a new question of a human collectivity and a universal figure arising from a "shared sense of a catastrophe" (Chakrabarty, 2009, p. 222), the terms of the conversation are changed, normalizing a depoliticized and dehistoricized 'humanity'. However, this selective humanity is *not* collective or unfractured, and in grappling with the anthropogenic nature of climate change we must prioritize the anthropological differences that define the issue (Agarwal & Narain, 2012). The framing of climate change as a problem of collective human trajectories is a strategy of modernity/coloniality, for "at no point in this development process was 'humankind' the agent responsible for inducing changes that would, in time, become the single largest threat to all planetary life" (Skillington, 2019, p. 2). Climate coloniality is preserved via rhetoric of universalism and speciesism and the "homogenizing tendencies of an undifferentiated 'we' in common climate discourses" (Sultana, 2022, p. 5), erasing from view the enduring power imbalances, racialization, gendering, hierarchization, differentiation, historical responsibilities, and the colonial difference.

Western humanism regarding climate change occurs most concretely as Northern rhetoric of the 'Anthropocene', epistemologically offered as the current era in which human activities have become a major geological force with long-term, permanent impacts to earth's geology and planetary makeup. With such rhetoric, the imperial concept of the 'Human' and its fracturing beyond Western modernity is no longer visible, instead presenting a false version of humanity that is communal and undifferentiated in its history and its power erected collectively as the 'Anthropocene'. The 'Anthropocene' is not a geologic,

'natural' reality. It is one interpretation of the world by a situated, subjective place – specifically that of Paul Crutzen, a white, male, European scientist from the formerly colonial empire of the Netherlands. For critical scholars, the act of naming the present and the future as 'Anthropocene' is an act of epistemic violence as it "erases the existence of human systems that have organized life differently" (McEwan, 2021, p. 79). The framing of the 'Anthropocene' invokes a universally problematic condition by which one 'humanity' is positioned as at odds with the planetary system, demonstrating "the privileged gaze of the Western policymaking subject" (Rothe et al., 2021, p. 4) in their selective control of the humanity narrative. Rhetoric of the 'Anthropocene' disguises coloniality of knowledge, epistemologically erasing from view the plurality of systems of place-based communities and populations living in harmony with earth that have always existed and still exist, and most importantly who are not part of the 12%–80%. These ways, beings, and knowledges "are erased every time we say that the climate crisis is a crisis of 'human nature' and that we are living in the 'age of man'" (Klein, 2016, p. 12). 'Anthropocene' as a dystopian narrative in which a global 'humanity' confronts a new era arising out of the death/end of our current way of life erases the deaths/ends of *all other* civilizations and ways of life that occurred with the construction of Western modernity (Milanez et al., 2022; Sultana, 2022b; Whyte, 2018; Yusoff, 2018). The naming of the 'Anthropocene' as the moment Western modernity elects to realize the disharmony of 'humanity's' current way of life is a logic of coloniality, for the historical global imposition of Western modernity "ended Indigenous peoples' local relationships to thousands of plants, animals, insects, and entire ecosystems" (Whyte, 2018, p. 226), and similarly, such logic would instead lead to the recognition of "a billion Black Anthropocenes or none" (Yusoff, 2018):

> "The Anthropocene might seem to offer a dystopic future that laments the end of the world, but imperialism and ongoing (settler) colonialisms have been ending worlds for as long as they have been in existence. The Anthropocene as a politically infused geology and scientific/popular discourse is just now noticing the extinction it has chosen to continually overlook in the making of its modernity and freedom." (Yusoff, 2018, p. xiii)

Authors have emphasized the inherent violence in the selective humanism of the 'Anthropocene' that identifies the industrial revolution as the moment to begin to conceive of the incompatibility of Western modernity with earth, when the global South has known this since colonialism (Davis & Todd, 2017; McEwan, 2021). Decolonial, feminist, political ecology, and critical climate justice scholarship rejects the normalization of "the endowment of a new history⋯ the era of the *anthropos*" (Mignolo, 2018, p. 170) and its selective perspectivism by which an ongoing praxis of displacement, dispossession, and coloniality is perpetuated in the enacting of a "universalist geologic commons, neat[ly] eras[ing] histories of racism that were incubated through the regulatory structure of geologic relations" (Yusoff, 2018, p. 2). Such humanity narratives offer as innocent "an Edenic narrative⋯familiar in Western civilization" (Fiskio, 2012, p. 25) of a new geologic era of 'humanity's' doing in which a depoliticized climate change is stripped of its history but that simultaneously exists alongside 'obscene capitalist accumulation' – a logic combining progress and humanity narratives that has been criticized as "the Anthropo-obscene"

(Swyngedouw & Ernstson, 2018). Importantly, logic of the 'Anthropo-obscene' and humanity narratives are not innocent, accidental, passive constructions, and instead are normalized to obscure the role of Western modernity and its fundamental institutions and beget certain approaches to climate change that preserve the interest of maintaining such systems.

In the context of SG, power is maintained by those who control the narrative of 'humanity' and thus of 'humanity's' relationship with the planet and 'our' collective response to the modern climate crisis (Dalby, 2021). As discourses on SG invoke questions of solutions to climate change, so too are invoked questions of "long-term human survival, extinction, sexual difference, social reproduction, and, by implication, the kind of human that will endure the coming epoch" (Baldwin, 2017, p. 3). A selective conceptualization of 'humanity' in the context of SG enables a new colonial process of codification and 'othering' by which those controlling the concept of humanity control the narrative on survivability in the face of climate change (McEwan, 2021). With the doctrinal principle of 'common concern' (Dehm, 2016) being enacted via Western enunciations of climate change and its solutions, a decolonial interpretation of climate justice urges investigation of the ways in which principles of commonality are employed, or negated, to preserve/justify certain interests, futures, and realities:

> "It does not make sense to take a for/against position on whether climate change should be articulated as a matter of 'common concern'. Instead, the important political questions concern what types of commonality are envisioned, the ways in which commonality is patterned, the modes of being in common that are enacted, what modes of conduct are authorized, and what responsibilities are compelled." (Dehm, 2016, p. 145)

In the SG discourse, usage of the concept of the 'Anthropocene' is highly expected, and its usage alone is not the point of critical concern – it is *how, when,* and *why* commonality is invoked. The humanity narrative may be used to enable certain conceptions of climate change within "ethnocentric and Eurocentric narratives of the Anthropocene" (Mignolo, 2020, p. 6) that work to justify certain logics regarding SG and its research and delegitimize others. Thus, while the presence of this universalized humanity narrative that "assumes planetary sameness" (McEwan, 2021, p. 86) disguises logic of coloniality by a Western imaginary, discourse that simultaneously recognizes difference and emphasizes fracture *selectively* may also reveal such logic that preserves as dominant a Western imaginary.

### The futuring narrative

Like that which erases histories of difference via selective humanism, the futuring narrative is that which emphasizes the problem of climate change in the future, obscuring the historical place of climate change by emphasizing the damage yet-to-come. In the context of Western modernity, time in its proper sense "is a category of reckoning, not a category of experiencing; it is a category attributed to culture not to nature" (Mignolo, 2009, p. 68). Time as a category of reckoning is one way by which modernity/coloniality operates, with the universalization of the '*now*' of Western temporality in the creation and maintaining of the image of that historical moment of Western civilization as the present (Mignolo, 2020). With the

universalization of Western modernity, history *as* time worked to "place societies in an imaginary chronological line going from nature to culture" (Mignolo, 2009, p. 69). Control over time is essential to the preservation of modernity, and extending from colonialism, coloniality enacts a particular motivation for transcending temporality in order to totalize its grasp, first seen in its material control over colonized peoples' presents and futures via their histories:

> "...colonialism is not simply content to impose its rule upon the present and the future of a dominated country. Colonialism is not satisfied merely with holding a people in its grip and emptying the native's brain of all form and content. By a kind of perverse logic, it turns to the past of the oppressed people, and distorts it, disfigures and destroys it." (Fanon, 1961)

Extended from colonialism, coloniality enacts a similar control over and destruction of temporality of its subjects, enacting a manipulation of linear time by which the pasts of Western modernity's 'exteriorities' are reconfigured around its own history. Thus, modernity/coloniality obscured/obscures 'Others' out of historical reality, attempting via discursive deflections away from lived histories the erasure of these histories from the present to control the future. Modernity enacts via the logic of coloniality the logic of the invisible, and the ways in which modernity ascribes invisibility in space and in time are of critical concern for decolonial thought (Mignolo, 2020). Decolonial thinkers emphasize modernity's specific orientation to the future (Mignolo, 2007), focusing on the ways in which the coloniality of time operates to constitute a universal, global, linear *future* by disguising global histories and erasing global *future(s)*. Importantly, however, the "Westernization of the planet did not erase the multiplicity of local temporalities. It only disguised them for a while" (Mignolo, 2020, pp. 1-2). Decoloniality challenges the linear coloniality of time by modernity, emphasizing different non-linear embodiments of and conceptions of time as resistance to this coloniality:

> "The future cannot be seen, it is behind us: First Nations' thinking has been saying this for centuries. The future is at our back; we do not see it. The present is in front: we can 'see' it but above all, sense it. It is inscribed in the body of, at least, every existing organism of the human species." (Mignolo, 2020, p. 12)

Contrary to a Western imaginary's partial, subjective imposition of linear time and of the 'present' via the epistemological manipulation of the past, "'time' is not naturally *the* central category of human experience" (Mignolo, 2009, p. 76), and as a result, "Western European peoples have never learned to consider the nature of the world discerned from a spatial point of view" (Deloria, 1973, p. 63). A Western imaginary does not conceive of a non-linear concept of time in which the future is constituted by and constitutive of the past and present as a continuous process, and instead, in its deficiency, transforms its conception of human experience of time as a point of arrival to maintain its preferred global future. This linear conception is only one option among many other more cyclical conceptions of time that see "continuity between space, time, nature, and life" (Mignolo, 2009, p. 88). However, modernity/coloniality attempts to ascribe time as the central category of human experience, obscuring the plurality of spatiality from reality, universalizing narratives of a linear future that erase pasts for certain motivations.

In the context of climate change, conceptions of time play a significantly complex and powerful role. Confronting climate implicates a complex interpretation of time, for as "climate justice involves confronting past emissions…and the future consequences of that warming" (Ferdinand, 2021, p. 235), we must ask: "How do we comprehend a crisis that simultaneously began over 500 years ago and yet looms on our immediate horizon?" (Ejército Zapatista de Liberación Nacional (Mexico), 2016). While climate change discourses must necessarily engage with the future, there is a "political tendency to turn climate change into an issue of the future rather than a problem of the present" that "disregards the people who *have been* and who *currently are* most affected by climate change" [emphasis added] (Wilkens & Datchoua-Tirvaudey, 2022, p. 142). Rejecting universality of the Western temporality of climate change requires first a focus on the historical responsibility that colonial empires and their resulting industrial states have for the long-accruing, past-present-future reality of climate change. The historical lens is necessary because it "points to the environmental colonialism inherent in the monopolization of the planet's resources by the Global North and the 'ecological debt' they owe to the Global South" (Ferdinand, 2021, p. 236). Western conceptions of the 'Anthropocene' future that normalize climate change as "a moment of rupture of the temporality of modernity" and thus as "a simple before and after" (Swyngedouw & Ernstson, 2018, p. 9) enact logic of coloniality. By obscuring the embodied, spatial, historical place of climate change and locating it in the future as a linear point of arrival – the "colonization of time" (Wilkens & Datchoua-Tirvaudey, 2022, p. 134) – diminishes necessary engagements with past and present, dispossessing other conceptualizations and the spatiality of climate change.

Futuring narratives and enunciations of climate change as a linear point of future arrival "reinforce a spatialization of time that has permeated not only scientific and environmental perspectives but also a long history of Western philosophy" (Neimanis & Walker, 2014, p. 568). Such a 'colonization of time' in climate discourses can work to obscure ever-historic and ever-present embodiments of the spatial violence of climate change:

> "Climate change lays bare the colonialism of not only of the past but an ongoing coloniality that governs and structures our lives, which are co-constitutive of processes of capitalism, imperialism, and international development. The uneven and unequal vulnerabilities and marginalizations, of deaths and devastation taken for granted, draw attention to continuities from the past and into the future." (Sultana, 2022, p. 3)

A Western enunciation of time as linear misconstrues the historical relationality of climate change, ignoring actual experiences and the non-linear processes of both cause and effect that are necessarily implicated. Discourses normalizing this narrative emerge as rhetoric of future loss, with loss located either "in the future or in places remote from Western audiences" (Randall, 2009, p. 118), thus displacing the burdens of past/present vulnerable populations. The narrative erases the historical reality of loss known by populations who live the colonial difference, including the plurality of Indigenous epistemologies and ontologies "who approach climate change having already been through transformations of their societies induced by colonial violence" (Whyte, 2018, p. 224). Further, a future-

conditional grammar of climate coloniality is conceived as difference and 'otherness' are created in the figure of the climate change migrant, a new category of human confined to the yet-to-come, thus colonizing in time the possible roles of the subaltern (Baldwin, 2017). These narratives of climate as future represent conceptions of "a white 'manthropocene'" (Di Chiro, 2017) that present climate and its catastrophe as forthcoming, which most critically "is not a futurity for all, but a past and present of colonial oppression of people of color" (Sultana, 2022b), thus dispossessing and de-futuring racialized 'Others' in the Western futuring of climate change (Baldwin & Erickson, 2020; Bettini, 2013; Davis & Todd, 2017; Sultana, 2022b; K. Whyte, 2020). Fundamentally, according to a feminist, transcorporeal enunciation of climate change, narratives of climate change as future are not innocent, as "meanings are contingent on place and history and cannot be imposed from above without risk of disjunctures and injustices" (Neimanis & Walker, 2014, p. 383), asserting the normalization of climate change as future as a political act of subject-making and object-making that justifies certain paternalistic approaches and solutions.

Problematically, the futuring narrative normalizes and justifies certain 'epistemologies of mastery' regarding the world and earth, as "linear discourses about climate change create a temporality which allows a determination of what is currently 'at stake' and what subsequently ought to be done to achieve a 'better future'" (Wilkens & Datchoua-Tirvaudey, 2022, p. 134). In the context of SG, such discourses direct the agency away from those lived experiences of the past-present-future continuity of climate change, instead inflating purely future-oriented paternalist logics of anticipation and salvation based on a universalized linear notion of 'climate time':

> "An ethic of fixing, making-up for, and even sustaining cannot recognize that all actions are forever contracted in lines-of-flight whose effects will continue to be made and unmade in many futures to come. Climate time, when assumed to be something we are 'in', or as part of a neoliberal progress narrative that we will either push forward or stave off, thus disables ways of thinking and doing ecology that stretch around and through our imbrications with climate." (Neimanis & Walker, 2014, p. 572)

The dominant temporality of climate change discourse has become that of the future, where anticipation narratives that focus on erecting solutions to *stop* or *prevent* the arriving entity of climate change erase the spatial, past-present-future entanglements with climate change that would conceive of solutions differently. In the context of SG, the dominance of a future temporality is expected as SG exists in the form of hypothetical future practices. However, discourses that construct certain futures are not apolitical, and SG discourses as activities that "create images, policies or socio-technical artifacts that will have lasting effect in and for the future" (Esguerra, 2019, p. 963) can work to reify certain constructions of the future in reality. The treatment of SG as a future practice or artifact ascribes knowledge for SG a political motivation in that it is constitutive of future pathways, and therefore, discourse that normalizes climate change as a future point of arrival may do so for certain purposes of reifying certain future visions, those sought to be preserved by Western modernity.

*The catastrophe narrative*

Extending from the narratives that universalize a linear temporality of climate change and that normalize 'Anthropocene' futures, logic that conceives of and presents climate change as an emerging catastrophe enacts a further dispossession of the historical reality of climate change. Logic that conceives of and presents climate change as an impending crisis finds origin in Western modernity as a praxis of dispossession that removes agency and historicity from the frame. The word 'crisis' finds genealogy in the Western vernacular as designating "a decisive point in the progress of a disease," implying "a point at which change must come for better or worse···, a 'decisive state of things'" (Mignolo, 2020, p. 5). According to decolonial critical interpretation, the Western designation of crises as such points of reckoning (and intervention) have historically facilitated "the system of belief that sustained the idea that more is better, that development and growth bring happiness, and that killing life (including the life of the people) is necessary to support innovation" (Mignolo, 2020, p. 5). Scholars recognize the rhetoric of crisis as a tool of modernity that has been used and abused in Western domains to nominalize the state of things as reified realities, obscuring their attributable set of human actions (or inactions) and advancing as unchallenging certain attitudes and approaches to global problems. Importantly, the notion of crisis works to attribute some sort of sentience to an effect or phenomenon, obscuring its human causes and deflecting attention away from the embedded systems that create and sustain such so-called 'crises' (Mignolo, 2020). Fanon (1961) asserted critically that contrary to linear, Western conceptions of human actions in terms of cause→effect, causation is not linear and an effect is necessarily also a cause, with the critical example: "you are rich because you are white, you are white because you are rich" (Mignolo, 2020, p. 2). Crisis rhetorics have worked to sustain Western modernity by framing abstract nominal 'crises' as effects that warrant certain actions, obscuring the systemic, cyclical causation and maintenance of such 'crises' by its actors and systems, disguising the central critical reality that "human beings are and were 'human doings'" (Mignolo, 2020, p. 6).

Framing climate change as a crisis attributes to it an abstract quality, deflecting attention away from the changes to global Western modernity's systemic exploitation of life that an embodied perspective would necessitate. Catastrophe narratives as an active strategy of Western actors in the framing of climate change implies the coloniality of such choices, with those actively 'giving into' the 'catastrophic imagination' of climate change precluding the recognition that it could be over if we begin to act and think differently (Parr, 2015). Critically, this catastrophe enunciation of climate change frames climate change as an unavoidable incident, dispossessing the entirely avoidable history of extraction, destruction, and exploitation of the planet and of life (Bettini, 2013). Extending from an obscured temporality of climate change, the catastrophe narrative presents climate change as a presently emerging problem that invokes urgency and desperation, emphasizing an anarchical, catastrophic, and urgent future. Authors have analyzed the exceptionalist discourse that occurs in climate change governance and science, asserting that dominant discourses obscure the reality of climate change as a long-known problem with long-known solutions. "Control of the discourses of climate emergency" (Sultana, 2022, p. 6) by certain imaginaries

plays an important political role in defining the content and terms of the conversation, as fundamentally, "defining any aspect of climate change as an 'emergency' is fraught with both scientific subjectivity and uncertainty" (Markusson et al., 2014, p. 284), and in the case of the catastrophe narrative has meant that climate change has taken on a level of abstraction in Western societies (Neimanis & Walker, 2014).

Catastrophe narratives ascribe a specific ontological status and political significance to climate change, as well as a purely futured temporality (Swyngedouw, 2010), ascribing a certain partial/subjective view of climate change with the status of totality/fact, normalizing certain outcomes or solutions as unavoidable and certain – a fundamentally political act (Ranciere et al., 2001). The normalization of climate as catastrophe constructs certain visions as unavoidable and "overlooks the complex variations of this discourse" (Fiskio, 2012, p. 13), reinforcing a certain arsenal of meanings and reasonings regarding the governance of solutions for climate change that align with a singularly Western approach. Authors assert the importance of instead conceiving of climate change as an idea that carries diverse meanings which can serve a range of agendas and interests (Fiskio, 2012). Further, portraying climate as crisis works to subjugate certain identities related to climate change, as importantly, "the extensive scaling up of the 'crisis of nature' discourse along spatial axes" by Western imaginaries works to doubly scale up those representational (and material) burdens that climate-vulnerable groups are made to bear (Farbotko & Lazrus, 2012, p. 2). The catastrophe enunciation disguises coloniality in its discursive construction of certain vulnerable populations according to this Western conception of 'crisis', silencing other conceptions altogether. According to Whyte (2018), the normalization of climate change as a coming dystopian/apocalyptic scenario erases the lived experience of the plurality of Indigenous populations who have already endured dystopia and apocalypse from colonial violence, and who thus "can situate the present time as already dystopian" (Whyte, 2018, p. 224). As linear narratives of climate catastrophe dispossess the embodied accounts of populations who live the colonial difference, authors identify the epistemic violence enacted against the Western category of climate-vulnerable populations, in particular with the category of the 'climate refugee':

> "Those identified as imminent climate refugees are being held up like ventriloquists to present a particular (western) 'crisis of nature'." (Farbotko & Lazrus, 2012, p. 1)

For these scholars, catastrophe narratives focused on 'climate refugees' as destitute victims first works to victimize, racialize, de-individualize, and depoliticize the figure of the climate migrant/refugee, and second constructs the concerned 'we' as a non-political, subjective subject (Bettini, 2013). Poststructuralist discourse theory on the rhetoric of climate catastrophe identifies the disempowerment of concerned populations and the depoliticization of the issue as together potentially erasing the ability for an emancipatory, democratic politics of climate due to the "shrinking of the room for radical alternatives" (Bettini, 2013, p. 69). While those mobilizing catastrophe rhetoric raise exceptionalist scenarios, they raise doubly the notion of agency of the subject, the 'we', enabling a Western paternalist frame of necessity and authority to act on behalf of the climate victims (Manzo, 2010). The first

victimization of climate vulnerable populations "reinforces postcolonial imaginaries: the silenced 'Other', with no agency and driven by desperation" (Bettini, 2013, p. 70), while the second deprivation of political subjectivity of the concerned 'we' works to depoliticize the subject of the discourse: "someone else (a neutral humanity) is defining how to speak about their future" (Bettini, 2013, p. 70) – thus precluding from the discourse (and the politics) the ability to challenge such categorizations. The catastrophe narrative excludes underlying power distributions in its enunciations of climate change and its subjects (Swyngedouw, 2010), bypassing *with purpose* the contentious, political aspects of climate change:

> "As paradoxical as it can sound, de-politicization is a highly political process, in the sense that the evacuation of the political results in a reaffirmation of the dominant relations and practices, a reaffirmation of an existing hegemony." (Bettini, 2013, p. 69)

In the context of SG, alarmist, catastrophe rhetoric can work to "escape specific culpability… and instead center a universal human frailty that ends with triumph, a clear moral, and a clean slate" (Gergan et al., 2020, p. 92). Depicting climate as a catastrophe would normalize this depoliticized framing that structures the larger discourse along 'post-politicized lines', legitimizing certain exceptional political options/opinions as unavoidable, likely trivializing other solutions "that do not avoid disruptive ecological changes" (Bettini, 2013, p. 69). The normalization of catastrophe rhetoric in the context of SG would "serve to define who is in need of protection from the threat posed by climate change; who is capable of providing this protection; and (crucially) what forms responses to these threats might take" (McDonald, 2013, p. 49), thus enabling an unchallenging expertise that offers restricted, quick-fix, 'Plan-B'-type solutions instead of supporting "reasonable debate about instituting difficult changes to our resource-based and extractive mode of existence" (Sikka, 2012, p. 168). Crisis narratives that depoliticize and dehistoricize climate change in the discourse on SG may occur as "doom and gloom narratives" (Bettini, 2013, p. 63) narrated with catastrophe language, or via the tipping point analogy by which exceptional cataclysmic climate change is at some point unleashed on the world, legitimizing certain attitudes towards SG (Sikka, 2012). According to Sikka (2012), "the setting up of this kind of exceptional scenario buttressed by panic-ridden language makes it difficult to have a reasonable discussion about geoengineering" (p. 168), thus pointing to the coloniality of such narratives that erase the possibility of 'otherwise' and preserve the interests of the dominant system via power of persuasion and potentially construing SG as necessary (Markusson et al., 2014). Catastrophe narratives can work to alter the scientific and political landscape by normalizing notions of pre-emption and the justification of certain actions/agendas based on subjective interpretations of 'emergency' events to come, perhaps enabling other Western narratives by which climate change is totalized as an unavoidable, apolitical, future ecological 'crisis' to which we *must* respond in a few select ways.

### *The forced choice narrative*

Following from the enunciation of climate as future and climate as catastrophe, a logic of exceptionalism works to buttress certain discursive constructions of necessity or unavoidability regarding climate

solutions but also regarding attitudes and values. As 'epistemologies of mastery' are "attempts to universalize partial and particular perspectives by privileging certain forms of rationality…or methodology" (Adelman, 2015, p. 10), the forced choice narrative emerges as that which offers limited promises for interventions in the world based on their validity in expertise and benevolence. Western logic of interventionism on behalf of the weaker, poorer 'rest' was/is enabled by attitudes of superiority characteristic to modernity's strategy for self-preservation. Western solutionism and logic of intervention is reinforced by logics of rationality that emphasize physical, technical aspects of certain ideas, reducing social issues to notions of probability (Escobar, 1995). Logic of exceptionalism has been employed by Western modernity to legitimize as universal its own preferred solutions to 'global problems', illustrated by the Western imposition of economic growth as a 'solution' to poverty and development and capitalist policies as a 'solution' to hunger until "development had achieved the status of certainty in the social imaginary" (Escobar, 1995, p. 5). Certainly, along with development and economic growth that are argued as necessary for humanity's well-being, so too was slavery portrayed as a necessary step to fostering progress and civilization – this notion of necessity emerging as one of the principal rhetorics to justify the West's relentless 'saving' of the world (Mignolo, 2011). Forced choice logic obscures fundamental realities and normalizes Western preferences as responses to 'global problems': "When people are hungry, is not the provision of food the logical answer?" (Escobar, 1995, p. 102). Modernity works to obscure obvious answers to the 'crises' it creates, instead conceiving of and offering to the world a limited, expert-derived, forced set of benevolent 'solutions' that erase other epistemologies and distract from its own actions.

Like the dichotomous hierarchy ascribed to humanity and the choices of non-humans (racialized and gendered 'Others') to either assimilate or be cast out, necessity as solutionism has always been a political project of modernity/coloniality, as "universal options are based on truth without parenthesis and cannot admit the difference" (Mignolo, 2011, p. 82). Hegemonic global systems preserve the interests of those who built those systems, and thus those options that are presented to 'global problems' within these systems are only one situated, partial, possible set of options (Mignolo, 2011). Truth-without-parentheses occurs in the discourses on climate where the global public is given a limited set of choices as a response, obscuring the plurality of possible futures, actions, and obvious realities that modernity seeks to disguise. Since for example freedom of choice "in a capitalist economy is the freedom to choose only among the capitalist economic options" (Mignolo, 2011, p. 299), freedom of choice in the Western hegemonic system of climate governance is the freedom to choose only among the Western hegemonic options it allows. As with the crisis narrative that removes the fundamentally unsustainable historical, political choices and actions of Western civilization from the frame, forced choice rhetoric enables a logic of intervention by which Western imaginaries conceive of climate approaches as the *necessary* making and implementation of new, universal solutions. Rhetoric of truth-without-parentheses in global climate discourses has been identified as a logic of solutionism that offers limited choice, removing the many possibilities of systemic transformation that have existed and continue to exist (McEwan, 2021). Climate change is constructed

and presented as a given condition, an unavoidable threat to which a limited political imagination and a Western logic of truth combine to justify certain preferred Western hegemonic solutions (Trombetta, 2021).

Coloniality works to limit the terms of the discussion on climate change, hegemonizing what actions are possible and thus erasing other ways and knowledges (Sultana, 2022). The invocation of catastrophe logic works first to preclude debate and second to legitimize "otherwise unpalatable options" (Markusson et al., 2014, p. 283). Exceptional, future framings of climate change enable pleas of necessity as expert-derived truths-without-parentheses, normalizing a "tyranny of urgency" (Stilgoe, 2015, p. 199) to which the self-ascribed authority of a 'we' can respond by determining the appropriate solutions. In the context of SG, such a narrative appears in the framing of the global public as faced with only two possible realities: to pursue emergency-measure technological solutions *or* to suffer the impacts of catastrophic, unabated climate change. Fatalist reasoning by which technological solutions are presented as the 'lesser of two evils' when compared with the threats posed by an unmitigated-emissions-future often employ reductionist assertions and overprovisions within narratives of forced choice (C. J. Preston, 2011). Critically, authors have noted the double standard in climate discourses in which emergency framing enables a preemptive logic of quick-fix/radical solutionism, while such emergency framing did not similarly warrant such preemptive urgent action for mitigation in the form of emissions reduction and system transformation, as mitigation still remains largely precautionary (Markusson et al., 2014). Malm criticized the inherent absurdity and coloniality of such logic:

> "That this 'unthinkable' human catastrophe is signified by hegemonic European discourses as an unavoidable incident to be fought with stricter… policies is one of the most macabre examples of normalization, of the 'impossible becoming possible'. It witnesses that apocalyptic images, even of a present hecatomb, are not enough for igniting action to avoid them." (Malm, 2022, p. 70)

The logic of universal solutions and forced choice narratives that portray climate as unavoidable and accordingly impose universal truths for solutions/interventions is one of the violences of climate coloniality, obscuring the paradox that such an impending, catastrophic point of arrival of climate disaster, a future reality "all but certain to come,… would be the moment when the refusal of capitalist society to countenance the boundaries and thresholds of reality no longer works" (Malm, 2022, p. 12). Forced choice rhetoric in the context of climate change is fundamentally political, as a Western arsenal of eco-managerial solutions that reinforce the status quo and the 'immunological prowess' of the current system work to obscure real, emancipatory solutions "so that we can believe that life as we know it can continue" (Swyngedouw & Ernstson, 2018, p. 16). Such framings may advance fantasies of climate stability via a process of de-politicization, presenting eco-modernist, security-based solutions as universal truths and as necessary, thus not only avoiding entirely addressable current trajectories of capitalist-driven climate change but even entrenching them further (Swyngedouw & Ernstson, 2018). Exposing the coloniality hidden in narratives of forced solutionism requires identifying the ways in which Western imaginaries sustain their superiority over its 'Others', revealing the saviorist notions by which such forced

choices are framed as the responsibility of this 'we' over here on behalf of the 'them' over there. As such, forced choice rhetoric may likely be hidden within discourses of justice and equity on SG, in which Western paternalist logic may reason that "not contemplating such research is tantamount to the rich abrogating their responsibilities to the global poor in dealing with the inequities of climate change" (Flegal & Gupta, 2018, p. 46). Echoing the absurdity of forced choice logic that does not apply such urgency-to-act to the realms of transforming unsustainable systems first, or to mitigation and adaptation second, this narrative may occur in the SG discourse that obscures the always-known solutions to be taken by the responsible 12%–80%. Critically, such an obscured focus from the known inaction of the global North to paternalist concerns for the global South is not innocent, as according to Flegal & Gupta (2018), "such a shift in focus could… amount to a blunting of the politically contested edge of equity" (p. 47).

Given that Western epistemologies within climate discourses may lead to a dominant conceptualization of climate as a future crisis, an exceptional enunciation of climate change is to be expected in the SG discourse by which logics of universal solutions are illuminated with the aim "to demand immediate attention and action with whatever information is currently at hand" (Sikka, 2012, p. 168). Truth-without-parentheses and forced solutionism in the discourse may advance neoliberal and materialist conceptions of the future that work to depoliticize climate change and the hypothetical solution of SG (Swyngedouw & Ernstson, 2018). Investigating not only the presence of solutionist rhetoric but also to which information its constructors point in deriving validity for such solutionism is critical to expose the ways in which other knowledges are erased accordingly:

> "In presenting our current choices in such stark terms, i.e. between catastrophic disaster and life-saving technical intervention using the trope of 'the tipping point', the 'right' decision, ipso facto, is made for us. To be clear, the kind of power generated by this discourse is located not in language itself but, rather, 'it gains power by the use powerful people make of it'." (Sikka, 2012, p. 173)

While the forced choice narrative may not ultimately be directly presenting the deployment of SG as potentially necessary, such logic may be located in smaller steps that precede such a reality, like in justification for research, certain governance measures, or even in certain attitudes towards SG and towards climate change. As put by Sikka above, locating instances of exceptionalism by which choices are presented as limited and necessary makes critical the investigation of the ways in which such logic works to ascribe power to certain actors, knowledges, and processes, in turn identifying in what ways these rhetorics ascribe validity to certain actors and to the Western imaginary.

### The utilitarian narrative

Following from the forced choice narrative by which certain actors and framings of climate change can determine the interests of the world and which actions can deliver solutions accordingly, the notion of this 'we' who performs such a calculus is invoked. Utilitarianism, the ethical reasoning that the ultimately beneficial ends of an act justify the perhaps problematic means, has been historically invoked to

rationalize certain approaches to the 'crises' of modernity, with a subset of 'we' declaring from a situated and partial context the overall, universal benefits of a certain act. Similar to the universal solutionism logic behind development and economic growth discourses, Western modernity intervenes in the world by universalizing its own preferred solutions to what it conceives as 'global problems' - or 'crises'. Escobar (1995) tells of the genealogy of the notion of 'global problems' as in Western modernity by which reductionist, Western science embedded its distinct vision of an interrelated globe whose issues were reduced in complexity in their ascribed nature as planetary. This Western vision of 'global problems' enables the managerial attitude by which the projects of growth and development could be preserved in treating the 'crises' of modern society (ie. poverty) as a function of the planet as a whole and not of the extremely political, situated processes of modernity's subjugation of populations, further enabling the notion of a 'we' with a particular role and responsibility in the management of the planet (Escobar, 1995). Critically, scholars ask:

> "But who is this 'we' who knows what is best for the world as a whole? Once again, we find the familiar figure of the Western scientist turned manager." (Escobar, 1995, p. 193)

The active role of a Western 'we' engaged in discourses of modernity problematizes and addresses global problems from a perceived place of rationalism and expertise. As examined within the scientific neutrality narrative, a Western reliance on science as truth bestows its actors with the particular role and authority to first know the world and second to act in its interest. Importantly, such a role has been accompanied by modern rationalism which approaches social problems with a universal utilitarian calculus – "an idea of individual interests as the basis of judgment, and a search for the one right solution" (Calhoun, 2002, p. 325). Modernity's 'global problems' have long been translated by a Western imaginary via utilitarian conceptions of justice, for example with the Western conception of poverty as linked to questions of labor and production, embedding a universal 'solution' of labor despite its variegated (problematic) means for the ultimate benefit of reducing global poverty (Escobar, 1995). More broadly, economic growth was imposed on the world order as the global good to be achieved, in turn enabling a perceived responsibility of the West to provide it. The notion of ethical obligation underlying modernity's mission to 'save' the world necessitates the important investigation of a Western framework for justice in the face of 'global issues', as such logic "shifts the priorities away from capital accumulation and onto advancing the social good" (Parr, 2015, p. 72). Because of the Western abstraction of the community to the level of the whole globe, differences and local realities can be ignored in the justification of means to reach 'benevolent' ends under the guise of ethical obligation (Calhoun, 2002). In particular, Escobar (1995) identified the function of a rational, utilitarian 'we' that could and would determine the managerial action to be taken on behalf of a world confronted with ecological crisis:

> "It is still assumed that the benevolent (white) hand of the West will save the Earth; it is up to the fathers of the World Bank, mediated by Gro Harlem Bruntland, the matriarch scientist, and a few cosmopolitan Third Worlders who made it to the World Commission, to reconcile 'humankind'

with 'nature.' The Western scientist continues to speak for the Earth." (Escobar, 1995, pp. 193-194)

The global vision of management embedded in a Western imaginary is made visible in the realm of environmental governance as actors define, normalize, and institutionalize approaches to global environmental problems that rely on a utilitarian imposition of a good to be derived above all else – both the responsibility and the authority of the expert 'we' to provide. In the context of environmental change, Western paternalism, the intervention in the autonomy of the world with the intent of advancing global interests, occurs as 'expertise imperialism' and the "tendency of experts to appeal to their genuine expertise in one area to justify their exercise of control in areas to which their expertise is in fact irrelevant" (Buchanan, 2002, p. 134). Further, via the agency of a 'we' through which such global decisions can be made based on the idea of expertise-as-knowledge-as-truth, the role of the 'Other' is silenced and remanded to the realm of non-knowledge. Of such 'benevolent' calculuses enacted by the capable experts of the West in the context of climate change and socio-ecological destruction, Sultana echoes Escobar's critical question:

> "Who is the expert producing climate knowledge⋯? Who is setting policy agendas and planning outcomes? It is often the same talking heads (often Global North, white, male experts) who tend to dominate climate conversations, rather than those experiencing longstanding climate devastation or producing place-based knowledge." (Sultana, 2022, p. 8)

Climate change presents a unique challenge to justice frameworks and their abstraction to the level of the globe as a whole, as justice itself possesses a plurality of aspects and can mean different things to different groups of people based on different imaginaries. Importantly, the Southern, critical climate justice conception of justice has three key elements: that reparative/compensatory accounting for past injustice is central, that distributive justice take shape in the form of equal rights to emissions and development, and that governance frameworks for addressing climate change must be inclusive and offer procedural justice (Ikeme, 2003). This critical, 'Southern' conception of environmental justice is more deontologically-oriented, emphasizing justice as rights and processes as the only path to deliver the right consequences, in contrast with the Western conception in which the consequences of an act contain the justice, and thus in the context of climate the most efficient minimization of climate impact may outrank procedural injustices (Ikeme, 2003). Deciding what constitutes the overriding goal in the face of climate change between differing justice frameworks is a political/normative process given that "all notions of justice are normative constructs" (Ikeme, 2003, p. 204). Despite 'Southern' frameworks of justice that require that climate action be justified based on whether it provides some procedural or reparative form of justice that accounts for root causes, Western discourses on climate action derive authority by claims of acting for and serving the public good via the consequential pursuit of objectives concerned with aggregate climate impact:

> "⋯the regulatory objectives are directed not towards addressing these causes, such as fossil fuel extraction, but towards addressing the aggregate level of GHG emissions, without distinction for

the social context in which these emissions arise. As such, the objectives of the agreement are translated from a political goal and antagonistic of transforming these causes and 'overcoming fossil fuel dependence by entrenching a new historical pathway' to a more technical goal of achieving 'measurable, divisible greenhouse-gas emission reductions'." (Dehm, 2016, p. 149)

Climate governance discourses that prioritize concerns based on "a utilitarian notion of justice that looks to an imagined aggregate in order to assess the overall common good" (Dehm, 2016, p. 146) diminish epistemologically and materially the possibility for reparative, procedural, historically oriented climate justice. The idea of 'climate risk management' has become an outcome-oriented interpretation of approaches to climate action, employing a Western global focus and managerial attitude by which universal benefits can be determined. In the context of SG, such risk management occurs as a common frame for determining the benefits and risks of SG (Flegal & Gupta, 2018, p. 52), a framing that scholars note as particularly normalized: "In contrast to the apocalyptic representations of the future, explore the bland, unchallenging, nature of the dominant solution narratives" (Randall, 2009, p. 119). In line with a Northern conception of distributive (consequentialist) justice, discursive calculus by which the goals related to SG as a climate solution are determined relies on a focus on potential *global* benefits over *local* risks. Flegal & Gupta (2018) pose the critical challenge: "Equity as a moral imperative to realize 1.5C: Does the end justify the means?". As experts employ a speculative ethics for SG from a Western imaginary, they reify a certain socio-techincal vision of potential distributive outcomes to be weighed over procedural risks (Flegal & Gupta, 2018, p. 51). Risk assessments behind SG implicate a political, epistemic process by which science as an institution steers and frames decisions about evidence, resulting in the empowerment of a certain 'we' and the simultaneous disempowerment of those who may prioritize other frameworks of justice in the context of climate change and in knowledge production to steer action and governance. The attribution and normalization of utilitarian narratives within risk/benefit-focused discourse on SG is a function of climate coloniality as it de-politicizes science and erases other conceptions of justice, and while "while many scientists are careful to acknowledge that political decisions about solar geoengineering are fundamentally a matter of value choices, discussions of··· risk management often remain bifurcated" (Flegal & Gupta, 2018, p. 54) from addressing the fundamental, unchallenged assumptions of justice:

> "...framing solar geoengineering and any attendant equity concerns as an epistemic issue of comparative risk analysis may (re)produce a perceived dichotomy between the production of scientific knowledge, on the one hand, and the resolution of broader political and normative debates, on the other." (Flegal & Gupta, 2018, p. 54)

Justice in its consequential conception is treated as empirical as equity is equated with the need for scientific assessment of feasibility, risks, and distributive outcomes. Authors who have investigated the utilitarian narrative of a Western imaginary in the context of SG locate power dynamics in the normalization of certain 'geofutures' – "anticipatory, integrated, performed versions of what geoengineering is, what criteria to evaluate it against, what governance it warrants and how action might be taken" (McLaren & Corry, 2021, p. 22). A Western conception of justice aligns with what authors classify

as an "idealized geofuture," one constructed through reductionist and rationalist logic, reliant on technical knowledge, and assuming SG actors as acting on behalf of the whole world, who present such a solution as purely an instrumental "means to alleviate climate harms, reduce the costs of climate action and enhance distributive justice" (McLaren & Corry, 2021, p. 23). Such instances in which a Western 'we' are portrayed as capable of and responsible for determining and thus delivering 'justice' to the global public work to legitimize Western notions of truth, benevolence, and intervention, erasing other justice frameworks from the discourse. Thus, identifying the discursive mechanisms of utilitarian framings and their hidden material/political implications by which actors decide "from the armchair about what could be beneficial for global justice" (Táíwò & Talati, 2022, p. 13) is critical to exposing climate coloniality.

### The rationalist narrative

Following from the utilitarian narrative and the idea that expert Western subjects can know and describe the benefits to be prioritized in the pursuit of climate action, the ability of such subjects to act based on rational grounds is implied. The rationalist narrative, in connection with utilitarian logic, advances the idea of actors and agents being rational, thus legitimizing certain conceptions of the world and of 'global problems'. The notion of rationalism as part of the Western imaginary has long been understood, as following a neoclassical economic view, humans are seen as rational agents who make decisions in order to promote their own interests (Hardin, 1968). This monolithic conception of human behavior "ignores historical, cultural, economic, and political contingencies" (Fiskio, 2012, p. 14). Further, the 'modern-colonial habit-of-being' relies on the promise of unrestricted autonomy and independence, a configuration in which "responsibility to and relationality with other beings are purely matters of choice and rational calculations of utility-maximization" (Stein, 2019, p. 2). The rationalist narrative thus underpins logic of utilitarianism, as following from the possibility of rational agency is the idea of weighing costs and benefits or risks and goals from a rational place that is abstracted from its necessarily deeper historical, situated, emotional contexts.

The advent of Western reason with modernity's fracture between nature/humanity and emotion/reason is marked by the fundamental belief that "the accumulation of particular kinds of knowledge can help to create a world marked by predictability, order and stability" (Beattie & Schick, 2012, p. 1). A modern rationalist conception, one that marks the paradigm of modern science, "takes little account of experience or emotion and leaves no space for contingency in ethical deliberation or outcome" (Beattie & Schick, 2012, p. 1). Thus, in line with the dichotomies between culture/nature and reason/emotion that mark modernity's central fracture, Western paradigms of knowledge production advance a "quintessentially Western liberal worldview that holds fast to the notion of a global order" (Beattie & Schick, 2012, pp. 1-2) enabled and characterized by the essence of and contribution for rationality. Critical to the implications of Western modernity is the rationalist perspective that neglects the 'non-identical' and 'non-rational': "that which cannot be subsumed into a narrow instrumental rationality, including emotion, relationality, community and history" (Beattie & Schick, 2012, p. 2). Such neglect enables a conception of the world in

which political structures and realities are static, linear and predictable, and such an approach to addressing 'global problems' can perpetuate coloniality by normalizing such a neglect for the non-rational:

> "…the vulnerability of the subjective liberal individual who, engaging as a powerful ethical/moral theorist within the political, could in the desire to achieve certainty, marginalize the plight of the *Other* in the absence of a more nuanced understanding of the embodied experience." (Beattie, 2013, pp. 194-195)

Western rationalism embeds an ontology of disembodiment (Grear, 2014), an ontology that is obviously problematic for those concerned with the recognition of lived embodied difference as critical for any meaningful, decolonial approach to 'global problems'. From a governance perspective, regimes that approach problems with such an ontology of disembodiment conceive of themselves only as "intervening variables that provide the means for rational or interest-maximizing state actors to stabilize expectations… and seek pareto-optimal solutions to collective action problems" (Okereke, 2010, p. 463). In the context of climate change as a collective action problem, the Western rationalist conception can be normalized in discourses that define and construct the governance and research landscape accordingly. The international governance of climate change has been dominated by an environmental multilateralist approach by which the role of states as rational agents enables the 'empirical' negotiation and direction of the global regime of mitigation, adaptation, and other efforts (Corry & Kornbech, 2021). Such rationalist assumptions in the context of climate change finds harsh criticism, for "if rationality had been a reasonable assumption about the way the world is run, the rationalist-optimists would have no quest to pursue… only the most profoundly irrational forces could have placed the Earth in the trajectory it is currently in" (Malm, 2022, p. 10). Problematically, rationalist logic assumes not only the monolithic nature of agency of governance actors and powerful agents in the context of climate governance, but also that scientists and the research community will be equally rational in their facilitation of knowledge to aid in policy measures. In line with the utilitarian narrative, the role of a 'we' over here acting rationally to preserve the interests of the globe entrenches climate coloniality:

> "…hypothetical rational argumentation favors the preemptive exercise of force on behalf of the protection of human rights. All these argumentations tacitly or explicitly repress the memory of Western liberal violence; they displace Western culpability in the making of a 'dangerous' world for Western liberalism; and they rationalize fantasies of white domination via an abstract universality given the perverse name of human rights." (Shilliam, 2013, p. 145)

Western rationalist approaches to climate change may exist in the discourse on SG with rhetoric of certainty enabling optimism and solutionism via logic of utilitarianism and scientific neutrality as in the face of climate change, rationalist assumptions may translate as justificiation for more drastic measures like SG. A 'rationalist-optimist' position has been identified in the context of SG as those actors who "prepare for a timely rescue operation" (Malm, 2022, p. 12) and who emphasize questions of feasibility first and of management second. Such approaches place decisive emphasis on the logic of costs and

benefits to rational actors, focusing on possible approaches to manage collective action dilemmas drawing on principles of environmental multilateralism (Corry & Kornbech, 2021). This narrative is first problematic in that "it cannot be assumed that states would use high-leverage geoengineering capabilities to some universal aim of global betterment, nor their rational self-interest in projected temperature… outcomes" (Corry & Kornbech, 2021, p. 103). Further, climate modeling behind SG research that seeks to simulate the hypothetical risks and benefits of SG in line with such rationalist logic would risk excluding geopolitical contestation and its underlying inequities, demonstrating an overall reduction in complexity to derive assumptions of stability and predictability. Such 'rationalist-optimist' focuses on costs and benefits "leave(s) out the many implications of the world being divided into multiple uneven societies" (Corry & Kornbech, 2021, p. 100), precluding historical materialist approaches to the topic of SG and climate change that reject the reductionist, depoliticized logic in the context of the extremely non-rational reality that is climate change:

> "Put differently, it is precisely because capitalist society has long since taken leave of the reality principle that geoengineering can amass the structural imperative on which the rationalist-optimists ride. Much as a cloud of sulfur would mask the cumulative emissions, so their rationality puts a veil on systemic irrationality: and neither is truly soothing or sustainable." (Malm, 2022, p. 10)

Critically, rational approaches to SG and climate inaction that see climate stability as the rational goal to be derived must conceive of the reality that choices to achieve such a goal have always been available but have not been taken, thus perhaps exposing the inability for those engaging with climate inaction and 'emergency' technological solutions as rational in any case (Paavola, 2008). The rationalism of Western paradigms, including utilitarianism, focuses an individualistic ontology, conceiving of people as externally related social atoms – not as highly internally related and complex patterns of being in relation. To see such a relational view would disable the 'rationalist-optimist's' ability to "treat equal interests equally irrespective of the particularity – and partiality – of relationships" (Callicott, 2011, p. 110). Rationalist assumptions that shape discourses on SG may occur as those that point to utilitarian, reductionist conceptions of climate action and climate stability, centering on criteria of feasibility and effectiveness, expressing an optimism for environmental multilateralism, and emphasizing a perceived stability and equality between and among actors and contexts.

### The inevitability narrative

Following from the exceptionalism of the catastrophe and forced choice narratives and the idea of a global public to be provisioned a benevolent, rationalist calculus of climate action, the logic by which actors employ notions of justice as justification for certain scenarios enables a reification of inequalities. A more obscure Western epistemology in the context of climate discourses is that which assumes as unavoidable the inevitability of dominance of the global North over emerging regimes such as SG, reifying such power imbalances in the present and future. Drawing on Foucault's (1972) interpretation of power,

it must be understood that power is an experience that is exercised, rather than an external entity that exists. Power is dialogically and discursively embodied, and can be locked into certain framings and ways of understanding phenomena (Krippendorff, 1995):

> "I suggest power to be not 'natural' in the sense of being unavoidable, omnipresent, affecting everyone albeit in unequal measures and regardless of how it occurs in language. The fact that traditional social scientists have theorized power as independent of observation and as outside human agency can hardly serve as reason not to conceive power as essentially erasable, extinguishable, voidable, overcomeable or undoable." (Krippendorff, 1995, p. 7)

Predominantly Western discourses on 'global problems' that conceive of power as an unfortunate, external, undoable reality disguise their own active perpetuation of power imbalances, nominalizing such inequities and removing them of agency or capacity for transformation. One of the fundamental paradoxes of modernity/coloniality is Western Europe's imposition of the ideas of "social equality, liberty and autonomy of all the individuals of the species, citizenship and the modern nation-state" via its project of globalization, while at the same time, "preventing the victims of this pattern of power from concretely exercising these social relations and respective social existence" (Quijano, 2013, p. 131). Logic that normalizes inequality and power as a function of some external, nominalized reality and not as the active making of the actors and systems of Western modernity reflects this central paradox: concern for benevolently providing the globalized pursuits of liberty and equality while simultaneously epistemologically and materially excluding Western humanity's 'Others' from such ideals in practice. The inevitability narrative occurs as that rhetoric by which actors are concerned with the justice or equality of weaker, developing populations but in their enacting of power as process and as discourse only reify such imbalances and remove the possibility of 'otherwise'. The notion of domination is implicit in Western discourses that points to some external, undoable notion of power. Instead, 'undoing domination' requires recognizing the complicity of *unquestioning* language, articulating what is not taken for granted, and thus reconstructing the reality in which power takes shape (Krippendorff, 1995). This 'undoing of domination' would occur as the normalization of emancipatory dialogue, the rearticulation of relationships, and "the construction of new ways of being-with Others" (Krippendorff, 1995, p. 25). Fundamentally, vulnerability is socially produced, and discourses that reify dichotomies and difference in the context of socio-ecological processes like climate change advance narratives of inevitability in which such vulnerability cannot be conceivably overcome or transformed.

The social production of vulnerability via inevitability narratives occurs poignantly with world-order dichotomies that reify the epistemological-ontological fracture of Western modernity between the Western enunciations of the global North and the global South. North-South dichotomies perpetuate colonial enunciations of 'us' and 'them' and can serve to institutionalize the West's paternalistic role towards developing countries (Joshi, 2022). Specters of the global South in discourse can reify the North-South divide and work to disempower Southern actors, idealizing and normalizing the role and agency of the global North and "downgrading an underestimated South" (Schneider, 2017, p. 25). Importantly,

the intention of such dichotomies in discourses does not diminish its impacts, for "while the term has been used as a tool to denounce injustices, dependencies, and 'subalternity,' it has also helped to reify problematic North-South dichotomies that have entrenched practices of inequality and domination" (Schneider, 2017, p. 18). In the context of climate change, dominant discourses that portray Western logics of 'concern' for inequality of the global South "are complicit in maintaining neocolonialism and reproducing discourses and material realities that produce hierarchical relationships and barriers" (Sultana, 2022, p. 121). The discursive normalization of inevitable destinies of vulnerable populations of the global South in the context of climate change governance works to solidify these destinies and maintain inequality. Further, discourse that normalizes notions of the global South as an undifferentiated, collectively vulnerable group disregards difference and lumps together extremely situated, diverse realities, disavowing the critical conception of the global South *as* plurality. When the global South is imagined to have an inevitable destiny as those marginalized from decision-making on climate governance or as those to remain vulnerable to climate catastrophe given the inevitability of inaction, causal and singular links of meaning between marginalization and the global South are constructed (Farbotko & Lazrus, 2012, p. 11). Importantly, while the recognition of power asymmetries and careful interpretation of potential proliferations of these imbalances are important, "they must also necessarily involve acknowledging the resistance, contestation and emancipation patterns that are intertwined with power" (Djoudi et al., 2016, p. S250). To recognize the plurality of the global South resistance must be emphasized, for to recognize resistance is to recognize the local, and to recognize difference (Cabral, 1974). Claims of concern for the homogenous, vulnerable global South conceives of vulnerability without similarly conceiving of and emphasizing resistance, thus reifying a Western logic of inevitability.

Emancipatory pathways as the complex mechanisms that break social barriers for the emancipation of certain global *future(s)* in resistance to Western modernity's universal global *future* require moving beyond the discursively entrenched social and political foundations that contribute to ongoing vulnerability and inequality, instead making possible transformational culture and practices (Djoudi et al., 2016). In the context of climate change, authors have asserted the problem with inevitability narratives both in terms of epistemologically manifested power dynamics and in terms of materially constructed local risk: "the deepening of inequality in the face of climate change is by no means inevitable. Rather, it is mediated and produced through specific decisions and responses" (Millington & Scheba, 2021, p. 14). Discourses on global climate inequities that erase the concept of resistance from focus discursively frames such climate inequity as a passive quality, inherent and problematic in its inevitability. Thus, climate discourses that do not entrench power imbalances require a reframing of climate inequity, instead emphasizing "reformulations of institutional arrangements to foster solidarities across differences and redistribution of power" (Sultana, 2022, p. 121). By disavowing emancipatory pathways, such approaches to climate inequality do not offer the possibility of transformation, and instead seek "redress solely from within systems that are undergirded by patriarchy, racial capitalism, colonialism, extractivism, and

exploitation" (Sultana, 2022, p. 121). Of inevitability narratives that underlie dominant climate discourses and their paradoxical reification of the North-South divide:

> "The colloquial saying 'the chickens have come home to roost' tragically points to the rising climate anxieties among elites in the global North, yet this is also an opportunity and a need to cultivate solidarity alliances and collective action with historically marginalized communities." (Sultana, 2022, p. 121)

In the context of SG, authors have criticized common assumptions "that SG will inevitably create new political inequalities or exacerbate existing ones, especially between the global North and the global South," instead arguing that "such arguments often participate in the very dynamics they criticize" (Táíwò & Talati, 2022, p. 13). While such discourse aligns with the Southern conception of climate justice in its concerns for the procedural risks and injustices associated with SG, it is important to investigate the ways in which such discourses can also, against their interests for justice, reify existing power imbalances and preclude emancipatory pathways. Táíwò & Talati (2022) assert that "Global North domination of SG is not inevitable, and arguments that portray Northern dominance as inevitable can, paradoxically, help create the political reality that they warn us about" (p. 14). Instead, discursive practices that enable emancipatory pathways that deny the inevitability of an all-encompassing, irreversible neoliberal domination by the global North both in terms of the epistemological construction of SG and its material implications can open up possibilities for 'otherwise' (Parr, 2015) and thus the discursive construction of "an alternative to the reification and boxing of modernity" (Trombetta, 2021, p. 164). The inevitability narrative may occur as that which emphasizes the future/conditional domination of knowledge production, participation, decision-making, governance, or deployment of SG by the global North over the global South, with a conception of a homogeneous global South. Importantly, domination has always been resisted, and discourses that do not point to such resistance in their concern for the risks and likelihoods of further climate inequity disavow the plurality of cultural lived resistances to Western modernity's totality.

### The damage narrative

Connecting with the rhetoric that re-articulates the North-South divide and obscures the agency and lived resistance of vulnerable groups in the context of climate change, the damage narrative occurs as that which translates vulnerability into victimhood, further enabling the paternalist logic of Western experts to act *on behalf of* an incapable, suffering global poor. Following from an inflated agency of the Western subject from the place of 'we' arising from a rationalist, utilitarian conception and from the reification of domination as seen in the inevitability narrative, damage rhetoric works to bolster the role of this 'we' as the saviors of the world by disavowing the agency of vulnerable populations. Western modernity's "imperial bent to 'save the world' by making of the world an extended Euro-America is unacceptable" (Mignolo, 2011, p. xiv), and long-standing development and humanitarian discourses (and now climate discourses) extend the ontology of Western superiority via logic of emancipation for the

global South. The "colonial gaze of assumptive Western superiority" that ascribes inferiority to non-white, non-western 'Others' enabled/enables the Northern "desire to 'fix' the 'third world'" (Sultana, 2022, p. 6). While this assumptive superiority aligns with the foundations from which utilitarian, forced choice, and catastrophe narratives arise in climate discourses, the damage narrative introduces an explicitly racialized, passivized conception of vulnerability as incapacity, one attributed not to the political reality that the making of Western modernity itself has created, but as a quality of those 'objects' rendered to the category of victim.

As recalled from Fanon (1961), coloniality enacts a dehumanization in the ascribing of categories within which one exists, creating inferiority through the creation of racialized 'Others'. Attitudes of paternalism that justify and preserve Western superiority and coloniality are enabled by victim narratives, an implicit social grammar that can disguise forms of contemporary racism (Táíwò, 2022). "A 'cultural grammar' that systematically excludes and victimizes certain people" (Táíwò, 2022, p. 96) is preserved by failures of global discourses to envision an ethic of care and responsibility to each other and to those who have incurred historical 'damages'. Critical feminism points to the subject/object dualism of the knowledge structures of a Western imaginary by which the constructed relation between a 'pure self' and the 'pure other' enables an ethics by which the subject comes to know the object as passive and analyzable as such, not warranting a knowing of the 'object' in its fullness (Plumwood, 2001). A Western, colonial subject/object relationship of a 'we' over here identifying the vulnerable global South as the 'object' over there enables an exclusion of relationships and ethics of care and sympathy, instead constructing discursively the object as alien to the knower (Plumwood, 2001). Discourses with Western subject/object relationships work to remove the agency of and dehumanize vulnerable 'Others' through victim narratives:

> "...it is problematic if the vulnerable, particularly in expert renditions, get cast as 'passive agent(s) in the path of potentially disastrous events.' Thus, if equity is to be equated with prioritizing delivery of benefits to the vulnerable, those characterized as such need to 'regain their status as active subjects, rather than remain undifferentiated objects in yet another expert discourse'."
> (Flegal & Gupta, 2018, p. 56)

In the subject/object knowledge structure, the object is constructed as passive, "the one acted upon" (Plumwood, 2001, p. 45), and in the context of climate change in which the global South is constructed by Western modernity as the vulnerable 'object', an ethics of care is precluded. While vulnerability frameworks can help portray important differential climate impacts with a focus on justice, vulnerability itself is socially constructed via ongoing, discursive forms of subject/object duality. The grammar of vulnerability in climate discourses can work to obscure vulnerability as associated with "passive, innocent, victimhood" (Djoudi et al., 2016, p. S258). As urged contrastingly by Sultana, "precarity and vulnerability co-exist with connectedness and kinship," and victim narratives that preclude knowing in full or caring for the lived experiences and histories and capacities of climate change discourses' 'objects' ignores and erases the critical understanding of vulnerability as not a passive victimhood or as damage, but as "the

resistance, worldmaking, undoing, longing, pain, reflexivity, intergenerational connectivity, and more that exists" (Sultana, 2022, p. 4). Instead, by misconstruing vulnerability as a passive quality of victimhood, climate discourses produce new configurations of inequity, confining subaltern populations to a category of passiveness and damage (Farbotko & Lazrus, 2012). Thus, while emphasis on vulnerability is important and necessary, it becomes problematic if the agency, self-determination, and fullness of those vulnerable populations is erased in the process (Flegal & Gupta, 2018):

> "...a simple victim–victimizer binary built around notions of causal responsibility or nearby moral notions like 'complicity'—whether we're talking about the present conditions of these peoples or their ancestors' role in the historical events that produced this present—commits us to vast oversimplifications at best." (Táíwò, 2022, p. 121)

The normalization of "a victim subjectivity reliant on embodied displacement and articulated distress" (Farbotko & Lazrus, 2012, p. 383) is a colonial narrative, one that precludes ethics of care and reciprocal knowledge. Importantly, in line with the necessary acknowledgment of resistance in addressing justice concerns to resist inevitability narratives, the agency and corporeality of the objects and of those vulnerable, colonized populations *matters* (Sultana, 2022). Damage is painted in Western climate discourses as a character or quality of the South as 'object', not as the human action imposed on these populations, an enacted violence that must be repaired as such (Táíwò, 2022). Damage narratives that employ tools of victimhood, guilt catharsis, and trauma porn in climate discourses are a form of epistemological violence and dispossession (Sultana, 2022), as damage classifications work to categorize Southern 'objects' as 'naturally fragile' and inherently passive (Farbotko & Lazrus, 2012). Importantly, damage narratives and the attribution of passiveness and victimization to certain populations, groups, and identities is a political, motivated act of control and power, for damage as a tool for dispossession is what is attributed to those the attributor seeks to contain (Tuck & Ree, 2013). In the context of climate change, vulnerability is not purely a linear product of ecological climate impacts or events, it is not a rational, technical output of rational, technical inputs. Instead, it is socially created by systemic power relations both materially and discursively (Farbotko & Lazrus, 2012). The making of damage narratives and the construction of vulnerability is a form of power and works to enable multiple forms of violence in multiple ways:

> "It promotes an idea that 'deficit' populations are incapable of navigating modern conditions. It re-emphasizes a narrative of individualized responsibilization—such that those facing the worst impacts of climate crisis are expected to step up and build their own protections, with a failure to do so being attributed to their inabilities to thrive... It neutralizes the idea that those most responsible for greenhouse gas emissions must take significant action to change the nature of their industries, production and economies···. And, it covers over the histories of colonialism, capitalism and patriarchy that have made so many countries and regions extremely vulnerable to crises from climate change." (Stanley, 2021, p. 5)

The context of climate has enabled a unique habitat for Western damage narratives, by which failed global mitigation translates to a focus on "Southern lack of capacity, rather than Northern responsibility" (Dehm, 2016, p. 141), justifying the colonial dynamics of difference as embedded in logic of damage and catastrophe narratives. Climate action as grounded in and justified by lack of capacity in the South thus falsely relocates this missing agency and capacity in the North, a rhetoric that enables the justification of interventions in the name of the global South but which may only advance neoliberal, techno-optimist, solutionist ideals and futures (Dehm, 2016). The securitization of climate change via catastrophe logic connected to damage rhetoric enables constructions of and justification for climate solutions that represent a masculine, techno-optimist domain (MacGregor, 2009). Importantly, 'Anthropocene' narratives that adopt the subject/object knowledge structure represent "new expressions of the 'White man's burden' to save 'humanity' from itself" (Ferdinand, 2021, p. 10) in which the global South is portrayed via damage and victim narratives that enable a racialized paternalism in the new geological era. Such narratives enable discourses of capacity building that falsely center the task of remedying the incapacity of the South instead of repairing the active damage *done* by the North:

> "Implicit in the vanguard call for comparative risk–risk assessment, for example, is that ambitious mitigation, aligned with historical and current responsibilities, is imperative but may not be forthcoming, thus necessitating other fast-acting alternatives. If so, notions of historical responsibility take on a new avatar in these visions, with those bearing the greatest responsibility for climate change now recast as 'risk managers' on behalf of the global poor and the vulnerable."
> (Flegal & Gupta, 2018, p. 57)

Damage narratives obscure the necessary focus of climate justice approaches to North-South relations that make central the notion of reparation and the responsibility for Western actors and systems to repair these relationships (Táíwò, 2022). In the context of SG, discourses may normalize concerns for justice and equity that represent 'vanguard visions' and saviorism by which the agency of the West is employed to address the vulnerability-as-victimhood of the South, thus precluding an ethics of care and obscuring the goal of reparation. The damage narrative passivizes those who should be at the center of the discourse on SG governance, perpetuating the idea that the global South and those not responsible for climate change are victims who possess no agency to act, participate in, and determine their own preferred, reparative solutions to the problem.

### The representation narrative

Following the discursive strategies that create vulnerability as victimhood and that thus perceive of certain approaches and attitudes towards knowledge on climate change as acts of saviorism on behalf of the incapable global South, representation narratives paradoxically require of this same, passivized populace the active representation of their interests and voices *within* the dominant systems of knowledge production that passivize them. As modernity/coloniality – and climate coloniality – is about knowledge production, of critical importance is understanding which actors, epistemologies, ontologies and interests

are represented in the processes of knowledge production. Representation is defined as the substantive acting for others (Pitkin, 1967) and in the context of environmental governance is understood as a necessary condition for justice as allocation to occur, defined in this context as democratic, fair and equitable procedural decision-making (Fraser, 2001; Schlosberg, 2007). According to Young (1990), representation occurs through vital political processes that allow for injustices to be addressed and remedied, often injustices in the form of distribution and recognition, requiring an understanding of who is being considered and included as legitimate participants and who are not (Burch et al., 2019). However, while representation in the context of environmental governance is seen as critical, representation is simultaneously understood in the domain of decolonial thought as one of modernity/coloniality's tools by which it preserves the systems it created and that thus serve certain (Western) interests. The meaningful purposes and virtues of representation are negated and precluded by modernity's 'regimes of representation' through which representation is used to control, isolate, and differentiate local cultures and identities by removing the visible (Escobar, 1995).

According to Mignolo (2018), "representation is a crucial concept of the rhetoric of modernity: it makes us believe that there is a world out there that can be described independently of the enunciation that describes it" (p. 151). Decolonial thinkers designate representation as a fundamental hallmark of modernity and its institutional empowerment of forms of representation *over* more meaningful forms of recognition, relationality, and listening. By seeking the representation *of* other knowledges, ways and beings, modernity claims a new universality. If knowledge production is not only about content but about setting the terms of the conversation, representation is a strategy by which Western modernity "builds fields of representation to legitimize the instituted and justify the global designs that bulldoze…whatever impedes their march" (Mignolo, 2018, p. 151). For Vázquez (2012), modernity/coloniality's two overarching modes of relating to the world are appropriation and representation, with representation as a means for modern science's control over its own intelligibility by determining its "own fields of validity and visibility" (p. 2). Importantly, "modernity's monopoly over representation is grounded on the negation of listening, that is, the negation of language as relationality" (Vázquez, 2012, p. 6). Critical to understanding the representation narrative in its specific, contextual forms is the notion that representation is a means by which Western knowledge can reproduce and reinscribe itself in a guise of non-universality:

> "Under the sign of the task of listening modernity appears as a system that holds the monopoly of speaking, of broadcasting, the monopoly of non-listening. Modernity appears as a system that silences the other, or better that produces the other as silent, non-existent or as 'pure representation'." (Vázquez, 2012, p. 7)

Representation works to naturalize that which is represented as the entirety of the real, making invisible the whole of what is 'purely represented' by making visible only its partiality within the space of modernity/coloniality. In international climate governance, legitimate representation is constitutive of

procedural, discursive, and geographical representation (Sénit & Biermann, 2021). However, authors have criticized the aspect of representation in the context of knowledge on climate change, as representation is *also* one of the numerous "mundane and institutionalized ways of subalternization of non-Eurocentric, non-masculinist, and non-capitalist understandings of climate, ecology, and nature-society relations" (Sultana, 2022a, p. 9). Being 'purely represented' in processes of knowledge production is not in itself a pathway to justice, as "it is not just about having a seat at the table… but determining what the table is, i.e. the terms of the debate or framing of the conversation and having decision-making power" (Sultana, 2022b, p. 8). While representation as a strategy to legitimize Western attitudes, concepts, projects, and actions is not guaranteed, and meaningful representation does exist, critical reflections on the regime of representation in climate discourses point to the problematic connection between rhetoric of rationalist and utilitarian narratives by which actors legitimize the centrality of their authority based on commitments to representation, all while excluding from full visibility those voices, knowledges, and lived experiences who they claim to somehow represent (Dehm, 2016). As decoloniality works "to open spaces for the listening of the voices from the outside of modernity… for the possibility of exercising the right to represent and produce their own worlds" (Vázquez, 2012, p. 3), to question the notion of representation becomes necessarily about the agency behind representation as an action preserved for those who do not represent themselves but who claim to representing others. Given the indoctrination of representation by modernity/coloniality as its way of relating to the world, it has been questioned:

> "…can modernity listen to those that it has silenced? Would a modernity open towards an intercultural dialogue be recognizable as modernity? The practice of listening is an opening beyond the modern/colonial order." (Vázquez, 2012, p. 7)

To expose the ways in which representation is used or enacted without using or enacting listening is to expose coloniality. Studies on the representation of developing countries in discussions on SG have recognized the necessary growing contextual representation of Southern actors as part of the epistemic community, however, pointing out critically that the flow of information remains largely driven by global North actors based on ideas and assumptions previously normalized in the discourses (Biermann & Möller, 2019; Hourdequin, 2019). Representation narratives obscure the temporality of representation, often conceiving of representation as meaningful in a secondary position in time or space, instead of as starting from a primary place of recognition, relationality, listening, and co-creation. Scholars critical of utilitarian narratives and justifications for research based on managing risks or remedying inequities on behalf of those most vulnerable assert that meaningful representation in such cases must necessarily value inclusion farther upstream of the research process and thus as primary in temporality (Flegal & Gupta, 2018). Following from the damage narrative by which the plurality of voices of the global South is ascribed a reduced, passive, homogenized victimhood, climate discourses can cultivate such 'epistemologies of deficiency' while paradoxically relying on and emphasizing the necessary role for such same actors and populations to be resilient, and "to be good development subjects who 'adapt'" (Sultana, 2022b, p. 6), thus limiting representation as their central space to act as transformative agents. Importantly, thus, as

"misrecognition often begins with unquestioned assumptions" (Hourdequin, 2019, p. 467),  in the context of SG not only has a discursive focus on representation been inadequate, but narratives of representation have worked to entrench political forms of marginalization and disavowal:

> "There have historically been few practical avenues for researchers from the Global South to join the geoengineering research community, leading to numerous debates in solar geoengineering meetings about what the developing world thinks (sometimes even phrased so reductively as to lump the entire Global South into a single entity)." (Kravitz & Sikka, 2023, p. 1637)

Efforts at integrating 'represented' voices and interests principally as including for consent and approval certain Indigenous, local, critical knowledges can serve merely as a means of gaining consent or approval for practical, feasibility-oriented SG research, normalizing only a conception of partial representation with those knowledges not being listened to earlier on the underlying visions, goals, and values (Whyte, 2012). Decolonial authors reject the hidden logic of 'pure representation' that seeks the integration of other perspectives, practices, and concepts *into* unchallenged, Western knowledge frameworks, instead of recognizing via relationality the voices of such 'Others' in *their own* epistemological, ontological frameworks and contexts. Existing approaches to representation that do not necessitate listening and that do not value 'the represented's' own frameworks and contexts in the context of SG and that thus "pronounce the Global South's interests from a microphone based in the North" have been remanded as "inevitably inauthentic vehicles to obtain consent for their values" (Táíwò & Talati, 2022, p. 14), thus normalizing a form of representation that preserves modernity/coloniality. Investigating what enunciations of representation are implicated in the discourse is critical to understanding and exposing the ways in which notions of representation preserve modernity via disguised projects of non-listening.

## 3. METHODOLOGY

Moving from the previously outlined theoretical framework, this section elaborates on the research methodologies employed to evaluate the prominent scientific discourse on solar geoengineering governance. I employed a mixed-methods approach by which qualitative desk-based research made up the entirety of the research as a series of evaluative processes using a wide range of existing literature. A preliminary literature review process enabled the contextual and conceptual frameworks presented earlier, from which the context of SG and its governance was related to a decolonial analytical method and its concepts. This section first presents the research framework by which the research process is aligned with each of the undertaken methodologies. Next, I elaborate on my formulation of a critical discourse analysis as the principal method of analysis undertaken in the research. I then present the methodology behind the data collection for this formulated discourse analysis, with specification as to

the analytical coding methodology conducted via the qualitative data analysis software NVivo. I then introduce the analytical framework of the research that explicitly connects the conceptual framework to the specific methodology of critical discourse analysis. Lastly, I present the methodology behind two semi-structured conversations through which important insights were derived that are foundational to the interpretation of the decolonial analytical results in the discussion section of this research.

## 3.1. RESEARCH FRAMEWORK

I formulated the research framework as the independent methodologies undertaken in relation to their corresponding investigation within the research objective, thus aligning the methodologies with their independent research sub-questions –*SQ's 1-5*. While the formulation of the critical discourse analysis (CDA) method is presented in detail in the following section, a decolonially-oriented CDA itself has implications on the research framework as a unifying methodology. Drawing on (Sabido, 2019) postcolonial critical discourse analysis (PCDA) as an adaptation of Wodak's (2001) Discourse-Historical Approach (DHA) to critical discourse analysis, I determined the research framework as a series of steps that correspond with the previously demarcated theoretical approach and that therefore enable a methodology in line with the objectives and concerns of a decolonial practical theory. PCDA provides a seven-step adaptation of the eight steps proposed by Reisigl & Wodak (2009), a research framework I adopted and modified only in its orientation of the analysis around the specific aims of decoloniality as differentiated from those of postcolonial theory. This slight adaptation results in the same seven steps of Sabido's PCDA with the exception that the sixth step – the formulation of a critique in relation to the postcolonial-historical background – was adjusted instead to reflect instead the formulation of a critique according to a decolonial analytical frame interpreted by Mignolo & Vázquez (2013) and Vázquez (2022). The proposed research framework that results from this modification of Sabido's PCDA, its connected research questions, and relevant methodologies are depicted below in *Figure 4*.
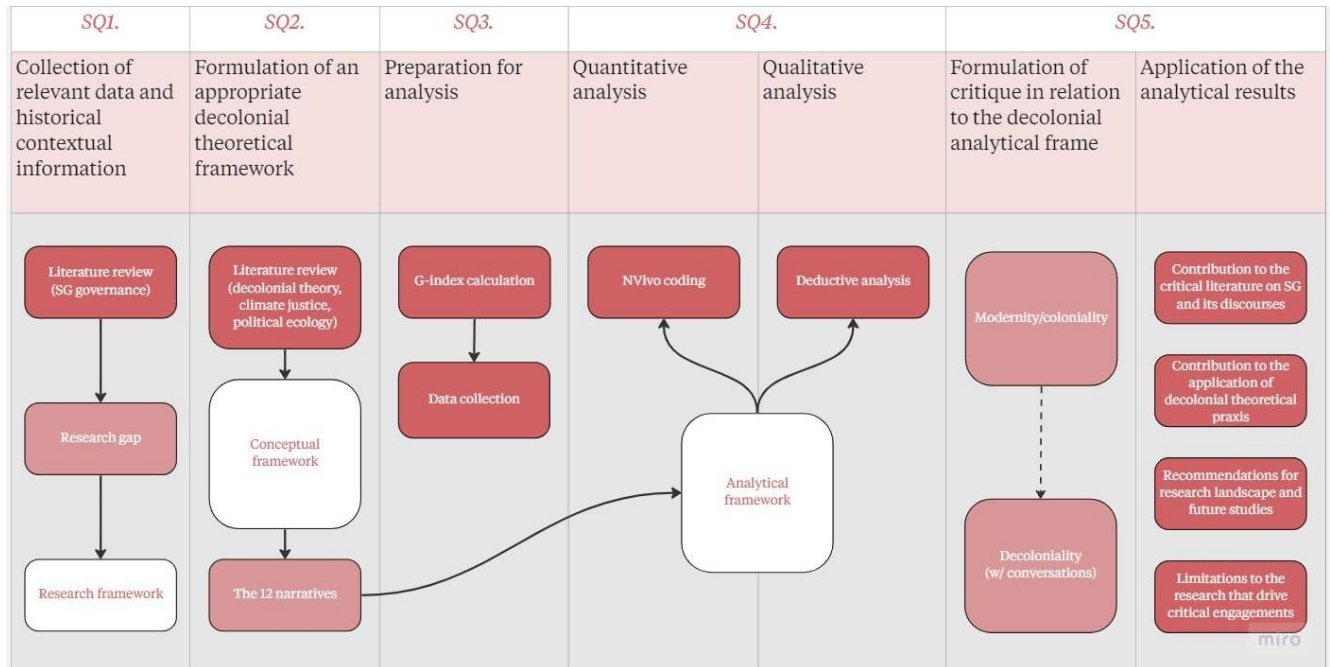
*Figure 4.* Research framework for a decolonial critical discourse analysis adapted from Sabido (2019)

The first step of the research framework as a unified research methodology involved the collection of relevant, historical data on the context of SG and its relevance for the chosen research objective. This step, oriented to answer *SQ1.* and elaborate on the situated, historical, socio-political context of the global scientific discourse on SG as a climate change solution, employed the method of a literature review of research on SG to identify the research gap and develop the research objective and subsequent research framework. The second step necessitated the formulation of an appropriate decolonial theoretical framework, thus responding to the investigation set out by *SQ2.* to determine what narratives of modernity are relevant for the scientific discourse on SG and how would the presence of these narratives indicate the dominance of a Western imaginary. This step employed the literature review of decolonial practical theory, climate justice, political ecology, and ecofeminism to construct the conceptual framework and inductively derive the twelve narratives to be included for analysis. The third step necessitated the preparation for analysis, encompassing the data collection method of the research that was informed by the $g$–index calculation, a methodology elaborated upon in *Section 3.3*. This step thus responds to *SQ3.* by determining whose knowledge on SG and its governance is the most prominent and thus that which is included for analysis. The fourth step of the framework involved the quantitative analysis of the selected data field using the method of coding in the NVivo software to produce quantitative coding results, while the fifth step involved the simultaneous qualitative analysis of the data via inductive analysis based on the analytical framework elaborated upon in *Section 3.4*. Both steps four and five respond to *SQ4.* by determining what narratives of modernity are normalized in the prominent scientific discourse on SG and its governance. Following the analytical framework, step six set up the formulation of decolonial critical analysis in relation to the decolonial analytical frame drawing on the established

concepts of modernity/(de)coloniality, partially answering in combination with the next step *SQ5.* by determining in what ways the SG discourse is situated in Western modernity, how it establishes a universal claim to knowledge, and what plurality exists. The seventh step involved the application of the analytical results, resulting in a contribution to the field of critical research on SG and to the field of decolonial critical analysis, providing recommendations for future research based on limitations and their implications.

## 3.2. CONCEIVING A DECOLONIAL ANALYTICAL LENS

Drawing on the justification for the formulated research framework above, I elaborate on my decolonial adaptation of Sabido's (2019) postcolonial critical discourse analysis (PCDA), a discourse analysis oriented to revealing the presence and function of narratives advancing modernity/coloniality via the totalization of a Western imaginary and to recovering possibilities for deconstruction and plurality. As a preliminary method for designing the analysis, I attempted to conceive of an analytical lens within the relevant framework of critical discourse analysis (CDA) and its many forms and functions. According to Chouliaraki & Fairclough (1999), the method of CDA enables an evaluation of how language influences social and political contexts and how discourse is embedded in power relations, enabling a consequential examination of how marginalized discourses are thus stigmatized and excluded, making it suitable to adopt more explicit decolonial lines of thought and investigative orientations:

> CDA addresses social problems.
> Power relations are discursive.
> Discourse constitutes society and culture.
> Discourse does ideological work.
> Discourse is historical.
> The link between text and society is mediated.
> Discourse analysis is interpretive and explanatory.
> Discourse is a form of social action. (Fairclough & Wodak, 1997, pp. 271-280)

Revealing how power is constituted by and constitutive of discourse is important not only for revealing dominant patterns of ontological and epistemological assumptions, but it also investigates the hidden motivations behind the ways in which such assumptions function – emphasizing that knowledge is inherently political (Sikka, 2012). According to van Dijk (1993), discourse analysis "is not – and cannot be – 'neutral'… the point of critical discourse analysis is to take a position" (p. 270). Because discourse is political and its investigations are therefore also political, critical discourse analysts advocate interdisciplinarity and the incorporation of knowledge and approaches from other disciplines to adopt certain investigations with particular aims and intentions (Ahmed, 2021). An adaptation of CDA, (Wodak, 2001) Discourse-Historical Approach (DHA) is one concerned with investigating and revealing inequality

in the socio-political contextual reality encompassing certain discourses. This orientation of CDA to include critical focus on the historical and societal situation behind certain discourses emphasizes the acknowledgment that knowledge is itself a social reality in a different form (Weiss & Wodak, 2003). From DHA, Sabido's (2019) PCDA extends this historical/contextual concern to the context of the postcolonial, enabling an analysis of the ways in which certain discourses situated firmly in postcolonial contexts reproduce colonial relations and dynamics. While PCDA offers an adequate precedent for the extension of DHA to more explicitly acknowledged (post)colonial contexts and thus is chosen as the basis for the research framework presented in the previous section, the field of postcolonial theory itself I conceived of as insufficient for the purposes of this research objective that derives from a firmly decolonial practical theory, and the differentiation of such fields was critical in this method of conceiving a decolonial lens with which to conduct a CDA.

Both postcolonial and decolonial authors challenge the universality of historical European narratives and urgently call for the contextual consideration of colonial histories rooted in the emergence of the modern world (Bhambra, 2014). Specifically, the concept of postcolonial refers to the era after colonialism in which new forms of coloniality persist and acquire new forms (Prakash, 1994). Postcolonial theory, drawing on the ideas of Edward Said, Homi Bhabha, and Gayatri Spivak, while offering a critical foundation for modern decolonial thought, refers mainly to the colonial processes of the 19th and 20th centuries and the issues of diaspora, identity, representation, and narrative (Bhambra, 2014). What can be conceived of as the decolonial domain of theoretical praxis emerged from the critical work of Frantz Fanon's Africana critical theory, Enrique Dussel's philosophy of ethics, and other scholarship that connected world-systems and development theory to the issues of political identity, revolution, inequality, and violence, beginning with the earliest incursions by the European world from the 15th century, and thus transcending in time the frame of the postcolonial era (Bhambra, 2014; Maldonado-Torres, 2016). Importantly, however, unlike the postcolonial, decoloniality is not a concept that was created or birthed, and instead is a collective way of thinking and doing that has always existed and thus does not originate in the academic world (MLDSS). According to Mignolo (2011), the postcolonial is an enunciation of modernity, and the decolonial is an enunciation from its exterior – as decoloniality is not a word of the West, it is, critically, a knowledge/way/idea from the global South. Thus, while decoloniality has always existed it is not a modern concept, and instead takes root in the development of social struggles and movements against a hegemonic perpetuation of coloniality. On the other hand, the postcolonial is a concept of the modern world, and therefore, "postcolonial postures ended up reproducing with their positions the same logics of location of an 'outside' (barbarian) and an 'inside' (civilized) own of the Global North" (Passada, 2019, p. 4).

While the many, variegated contested points of departure between the postcolonial and decolonial as theoretical realms could be explored to a very great extent, I give only a limited view here. According to (Colpani et al., 2022), in addition to the differences in overall reference points for and origin points of the fundamental theoretical developments between the two, the central departure point from the

postcolonial of decoloniality is that decolonial theorists conceive of a decoloniality and the decolonial option – a possible 'delinking' – a concept that is not similarly central to postcolonial theory, making up the fundamental difference as theoretical. Importantly, decoloniality is a way of thinking from the specific epistemological 'place' of Latin America that opens up recognition of "the forms of subaltern thought and the local and regional modalities that configure the world" (Escobar, 2000, p. 116). This recognition of and quest for such visibility is argued as hidden or removed from postcolonial investigation (Colpani et al., 2022). Given these limitations of PCDA in its fundamentally differentiated theoretical aspects, I conceived of the possible applications of a decolonial analytical method to the PCDA approach. Importantly, decolonial analysis can expand the scope of critical discourse via the focused attention on coloniality of power (Ahmed, 2021). The notion of decoloniality and a de-linking from the CMP that is central to such an approach would enable that the principles of discourse analysis by a decolonial perspective, while subjective and not prescribed, expand upon those principles of PCDA to conceive of a "theoretical, methodological, and epistemological way to deconstruction" (Passada, 2019, p. 1). While the methodology of CDA takes Northern theories and concepts, a decolonial perspective would thus seek to increase such methods with decolonial thought, resulting in this sense in a 'South Global regard' by which discourse analysis seeks not only to know the inequalities reproduced via global North classifications, but also a theoretical and epistemological way to its analysis "from a perspective that breaks the instituted and normative of the heterogeneity of the 'should be'" (Passada, 2019). Accordingly, a decolonial perspective for CDA must be designed with this specific intent:

> "...to make a 'decisive intervention' into the very discursivity of the modern sciences in order to craft another space for the production of knowledge – an other way of thinking, un paradigma otro, the very possibility of talking about 'worlds and knowledges otherwise." (Escobar, 2007, p. 179)

Drawing on this preliminary conception, I developed an analytical method by which the relevant aspects of PCDA are extended to first enable a focus on how Western imaginaries occur and operate within discourse and to second enable an interpretation of the application of a decolonial analytical frame can point to and emphasize the other perspectives, ways, and experiences that exist as deconstruction/decoloniality – as 'otherwise'. Importantly relevant, while PCDA "must be critical of itself and of the insights it derives" (Sabido, 2019, p. 43), any thinking with decoloniality must equally be highly reflexive and critical. While decoloniality is essentially not a theory for the use or appropriation of global North concepts/thinking, the application of its analytical frame and the enabled interpretation of a decolonial option has as a theoretical tool reached new geopolitical contexts including Europe itself (Colpani et al., 2022). The use of decolonial critical analysis as an analytical tool in contexts like this research within Europe and thus within global North frameworks of knowledge production and its implications is controversial and precarious given the original grounding of decoloniality in Latin America distinctly (Colpani et al., 2022). Importantly, however, while decoloniality is not a theory, theorizing helps (MLDSS). To recall and reflect upon the situatedness and positionality of this research, I Blake do not

know coloniality, and while I cannot think *from* the place of decolonial struggle, I can think *with* these places to begin to build seeds and connections to construct something different – I can work to add recognition and reveal the hidden faces of the CMP from within the walls of modernity (MLDSS). To conceive of a decolonial approach as a method/model of analysis that seeks not the appropriation or co-option of the fundamental grounding of decoloniality as praxis, and as necessarily nothing of my own, is simply my attempt to "extricate (my)self from the linkages between rationality/modernity and coloniality" (Mignolo, 2011, p. 52). Recognizing the limitations of lending decoloniality as a tool for theorizing, I could conceive of a decolonial analytical method that engages in ongoing reflexivity as from within a global North framework, but one "enacted from the perspective and interests of the damnés" (Mignolo, 2007, p. 458).

In conceiving of a decolonial analytical approach to the endeavor of CDA, this preliminary method of understanding the limitations of such a method and of conceiving of its subjectivity was critical. I assert that the decolonial lens adopted here is only one, subjective approach to decolonial investigation, one constrained by its confines and implications as within and from modernity. As I pursue the methodological program by which a decolonial investigation of the prominent discourses on SG and its governance emerges, this method of conceiving of such an endeavor was continuously revisited. Drawing on DHA, PCDA, and decolonial critical analysis, I established an analytical framework that is politically and socially mobilized, with the intent of exposing the faces of the CMP within the domain of knowledge production on SG. According to Mignolo (2007), the process of de-linking "moves in two simultaneous directions," 1) the analytic of coloniality, and 2) the programmatic of decoloniality (p. 459). I invoke here a methodology that commits only to the first direction prescribed, while alluding to this programmatic but without any claimed accomplishment thereof. Methodologically, I established a limited decolonially-oriented CDA in the sense that it focuses principally on analyzing for and revealing the logic of coloniality within the discourse on the selected field of research on SG and its governance, but within the global North context of which the programmatic is not possible. In establishing these methods here, I remind the reader that by choosing to apply a decolonial perspective to the intended discourse analysis, I do so in an active, positioned struggle to reveal colonial discourses and show the limits of Eurocentrism and of the research itself thus.

## 3.3. DATA COLLECTION

Before presenting the analytical framework by which the previously conceived discourse analysis was conducted, I present the method for determining which data was included for analysis. As I seek to reveal the ways in which the CMP maintains the colonial difference within the most prominent and thus the most powerful scientific research being advanced on the governance of solar geoengineering, the detailed methodology for determining which research I determine as most prominent is explained. This section

presents the methodology behind the data collection process for the decolonially-oriented critical discourse analysis, thus answering the third research sub-question:

*SQ3. Whose knowledge on the governance of SG is the most prominent and therefore the most powerful?*

The task of narrowing the breadth of the decolonial critical analysis to include only the most prominent scientific research on SG and its governance required a thorough set of criteria to delineate the desired data field. First, I excluded from the field that body of discourse considered within the Western tradition of knowledge as non-scientific literature: that which occurs as non-published research, media articles, public dialogues, social communication, informal statements, and websites. Included instead was the more formal scientific body of 'expert' discourse, comprising peer-reviewed, published scientific articles, working papers, formal reports, and books. I made this delimitation to enable a critical analysis of that literature which currently comprises the knowledge on SG governance that is being most accessed, cited, and normalized at the highest, most formal levels of knowledge production and thus with the most severe implications for policy-making and the political and societal institutionalization of scientifically produced knowledge. While research on the more informal, non-scientific body of discourse is highly important given the increasing intensity, frequency, and decentralization of the debate on SG and its governance across less formal circles of discourse, I assert that what is considered according to ideals of Western science as that more formal, expert, scientific category of discourse poses the most relevance when it comes to contributing timely critical analysis of those dominant knowledges being advanced on climate solutions and the normalization of a Western imaginary, as emerging governance and policy decisions for SG will most likely rely on the current field of that most prominent scientific research. While scholars of discourse analysis assert the importance of understanding the role informal platforms play for the political and social construction of discourse in reality, including notably that of mass media (T. A. van Dijk, 1997), this research acknowledges such investigation as a potential role for future research to illuminate the ways in which the scientific knowledge included in this analysis finds relationships within more informal settings of knowledge production.

Following from the first criteria of including only that considered as 'formal' scientific knowledge on SG and its governance, the process of delineating which knowledge treats the governance of SG as a specific form of global climate intervention arose. Solar geoengineering includes a complex repertoire of not-yet-existing technologies that in their most popularly accepted global-in-scale format would include specific technologies that reduce solar radiation as an effort to reduce global temperatures to alleviate emissions overshoot. Other major forms of geoengineering invoke very different technologies for the purposes of carbon dioxide removal in the popular form of carbon capture and storage technologies, earth radiation management to allow the escape of heat into space, ocean fertilization, cloud-seeding, or as forms of local geoengineering for purposes such as local weather modification or other (Boyd, 2021). As I focus this research solely on research that treats the governance of the type of geoengineering that would be implemented globally for the purposes of climate change amelioration via global temperature stabilization

by means of sunlight reduction, research on those non-solar forms of geoengineering was excluded. Because of the unique complexity of the terminology used in solar geoengineering research, I took care to include via the data collection process that total research field that can vary in its usage of terminology for SG. The data collection process included a total of thirteen independently normalized terms for SG in the criteria for determining the data field which derive from the literature review process on SG:

*Solar geoengineering*
*Solar radiation modification*
*Solar radiation management*
*Solar radiation reduction*
*Stratospheric aerosol/sulfate injection*
*Stratospheric aerosol/sulfate engineering*
*Climate engineering/geoengineering*
*Climate stabilization*
*Climate intervention*
*Albedo modification*
*Radiative forcing geoengineering*
*Sunlight reduction/reflection*
*Novel climate protection*

The terminology of SG is worthy of critical study itself, with observations of the more popularly used term 'solar radiation management' being introduced in 2006 at the NASA & Carnegie event "humorously with the intent of sounding as bureaucratic as possible, and thus allowing the meeting to pass by NASA bureaucrats who were sensitized to possible controversy surrounding the term 'geoengineering'" (Caldeira & Bala, 2017). The fact that a wide range of terminology can implicate SG as a global climate intervention is not innocent, as through scientific lexicalization, new terms can be invented as a one-way flow of knowledge controlled by scientific actors in the context of emerging technologies or topics (Fowler et al., 1979). Lexicalization is a tool of expert scientific actors to maintain unequal access to the discourse and to the knowledge being produced on a topic, with those in control of the terminology thus acting as gatekeepers for the scientific landscape (Fowler et al., 1979). Thus, despite the fact that some of the SG terms are used much more commonly like SRM and SAI, I included all of the likely suspects in the process for data collection to ensure that those prominent actors perhaps invoking newer lexical terms were included in the determination of which research is most powerful.

Following from the established criteria of including in the data field only 'formal' scientific research that treats that specific form of geoengineering that would intend to reduce temperatures as a global climate intervention (solar geoengineering), I further delineated the field to include that which treats SG and its governance. Because I seek to analyze the prominent research on the *governance* of SG and not only that research on SG as an atmospheric intervention technology itself, these thirteen SG terminologies required further criteria. As I excluded literature that is not focused on governance, a set of governance

terminology was established to be entered in combination with the thirteen SG terms: *governance, govern, governing, governed, governable, law, politics, political, social,* and *ethical.* A combination of three analytical search engines by which to collect the data field was chosen to include data from three diverse sources: Web of Science, Scopus, and Google Scholar. The search engine Google Scholar was included along with the more rigorous search engines of Web of Science and Scopus because of the exclusivity of these databases, with Google Scholar being more freely available and encompassing a wider range of data (Harzing, 2010). Thus, each of the thirteen SG terms in connection with the governance terminology were searched within all three databases to yield a resulting field of literature with the specification that the respective SG term appear as a keyword of the yielded text and at least one of the governance terms appear in the abstract of the yielded text. By designating the respective SG term as a keyword and any of the governance terminology as in the text's abstract, I (effectively) determined a data field that treats the governance of SG. This was further ensured by selecting only social science-based results to be included by conducting a meta-analysis that removed the natural science papers from the yield based on their abstracts. According to the established method, each search inquiry for each of the thirteen SG terms was run for each of the three search engines, resulting in a total of 39 searches, each yielding a varying number of texts. While the thirteen terms as search strings and their total yielded texts are shown in *Table 1* below, the total yield for each search within the Google Scholar database is indeterminate due to Google Scholar being much more inclusive and thus each of its searches being limited to include only the top 100 results.

*Table 1.* The 13 independent search strings and their resulting data yield when combined with the governance terminology for each of the three search engines

|     |                                                      | WOS | SCOPUS | GS  |
| --- | ---------------------------------------------------- | --- | ------ | --- |
| T1  | solar AND geoengineering                             | 160 | 199    | 100 |
| T2  | solar AND radiation AND modification                 | 57  | 93     | 100 |
| T3  | solar AND radiation AND management                   | 233 | 370    | 100 |
| T4  | solar AND radiation AND reduction                    | 14  | 9      | 100 |
| T5  | stratospheric AND aerosol OR sulfate AND injection   | 69  | 50     | 100 |
| T6  | stratospheric AND aerosol OR sulfate AND engineering | 69  | 28     | 100 |
| T7  | climate AND engineering OR geoengineering            | 820 | 276    | 100 |
| T8  | climate AND stabilization OR stabilization           | 15  | 14     | 100 |
| T9  | climate AND intervention OR alteration               | 84  | 33     | 100 |

| T10 | albedo AND modification | 24 | 27 | 100 |
| T11 | radiative AND forcing AND geoengineering | 9 | 11 | 100 |
| T12 | sunlight AND reduction OR reflection | 16 | 1 | 100 |
| T13 | novel AND climate AND protection | 5 | 21 | 100 |

Using Clarivate Analytics for the Web of Science result pools, Elsevier B.V. for the Scopus result pools, and the Publish or Perish software for the Google Scholar result pools, the data could be investigated for its prominent authors. To identify the most prominent scientific discourse within the yielded results, I narrowed in via bibliometric analysis on the authors that produce the most cited literature on the governance of SG. Each of the thirteen data pools produced a resulting list of authors that could be organized based on total citations. From this process, the method of determining the *g*–index for each author was enabled. The *g*–index provides a quantitative measure of the global citation performance of a set of articles by an individual author (Egghe, 2006). The *g*–index indicator arranges a set of articles ranked in decreasing order based on number of citations received, enabling a *g*–index where *g* is the largest rank such that the top *g* papers have together at least $g^2$ citations (Egghe, 2006). I chose this index over its predecessor the *h*–index and over the metric of total cumulative citations, as it gives more weight to highly cited articles and is better suited to more recent fields of literature that have had less time to accumulate large numbers of citations (Harzing, 2010), a benefit that is critical given the relative recency of the field on SG and its governance. Determining prominent scholarship via the *g*–index thus accounts for the infancy of research on SG and its governance and the concerning nature of the field in which some authors who have not produced a large quantity of research on SG and its governance have however produced one or two of the most cited/accessed texts on the subject. For each of the top 20 most prominent authors for each of the thirteen data fields corresponding to each SG term, I derived those author's individual *g*–index. As many of the same authors appeared across the thirteen data fields to varying degrees given the tendency for authors to use the various SG terminology either interchangeably or differently in different studies, many of the top 20 authors for one data field were also located within the top 20 for another. By cross-referencing the top 20 authors for each of the thirteen data fields, a total result of 68 authors representing the most prominent scholarship across the research on the governance of SG was derived. The *g*–index for each of the 68 authors for each of the thirteen SG terms (in combination with the governance terminology) was calculated, resulting in a table presenting the 68 authors each with thirteen individual *g*-index scores, from which an average *g*–index could be calculated. The total yield of the 68 most prominent authors on SG and its governance ranked according to their averaged *g*–index across the thirteen representative literature fields is shown in *Appendix 1*.

From this resulting yield of the 68 most prominent authors, the 20 authors with the highest average $g$–index were determined. Following from the research objective and the goal to analyze the most prominent scientific literature on SG and its governance, units of data from each of the top 20 authors had to be selected. In line with the scope and capacity of the research, I determined that from each of the 20 most prominent authors, two texts would be selected for analysis. Drawing on those texts by the top 20 authors that meet the established criteria (social science research with the proper SG and governance terminologies), two texts would be chosen. First, the most impactful text of each author in terms of total citation count was selected, given the obvious implications of citations on research impact and therefore its significant role in knowledge production. Second, a highly impactful text in terms of citation count of each author with a publication date of 2018 or later was selected. Given the recency of the emerging field of research on SG and its governance and the important historical, socio-political context of current climate governance and the expanding debate on SG, the inclusion of prominent *recent* scholarship is important for such analysis. The method for selecting which texts to include in the analysis, though primarily based on the aforementioned criteria of most impactful and recently impactful, was a subjective process of selection, especially given the nature of co-authorship as an intrinsic part of the research. Co-authorship is inherent in the scientific structure of formal, peer-reviewed research on topics like SG and its governance, and while this is important for the reliability and thoroughness of research, it becomes difficult to isolate single-author papers for analysis. As the intended method was to derive data representative of the 20 most prominent authors, it was preferred that the chosen texts were either single-author or in which that top 20 author was the lead author. However, this was not always possible, or it was outweighed by the competing preference for relevance of the selected text.

The nature of co-authorship in the data has implications for the applicability of the analysis first as some selected texts include authors external to this group of top 20 authors, resulting in the potential analysis of certain discourses whose authors and ideologies are not explicitly included. The second implication is that some selected texts present co-authorship by multiple authors from within the top 20 itself, resulting in the potential for repeated analysis of the discourses of certain authors. This implication offers an intriguing point for reflection, as many of the top 20 authors co-author and co-produce certain discourses and thus possessing across the research landscape a potential relation and translation of ideas and discourses, having implications for the relationships constructed in the research field itself. Further, as I prioritized the selection of texts that are highly impactful, recently impactful and that display either single-authorship or lead authorship, I added to this selection method a combined preference for those texts I deemed those most relevant to include based on their treatment of aspects of justice within governance on SG. Given the nature of research on SG as a topic of climate science and governance, the top 20 authors represent a wide range of scientific disciplines, and while all of the yielded texts were social science-based, some of the most impactful, recently impactful, or independently authored texts for those 20 authors within the more natural science-focused realm offered less explicit treatment of the governance of SG, despite being of social science output. As a result, certain texts were selected in which

the top-20 author is only the second or third author, but when considering the total research impact of the paper and its relevance for the subject of governance or justice in particular, co-authorship was not necessarily always prioritized. Thus, by weighing the various criteria elaborated here with a reading of the abstracts of the most suitable texts, the texts included in the analysis were selected. This method for data collection produced a total of 40 texts (ranging from books to articles), 20 having the highest total research impact and 20 having high research impact and being from within the last five years, barring exceptions in line with the subjective weighing of the criteria and preferences. The 20 most prominent authors on SG and its governance according to average $g$–index, their scientific field of discipline, and their two selected texts for analysis and corresponding data type are shown in *Appendix 2*.

## 3.4. ANALYTICAL FRAMEWORK

After determining the most prominent scientific research on the governance of SG via the collection of the 40 texts for analysis, I determined the framework and methodology by which the data would be analyzed as part of a decolonial critical discourse analysis. Drawing on Bäckstrand & Lövbrand (2019), my analytical framework employs four categories important for analyzing discourses for "reoccurring ways of reasoning about, calculating, and justifying desirable forms" (p. 5) of climate governance, which I transported from the field of climate change discourses to the analysis of discourses on SG and its governance specifically. First, the *problem* of SG governance category enables an analysis of the ways in which the problem of unmitigated climate change and the problem of SG as a potential globally governable strategy is known, articulated, framed, and presented. Second, the *ethos* of SG and its governance category enables a critical analysis of the normative and moral principles that underlie the discourse that work to justify certain approaches to SG and its governance. Third, the *methods* of SG and its governance category facilitates the analysis of the articulated means by which the governance of SG is proposed in the discourse, resulting in a critical analysis of the discursive mechanisms behind the visions that inform such governance. Fourth, the *subjects* of SG governance category enables a critical analysis of the forms of agency invoked in the discourses of the various actors implicated as 'subjects' of governance for SG. Within each of these four analytical categories, I placed the twelve narratives that I claim are indicative of a Western imaginary regarding the subject of SG and its governance. As an analytical framework, this categorization of the twelve narratives enabled an analysis of discourses within the larger framework of climate governance, connecting specifically that literature on SG and its governance. Thus, while the narratives may not be solely applicable to their specific analytical category and may transcend such an attempted categorization, such a framework makes explicit the potential analysis of the narratives as within climate discourses more generally. The twelve narratives within their respective analytical categories are presented below in *Table 2*.

*Table 2.* The analytical categories for the twelve narratives of a Western imaginary in the prominent scientific SG discourse

| Analytical category | Narrative | Label |
|---|---|---|
| Problem/context of SG governance | 1. "Climate change and its solutions can be technically known as separate from its socio-political contexts." | The nature/humanity narrative |
| | 2. "Climate change is a crisis that requires emergency solutions." | The catastrophe narrative |
| | 3. "Climate change is problematic in its future violence." | The futuring narrative |
| Ethos of SG governance | 4. "Science behind solar geoengineering is neutral, unbiased, universal, and objective." | The neutrality narrative |
| | 5. "Solar geoengineering may be the lesser of two evils." | The forced choice narrative |
| | 6. "The ends of solar geoengineering may justify the means." | The utilitarian narrative |
| Modes of SG governance | 7. "Climate solutions exist because the interests of actors and institutions can be rationally determined." | The rationalist narrative |
| | 8. "Climate solutions that preserve economic growth enable human progress." | The progress narrative |
| | 9. "Global North dominance over solar geoengineering research and development is inevitable." | The inevitability narrative |
| Subjects of SG governance | 10. "We are one collective humanity facing the problems of the Anthropocene." | The humanity narrative |
| | 11. "We must save the most vulnerable victims of climate change." | The damage narrative |
| | 12. "The interests and perspectives of the global South can and must be represented." | The representation narrative |

Drawing on the conceptual framework and the theoretical foundations for each of the twelve narratives presented earlier in *Section 2.5*, the analysis identified within the 40 selected texts the presence of these narratives via discursive mechanisms that frame, present, justify, and normalize their respective Western conceptions of the context, ethos, modes, and subjects of governance for SG. The deductive interpretation of discursive indicators for each of these twelve narratives would produce a certain degree of coding for each narrative (quantitative result), signifying a certain degree of thinking from a Western imaginary for each text that may totalize the narratives and thus exclude other imaginaries, entrenching discursively the colonial difference (qualitative result). A deductive analysis of this set of narratives enabled the application of the decolonial analytical frame to the process of CDA, an investigation that is

certainly oriented to revealing connections between discursive elements and processes of power as coloniality. To recall the assertion by van Dijk (1993), discourse analysis "is not – and cannot be – 'neutral'. Indeed, the point of critical discourse analysis is to take a position" (p. 270). While the deductive analysis of the twelve narratives within the data field was established with the explicit, non-neutral goal of revealing those discourses that normalize a Western imaginary within knowledge production on SG and its governance, I noted the importance of also including in the analysis recognition of moments in which such universality is negated.

I established the framework so to include the absence of or resistance to these twelve narratives as a result for consideration within the analysis. By looking also for the presence of discourse that supports the resistance to these twelve narratives as that which points to the contrasting plurality of approaches to such concepts within the same analytical category, I gave room for the discourse to possess elements that display active attempts by the authors to break from modern/colonial patterns of Western totalization. Resistance to the twelve narratives does not simply mean the presence of other, identifiable imaginaries, but instead reveals recognition of plurality. Importantly, as the decolonial perspective does not mean a rejection or negation of Western thought (Walsh & Mignolo, 2018), resistance to the twelve narratives does not also simply refer to the antithesis or opposition of such narratives. Instead, what decoloniality seeks is the nonacceptance of the West as the only way and thus a transcending of Western totality, and thus discourse that undoes the singularity of certain narratives demonstrates such resistance as recognition of difference. Decoloniality as 'de'-coloniality "does not imply the absence of coloniality but rather the ongoing serpentine movement toward possibilities of other modes of being, thinking, knowing, sensing, and living; that is, an otherwise in plural" (Walsh, 2018, p. 81). Including in the analytical framework the possibility of an 'otherwise' in plural, I formulated twelve discursive resistances to the narratives to be included in the analytical framework. Identifying these discursive resistances would enable a more holistic decolonially-oriented CDA that can simultaneously examine the presence of certain resistances to modernity/coloniality, but that are also not mutually exclusive of underlying narratives and of Western totality. The discursive indicators that give evidence of either the twelve narratives or their discursive resistance are presented in the analytical framework in *Table 3* below.

**Table 3.** Analytical framework for the deductive analysis of the twelve narratives and their discursive resistance in the 40 selected texts on SG and its governance

| Narrative | Indicators (N) | Resistance | Indicators (R) | Question |
|---|---|---|---|---|
| *N1.* "Climate change and its solutions can be technically known as separate from its socio-political contexts." | • Textual & contextual demarcation b/w nature/humanity<br>• Climate as removed from its locales and contexts<br>• Reductionism or oversimplification of climate system<br>• Assumptions of technical predictability, knowability<br>• Language of 'fix', 'decide', 'choose', and 'design' | *R1.* "Earth and humanity and thus climate and societies are interrelated and interdependent, so their investigations cannot be made in isolation." | • Emphasis on historical, socio-political context of climate change<br>• References to dependence on and being part of earth<br>• Acknowledgment of complexity of climate system<br>• Politicization of climate<br>• Acknowledgment of intrinsic value and interests of non-human life over human utility (respect, reciprocity) | How is the subject of the planet or climate system framed and treated? |
| *N2.* "Climate change is a crisis that requires emergency solutions." | • Language of anarchy, emergency, catastrophe, crisis, threat, danger, etc.<br>• Links b/w climate and conflict<br>• Pleas of necessity, rhetoric of desperation<br>• Trope of the tipping point<br>• Logic of preemption | *R2.* "The problem of climate change and its solutions have been known for centuries, and though future impacts are uncertain, approaches must emphasize precaution and transformation." | • Historicization of climate change<br>• Emphasis on the accepted solutions of decarbonization and system transformation<br>• Recognition of agency, of human actions as cause/effect<br>• Logic of precaution | Is climate change presented from a place of crisis as emergency? |
| *N3.* "Climate change is problematic in its future violence." | • Language of the future, 'will be', 'yet to come', etc.<br>• Obscured historical temporality of climate change<br>• Emphasis on roles of refugees or other forms of future categorization<br>• Rhetoric of knowability, certainty | *R3.* "Climate change is a long-standing violence as a cause of historical processes of exploitation and oppression of earth, peoples, and epistemologies." | • Emphasis on the historical context of climate change<br>• Focus on reparation and restorative justice<br>• Discursive elements of differentiation and acknowledgment | Where does the discourse ascribe the temporality of climate change? |

| | | | | |
|---|---|---|---|---|
| *N4.* "Science behind SG is neutral, unbiased, universal, and objective." | • Rhetoric of objectively observable results, knowability, certainty, truth, etc.<br>• Commitments to hypotheses<br>• Assumptions that research as knowledge is beneficial<br>• Language of 'know', 'show', 'prove', 'expert', etc.<br>• Claims of a universality | *R4.* "There is no single scientific method to derive universal truth; science is a subjective form of power and those who claim objectivity erase plurality and difference." | • References to author subjectivity, positionality, ethical perspectives, etc.<br>• Questioning or presenting some phenomena as uncertain<br>• Emphasis on opinions or biases<br>• References to plurality, difference, other approaches | Is the knowledge on SG presented with claims of certainty and objectivity? |
| *N5.* "SG may be the lesser of two evils." | • Language of 'should', 'must', claims of necessity, and overprovisions<br>• Painting the topic as of highest importance<br>• Security logic: 'Plan-B', 'in case', & rhetoric of options<br>• Portraying actors as with higher exceptional roles<br>• Exceptional scenarios where a 'choice' must be made | *R5.* "It is still possible to equitably address climate change via the systemic transformation and dismantling of the carbon economy and its projects of destruction." | • Emphasis on mitigation pathways, justice as transformation<br>• Acknowledgment of SG as a false solution<br>• References to processes of inclusion and global procedural justice<br>• Historicization and politicization | Is SG presented as one of the only available options to address climate change? |
| *N6.* "The ends of SG may justify the means." | • Emphasis on benefits over risks<br>• Emphasis on global over local<br>• Reductionist logic, bad/good dichotomies<br>• Language of interests and desires, of needs<br>• Acts of self-representation as rational/reason, language of decision-making<br>• Formulaics, propositioning visions to be realized | *R6.* "The complex interests and values for climate justice of the many cannot be linearly determined by a few." | • Local risks, experiences, & contexts emphasized over global benefits<br>• Emphasis on the differentiation of hazards implicated by climate intervention<br>• References to inclusion and representation as recognition<br>• Language of difference, plurality | What and whose interests and benefits are professed as known in the discourse on SG? |

| | | | | |
|---|---|---|---|---|
| *N7.* "Climate solutions exist because the interests of actors and institutions can be rationally determined." | • Language of incentives, costs/benefits, & rationality<br>• Rhetoric of de facto governance<br>• Emphasis on multilateralism and democratic processes<br>• Optimism about governance<br>• Focus on formal cooperation b/w states and certain actors<br>• Linear, reductionist conceptions | *R7.* "Climate governance is marked by power imbalances and historical complexity, and the interests of actors cannot be determined as rational or linear." | • Emphasis on the non-rational: emotion, embodiment, subjectivity, etc.<br>• References to geopolitical conflict, institutional failure<br>• Acknowledgments of inequality and adversity<br>• Assumptions of contention and disagreement<br>• Language of difference | Are SG governance entities and interests implicated as linear and rational or as complex and subjective? |
| *N8.* "Climate solutions that preserve economic growth enable human progress." | • Rhetoric of technological determinism/optimism<br>• Economic reasoning and argumentation<br>• Language of costs/benefits<br>• Situating the economic and the political as isolated | *R8.* "Just solutions to climate change must dismantle the systemic commitments to capitalist, industrialist, and globalist agendas." | • Emphasis on societal and ecological value<br>• Condemnation of economic priorities voiced in the debate<br>• References to degrowth and other alternatives<br>• Historicization of climate change and development | Does the discourse invoke logics of capitalism in the framing of governance for SG? |
| *N9.* "Global North dominance over SG research and development is inevitable." | • Language of inevitability<br>• Predictions and assumptions of inequality, unevenness & exclusion<br>• Mitigation of agency of developing, Southern actors<br>• References to global South that reduce governance complexity<br>• Homogenization of global South | *R9.* "The vulnerable communities of the global South resist vulnerability and possess their own agency to determine and contribute to desired climate futures." | • Emphasis on the agency of the South, active framings<br>• References to institutional injustices with emphasis on resistance<br>• Emphasis on difference<br>• Rhetoric of emancipatory pathways | Does the discourse normalize North-South dichotomies and assume inevitability of dominance in the context of SG? |
| *N10.* "We are one collective humanity facing the problems of the Anthropocene." | • Language of 'we', 'us', 'humanity', 'together', etc.<br>• Globalist discourse that places agency on all humans evenly<br>• Speciesism and humanism<br>• References to climate change that ignore geopolitical and spatial differentiation<br>• Anthropocene rhetoric | *R10.* "We are all differently entangled in the historical processes of exploitation and subjugation that have caused climate change and we thus bear different roles and responsibilities." | • Acknowledgment of differentiated responsibilities<br>• Contextual considerations of difference<br>• Historicization and politicization<br>• Rejections of speciesism<br>• Emphasis on agency and roles | Does the discourse obscure the colonial difference by invoking humanism in the context of SG? |

| N11. "We must save the most vulnerable victims of climate change." | • Notions of equity, ethics, and justice as universal<br>• Logics of saviorism, protectionism, paternalism<br>• Victimization<br>• Nominalization and passivization<br>• Enacting agency to conceal the role of certain agents: 'we' | R11. "Those vulnerable to climate change have been made/are continuously made vulnerable, and via their capacity for active resistance they play an active, self-determined role in governance for solutions." | • Emphasis on the agency of vulnerable communities<br>• Humility of researchers, acknowledging limits and failures<br>• Treatment of specific, local contexts<br>• Emphasis on local resistance and capacity over global vulnerability | Are ethical concerns for the vulnerability of populations framed in ways that remove their own agency? |
|---|---|---|---|---|
| N12. "The interests and perspectives of the global South can and must be represented." | • Language of representation as 'on behalf of'<br>• Logic of consent & legitimacy<br>• Secondary language of 'bringing in', 'finding', 'adding', etc.<br>• References to equity and diversity without agency<br>• Direct references to certain authors or processes as a justification<br>• Homogenization of global South | R12. "The plurality of voices, experiences, epistemologies, and knowledges of the global South can and must be listened to in their own geopolitical contexts." | • Recognition of spaces and contexts that already exist outside of Western centers of knowledge production<br>• Representation as primary (norm-setting, challenging assumptions, etc.)<br>• Emphasis on agency of global South actors and processes<br>• Rhetoric of recognition and procedural justice<br>• Listening, not telling | Is the representation of Southern interests presented as primarily a function for legitimacy and consent? |

According to Verschuren et al. (2010), the qualitative analysis of complex and abstract concepts that are not directly visible is enabled via the selection of observable indicators and criteria. Each of the twelve narratives and their resistances are made observable in the framework via a process of operationalization for such indicators. Indicators can vary in size, such as "words, phrases, sentences, or whole paragraphs, connected or unconnected to a specific setting" (Coffey & Atkinson, 1996, p. 28). Further, (Verschuren et al., 2010) assert that for each indicator, one must transfer the indicator into instruments that can take the form of semi-open questions by which the complex concept in question can be divided into its various dimensions and thus into an observable reality. The twelve narratives and their antithesis are made visible via indicators derived from the literature and instrumentalized via semi-open questions for each, shown with their corresponding narrative in *Table 3*. Further, Huckin's (1997) method of mining discourse for topicalization, how a topic is framed, can reveal critical power relations, as topicalization exposes enacted tones and connotations that differ among actor types to reveal the embedding of certain perspectives. Importantly, Wodak & Meyer's (2009) strategy of theoretical triangulation enables four levels of context to be included in a discourse analysis: immediate language, interdiscursive relations between discourses and texts, the social level or situational context, and the broader societal or historical context.

The selection of indicators derived in the analytical framework attempts to reveal aspects of each of the four levels of context and thus enable a degree of this triangulation. The 40 selected texts were analyzed via a process of interpretive coding by which the indicators for the twelve narratives and their resistances were identified in the texts and accordingly coded to the corresponding narrative or resistance code. The analysis, drawing on the analytical framework, was conducted for each text within the NVivo qualitative data analysis software.

## 3.5. CONVERSATIONS & BORDER THINKING

In addition to the discourse analysis as the central method of the research framework, I developed two semi-structured conversations as a method for gathering ideas and insights to contribute to the interpretation of the decolonial moment as part of the analytical frame. Discerning decolonial options is a political commitment, one that can only be enabled by listening to and thinking with the knowledges and ways that exist and have always existed outside of modernity. According to Vázquez (2022), decoloniality is "not just a set of conceptual tools," but is a politics and ethics (p. 22). To make visible the necessary programmatic of decoloniality in the context of the analysis of the scientific discourse on SG governance and its implications for climate coloniality, this research must think with the spaces outside the confines of its situatedness, isolation, and dominant thought structures, acknowledging the limitations of the research to unlearn modernity/decoloniality in such isolation. To engage in border thinking and think with those spaces that resist modernity that make the programmatic of decoloniality visible, I included as a methodology two semi-structured conversations by which the decolonial analytical frame could be strengthened in the interpretation of the results. Decoloniality encompasses the recovering of old and the forging of new methods of interdisciplinary analysis that do not contribute to long-standing Eurocentric systems of knowledge production (Maldonado-Torres, 2007; Martin et al., 2016). Accordingly, these conversations were not designed to produce findings, to gather data, or to attach other viewpoints to my own, but instead to contribute to the process of unlearning and delinking.

The first, more central conversation developed by this method was with Yuvelis Natalia Morales Blanco. This conversation represented an attempt at border thinking and thus was intended as a means only to *listen* to the sharing of Yuvelis' individual perspective and experience of climate change. This conversation attempted first to think with the place of struggle Yuvelis embodies and lives and to think with decoloniality as praxis by unlearning the Western, Northern conception of climate change I carry. The conversation with Yuvelis enabled a reflection on the plurality of resistance to climate coloniality, a plurality that was expected to be at least partially or substantially erased from the discourse on SG. According to Agboka (2014), non-extractive methodological approaches that enable a process of co-collaboration and learning as opposed to extractive forms of data collection are critical. This conversation was conducted in Spanish and translated in collaboration with Andrea Eidler, and the principal limitation

of this conversation is therefore the epistemic violence of my translation of Yuvelis' words and story. By translating this conversation into English and listening to her words not in their own form but in their translated form is a form of erasure, and further, the inclusion of her words in *Section 5.3* in their English translation perpetuates one of Western modernity's central violences (Vázquez, 2011). While this method of conversation limited the validity of creating a non-universalizing process of learning and unlearning in its translation, the conversation enabled a reflexive process of my own questioning this research, its methods, and its aims. The insights I carry with me from thinking *with* Yuvelis' 'otherwise' of climate coloniality contributed to making visible in the discussion section of this research the critical climate justice horizon.

The second, more supportive conversation developed by this method was with Tina Sikka. This conversation did not engage in border thinking as Tina also thinks from a place within modernity. However, the conversation as a method sought to listen to the ways in which the praxis offered by feminist empiricism could reveal the processes by which knowledge of SG and its governance and of climate change could (or could not) become open to plurality, thus connecting more explicitly the results of the discourse analysis and the knowledge on SG to the attempt at making visible the decolonial horizon. Further, this conversation and its gained insights attempted to provide a space of connection between the lessons (un)learned from listening to the embodied decolonial praxis of Yuvelis and the scientific context of knowledge production and the discursive perpetuation of climate coloniality, enabling a more targeted reflection on the implications for climate coloniality's 'otherwise' in the context of this research. From this conversation, I could reflect on Tina's approaches and sentiments regarding climate and knowledge production for SG derived from feminism frameworks to more meaningfully interpret the application of a decolonial analytical frame in the context of science for SG and its governance. In pluralizing the knowledge produced in the context of knowledge production on climate and its solutions, this conversation added to the critical discussion on the results of the analysis on climate coloniality and recommendations for future research.

## 3.6. RESEARCH LIMITATIONS

The first limitation of the research method is the limited selection of the top twenty authors according to average *g*–index, as some authors not included in this list fall very close behind in terms of prominence based on *g*–index to those included in the analysis. Because of this data selection method, these authors and their nearly-as-prominent research that is thus highly relevant for this analysis are excluded. This poses a limitation to the scope of the research as including other authors with similar prominence would add a more holistic examination of the field and would perhaps lead to different findings. Second, each text of course has an entire section that is not coded, and this context is important as well, though it is not sufficiently included for analysis. The narrowly defined deductive method of analysis for the presence

of certain narratives or resistances precludes a more holistic and inductive CDA by which other important findings could be determined. However, for the sake of the research objective, I prioritized based on the highly developed theoretical framework the more narrow deductive method. Third, while my English language bias did not pose significant limitations to the analysis itself as the field of prominent research and knowledge production on SG and its governance is dominated by Northern actors and thus is principally in English, it poses other limitations. While the analysis of the prominent scientific discourse on SG and its governance is not hindered by my English language barrier, I am only conducting and am able to conduct this research because of my English language bias and my subsequently Western-based understanding of climate change, and as such, most of the very words and concepts I use belong to the English language and to European imperial vernacular. Thus, in addition to my language bias adding principally to the ethical limitations of this research, the language bias limits the validity of the research as a method given that the very vernacular I take for granted in the analytical framework on climate coloniality may not be applicable or even valid according to other interpretations. Further, the scale of this research, though quite large given its technical constraints as a master's thesis, could be made extremely extensive as either the inclusion of other narratives in the analytical frame or the more in-depth examination of only one or some of the chosen narratives would enable much more holistic research for the former and much more thorough research for the latter. While a more thorough analysis would have enabled more reliable findings, the aim of the research was to expose the dominant discourses that mask the normalization of a Western imaginary, and thus an analysis on this wider range of narratives enables an investigation in line with the research objective. Further limitations that are specifically connected to the interpretation of the results within the chosen analytical frame of this research are elaborated in *Section 5.1* of the discussion.

## 4. RESULTS

By identifying and coding for the chosen set of narratives and their resistances, the analysis revealed which conceptualizations from a Western imaginary are present in the field of literature. The analysis thus revealed patterns of totalization within certain discourses, ideas, and framings across the particularly exclusive field of research on SG as a global climate solution. This section presents the results of the CDA – the dominant discourses within the prominent scientific discourse on the governance of SG, answering the fourth research sub-question:

> *SQ4. What narratives of modernity are normalized in the prominent scientific discourse on SG and its governance?*

First, I present the results of the data collection process as the material and political context of the discourse regarding the actors, affiliations, and positionalities implicated in the knowledge production on SG and its governance. I then present the results of the CDA by which the texts were found to align in terms of content on the overarching advocacy or opposition attitudes towards SG, thus resulting in a delineation of the results across the determined coding attribute of coalition type. I then present the dominant discourses as separate results sections for each of the three identified coalition types, followed by a section on the dominant discourses that transcend the field as a whole.

## 4.1. ACTORS, AFFILIATIONS, & POSITIONALITIES

A critical first result from the formulation of the CDA is the interpolation of individual/personal attributes of the authors included as those producing the most prominent scientific knowledge on SG and its governance. Of the 20 authors included in the analysis, each is male, each produces his prominent research in either North America or Europe, almost all are white, and almost all are of American or British nationality. While the larger yield of 68 authors from the original selection method includes less explicitly aligned authors and that includes women, people of color, younger authors, those from less prominent institutions, and those conducting research from Southern centers of knowledge production, their research is less prominent and thus are eclipsed in terms of research impact by the field's most dominant authors. Further, the research field from which the top-20 authors' individual *g*–index calculations were made represented research affiliated with the same most recurring institutions and entities, with the top being Harvard University, the University of California system, American University, Cornell University, University of Cambridge, Carnegie Institute for Science, and University of London. Given that power of knowledge is measured by control over and access to discourse (T. A. van Dijk, 1993), the homogeneity of the resulting pool of authors first in personal attributes and positionality and second in affiliations (all being elite American or British research institutes) poses serious implications for which groups and perspectives are thus necessarily more marginalized from the discourse: authors of color, female authors, authors of different geo-political contexts, and authors of less-prominent affiliated institutions. Further, the results from the g–index calculation method reveal the finding that some of the top-20 authors use only certain SG terminologies, while some use a more varied mix of different terminologies. While this finding is not sufficiently investigated given the scope of the research, lexicalization and the different use of the SG terminologies by different authors is a critical point for further investigation into the ways inaccessibility is thus perhaps more entrenched by certain groups of authors.

Turning to the results of the CDA, I present the demarcation of the discourse in connection with the result of determined coalition type for each author. Reading and analyzing each text enabled the determination of similarities in coding between authors of the same overarching attitude towards research on SG and its governance. In line with preceding studies, the data field displayed essentially two central streams of discourse across two distinct coalitions into which the 20 authors could be placed – with the exception of two authors for which a third neutral coalition was delineated. The 'climate engineering community' is indeed made up of two distinct coalitions reflecting two generally opposing discourses regarding SG and its governance: the first supportive of research and development, and the second opposing research and development. These coalitions I refer to hereupon as Coalition 1 and Coalition 2 respectively. While Coalition 1 includes 50% social scientists and 50% natural scientists, all of the natural scientists included in the CDA are in Coalition 1, and thus none of the natural scientists included in this research are found as opposing the proliferation of research on SG. In contrast, Coalition 2 is almost exclusively made up of social scientists who are generally more critical of and opposed to the proliferation of research on SG. Two authors were not so easily categorizable within these dominant coalitions, taking a more neutral stance within the debate and displaying different patterns in coding. Coalition 3 is therefore that neutral, indeterminable group of only two authors. While the results confirm this already observed delineation, I did not expect to be able to so easily distinguish discursive patterns in terms of narrative thinking along the lines of these more content-based coalitions with regards to SG and its governance. Thus, while the demarcation in argumentation and theme was predicted, the divisibility of texts into similar discursive, rhetorical usage types was unexpected to the resulting degree. For this reason, the results are presented according to coalition type and interpreted thus.

## 4.3. QUANTITATIVE RESULTS: USAGE OF THE NARRATIVES

The CDA by which the twelve narratives and their resistances were deductively identified within the 40 texts produced quantitative results for each narrative and resistance. Given the previously stated alignment of each case (author and their two texts) within one of the three coalition types, I chose to primarily assess the quantitative findings of the results as according to coalition type, leaving out targeted comparisons of individual authors or results based on other case attributes, though these investigations could be interesting points for future research. The quantitative usage of the narratives according to coalition type is presented below in *Table 4*, with the amount of text coded for each narrative displayed as a percentage out of the total text field of that coalition.

*Table 4.* The percentage coverage of each of the twelve narratives for each coalition (as a percentage out of the total possible text for that coalition)

|  | Coalition 1 | Coalition 2 | Coalition 3 |
|---|---|---|---|
| *N01. The nature/humanity narrative* | 17% | 1% | 5% |
| *N02. The catastrophe narrative* | 3% | 1% | 20% |
| *N03. The futuring narrative* | 22% | 15% | 20% |
| *N04. The neutrality narrative* | 18% | 2% | 4% |
| *N05. The forced choice narrative* | 10% | 0% | 10% |
| *N06. The utilitarian narrative* | 21% | 2% | 16% |
| *N07. The rationalist narrative* | 6% | 0% | 1% |
| *N08. The progress narrative* | 10% | 1% | 9% |
| *N09. The inevitability narrative* | 3% | 20% | 3% |
| *N10. The humanity narrative* | 20% | 5% | 4% |
| *N11. The damage narrative* | 16% | 3% | 0% |
| *N12. The representation narrative* | 14% | 4% | 9% |

Given the obvious condition that the lengths of the texts differ and thus the size of total text field for each coalition differs, the percentage coverage result enables a fair cross-comparison of the narrative usage across the coalition types as it represents a calculation of the relative percentage of the total possible text field. The percentage coverage results show that Coalition 1 exhibits the highest average narrative usage with 13%, Coalition 3 exhibiting the next highest average usage with 8%, and Coalition 2 lastly with 5%. As seen in *Table 4*, only one narrative runs heavily and consistently throughout the entire community: the futuring narrative (N03.). The results show significant differences across the coalitions. As seen in *Table 4*, four narratives run almost exclusively through Coalition 1: the nature/humanity narrative (N01.), the neutrality narrative (N04.), the humanity narrative (N10.), and the damage narrative (N11.). One narrative runs almost exclusively through Coalition 2: the inevitability narrative (N09.), and one narrative runs almost exclusively through Coalition 3: the catastrophe narrative (N02). Some narratives run more heavily and sometimes almost exclusively through Coalitions 1 and 3 and not in Coalition 2 – the forced choice narrative (N05.) and the progress narrative (N08.).

A similar set of quantitative results for the presence of the twelve resistances is produced. The quantitative usage of the resistances for each coalition type is presented below in *Table 5*, the amount of text coded for each resistance also displayed as a percentage out of the total text field of that coalition.

*Table 5.* The percentage coverage of each of the twelve resistances for each coalition (as a percentage out of the total possible text for that coalition)

|  | Coalition 1 | Coalition 2 | Coalition 3 |
|---|---|---|---|
| *R01. Resistance to nature/humanity* | 4% | 8% | 4% |
| *R02. Resistance to catastrophe* | 2% | 2% | 0% |
| *R03. Resistance to futuring* | 5% | 7% | 3% |
| *R04. Resistance to neutrality* | 17% | 24% | 37% |

| | | | |
|---|---|---|---|
| R05. Resistance to forced choice | 3% | 7% | 0% |
| R06. Resistance to utilitarian | 11% | 17% | 13% |
| R07. Resistance to rationalist | 22% | 13% | 20% |
| R08. Resistance to progress | 1% | 4% | 2% |
| R09. Resistance to inevitability | 4% | 1% | 2% |
| R10. Resistance to humanity | 18% | 13% | 16% |
| R11. Resistance to damage | 1% | 1% | 1% |
| R12. Resistance to representation | 4% | 14% | 10% |

Unlike the quantitative results for the narratives, most resistances are consistent across the coalitions as there are no significant differences in average resistance usage across the coalitions, with Coalition 1 exhibiting an average resistance usage of 8% and Coalitions 2 and 3 both with 9% and further demonstrating similar resistance types across the coalitions. This compares with the narrative usage findings that displayed high differences in both which narratives were identified and to which extent. As seen in *Table 5*, the resistances with the highest percentage coverage are the resistance to the neutrality narrative (R04.), resistance to the rationalist narrative (R07.), resistance to the humanity narrative (R10.), and resistance to the utilitarian narrative (R06.). Only one resistance shows significant difference across the coalitions, with Coalitions 2 and 3 exhibiting 14% and 10% of resistance to the representation narrative (R12.) respectively, while Coalition 1 only exhibits 4%.

In comparing the narrative results with the resistance results, several relationships become clear. Some narratives that are used highly throughout the field are accompanied by a somewhat high usage of their respective resistance by the same coalition, thus pointing to a discourse that exhibits a more quantitatively balanced representation of a Western imaginary. On the other hand, some highly used narratives do not see any usage of their respective resistance within those coalitions, indicating some narratives in the discourse that are more totalizing of a Western imaginary. Thus, as some narratives are more ingrained in the discourse due to an absence of their polarity, it is critical to examine these narratives closely. Critically, for each coalition, the futuring narrative (N03) is highly ingrained. Further, each coalition exhibits at least one highly ingrained narrative unique to that coalition. The most ingrained narratives for Coalition 1 are the nature/humanity narrative (N01.), the representation narrative (N12.), the damage narrative (N11.), and the progress narrative (N08). The most ingrained narrative for Coalition 2 is the inevitability narrative (N09.), and the most ingrained narrative for Coalition 3 is the catastrophe narrative (N02.). Following from the result of which narratives are most ingrained due to their absence of significant resistance, the results enable a determination of which narratives are most quantitatively balanced in the discourses. The most 'balanced' narratives in Coalition 1 are the neutrality narrative (N04.), the utilitarian narrative (N06.), and the humanity narrative (N10.), while the most balanced narratives in Coalition 3 are the utilitarian narrative (N06.) and the representation narrative (N23.). Coalition 2 displays no balanced narratives in the sense that neither of its two narratives exhibiting significant usage are matched by a high usage of their resistance. While quantitatively the aspect of a

balanced narrative can be determined, this result does not assume as balanced the ways in which the narratives are countered by their resistance, as perhaps the function of a balanced narrative may reveal discourses that are most controversial where perhaps usage of the resistance serves certain justification purposes or other strategies, a nuance to be examined in the qualitative section.

## 4.4. QUALITATIVE RESULTS: THE DOMINANT DISCOURSES

Following from the general quantitative results of narrative and resistance usage across the data field, this section presents the qualitative results by which the presence of the narratives and resistances is interpreted to reveal the dominant discourses within each coalition. After separately presenting the narrative results and the discourses unique to each coalition, I examine separately the only narrative employed similarly throughout each coalition type and the dominant discourse that transcends the research field as a whole. The results reveal the dominant discourses normalized within the prominent scientific discourse on SG that either totalize or resist totalization of a Western imaginary, enabling a more critical discussion of the results in *Section 5*.

### 4.4.1. THE DOMINANT DISCOURSES: COALITION 1

Coalition 1 is that which adorns a supportive view of research for SG and its governance and aligns with a more advocacy-oriented approach regarding the future development of research for SG. The central discourse advanced by Coalition 1 is the idea that research on the governance of SG should be pursued and further advanced. Coalition 1 asserts that SG research must be ramped up to the level of a serious, embedded, mission-driven international research program or entity, regardless of whether deployment will eventually be pursued or not. The discourse urges the problematic nature of its own SG governance research in its uncertainty, followed by the idea that with more vigorous, dedicated research, this problematic uncertainty can be reduced. 14 out of the 20 authors included in the data pool align with Coalition 1, and thus the Coalition 1 discourse is made up of the majority of the field with 28 of the 40 total texts. Some of the twelve narratives are present almost exclusively within Coalition 1, as examined above in *Section 4.3*. The top narratives and resistances identified in the Coalition 1 discourse can be seen below in *Table 6*.

*Table 6.* The top narratives and resistances identified in the Coalition 1 discourse (as a percentage out of the total possible discourse)

| Top narratives | N06. Utilitarian (21%) |
| | N10. Humanity (20%) |
| | N04. Neutrality (18%) |

| | N01. Nature/humanity (17%) |
|---|---|
| | N11. Damage (16%) |
| Top resistances | R07. Rationalist (22%) |
| | R10. Humanity (18%) |
| | R04. Neutrality (17%) |
| | R06. Utilitarian (11%) |

The CDA resulted in a qualitative interpretation of the Coalition 1 discourse as marked largely by a favorability of technical evidence, a prioritization of risk/benefit dichotomies, and a removal of fundamental questions of ideology, epistemology, and situatedness. The logic behind this central discourse advocating for greater proliferation of research is made up of several overlapping and interrelated narratives. First, the discourse is reliant on a focus on the feasibility question behind SG, a focus that is enabled by the conceptualization of a technical 'Earth' removed from its socio-political context (N01. nature/humanity). Next, the discourse presents the idea that the hypothetical ends of SG can be technically known and that these ends might trump the means of SG, presenting a hypothetical scenario of utilitarian logic that can be informed legitimately through technical research (N06. utilitarian). Further, the discourse normalizes the idea that technical expertise behind SG is objective and can contribute to the well-informed future governance of SG in a largely unbiased manner (N04. neutrality). Finally, the discourse presents the idea that a universal humanity is together facing climate change and climate inaction, but that research must be developed for the sake of the developing, vulnerable world (N10. humanity; R10. resistance to humanity).

### Feasibility of SG for a technical 'Earth'

Coalition 1 largely exhibits an environmental and technical focus when understanding, framing, and assessing the governance of solar geoengineering, a focus that depreciates the critical historical, socio-political context implicated. The discourse exhibits the idea that research into SG and its governance should be pursued because knowledge about the hypothetical impacts and technical feasibility of SG must be and can be understood *before* and *in isolation of* the historical, socio-political context. Central to this line of reasoning is the fundamental separation between the natural world and its societies that Coalition 1 authors normalize as the basis of their technical focus, a conceptualization that does not appear at all significantly in the other coalitions (17% for Coalition 1, 1% for Coalition 2, and 5% for Coalition 3). Coalition 1 scholarship mainly addresses the current body of natural science investigations of SG, and thus a focus on the technical aspects of SG and its governance was expected. However, the discourse works to normalize a fundamental conception of the natural world that aligns with a Western view of earth and the role of science.

The discourse makes claims of limited scope, with some asserting a limited focus "exclusively on natural science and engineering questions" (Morrow, 2020, p. 627), or that "the goal is to evaluate the physical

consequences of SG" (Keith & Irvine, 2016, p. 551). Common claims of this nature propose a self-imposed focus on the natural science-based aspects of SG that sees the technical, planetary operation of SG as a removable phenomenon to be re-introduced later to its deeply important historical, socio-political context. Coalition 1 scholarship conceives of and presents the planet or the climate as a separate, investigable, treatable, and technical entity with the general removal of humans from nature in the discourse via language of dichotomies, the most common being the Earth system vs. society, human systems vs. natural systems, and differentiated treatment of people and of climate. The common conceptualization of the climate system as separable from its historical, societal context enables the pursuant reasoning that the climate and SG can (at least primarily) be researched and therefore known in isolation of this context, with rhetoric presenting climate change as environmental *before* it is historical/political/societal:

> "Anthropogenic climate change is arguably the most important and difficult *environmental* [emphasis added] problem that presently confronts global society." (Reynolds, 2019b, p. 8)

The discourse establishes an ordering to the conceptualization of the natural world in terms of SG, whereby the technical knowability of climate and its solutions *precede* relevant societal or political questions. In line with van Dijk's (2001) notion of ordering and primacy, rhetoric that creates this ordering asserts the technical nature of climate change and of SG as the first or most important character. This ordering tendency appears with statements like: "Climate change is foremost an atmospheric phenomenon" (Reynolds, 2019b, p. 92) or "Without a better sense of the content and character of technical decisions···, it is difficult to fully gauge their political implications for governance of solar geoengineering" (MacMartin et al., 2019). This logic advances a Western imaginary as the discourse boasts the (at least primary) separability of natural investigations from societal ones and a positivist attitude towards science in general. Further, a global gaze – a removed, powerful gaze-from-above – is employed as nature is approached as a 'terrestrial infrastructure' subject to human investigation and stewardship (Bäckstrand & Lövbrand, 2006; Litfin, 1997). While the authors obviously find importance in the historical, socio-political context of climate and of SG, their rhetorical emphasis on climate change and SG as *first* a question of technicality remands the political ecology of climate change and SG to a secondary position.

The isolation of climate change and SG from its historical, socio-political context is normalized in the discourse further as rhetoric of optimization. If through SG research a hypothetical climate and its aspects can be known, the discourse follows that humans can potentially examine the optimization of the climate. According to the discourse, the notion of "a desired climate" or "an ideal climate, nature vs. artifice, etc." can be explored technically (MacMartin et al., 2021). Language such as "the partial control over the climate that solar geoengineering would allow" (Irvine et al., 2016, p. 815) introduces the concept of physical mastery, over at least the technical 'Earth', further normalized by rhetoric of control: a hypothetical "conscious planetary management" (Lawrence et al., 2018, p. 13) made up of decisions about

"which climatic conditions countries would prefer" (Reynolds, 2019b, p. 199) would make up some determinable (or indeterminable) process of 'setting the global thermostat'. Such unchallenging logic of adaptive management or 'eco-managerialism'– introducing engineered things to make things better – silences other conceptions and relies on assumptions of Western values of management and design. All Coalition 1 texts contain rhetoric that "geoengineering is a design problem" (MacMartin et al., 2021, p. 19):

> "Here, 'design' does not mean specifying a particular institutional architecture for making basic political decisions about solar geoengineering, but rather, planning the precise physical and chemical attributes of a specific solar geoengineering intervention scheme." (MacMartin et al., 2019, p. 1327)

By first framing the climate as a separate entity that can be assessed with precision via technical investigations alone, an ideology of control over natural phenomena is enabled, one held most singularly by a Western imaginary. The idea of design translates the notion of SG into a series of "operational decisions,… technical in nature," by which "different climate outcomes" are weighed against each other (MacMartin et al., 2019, p. 1327). While the discourse displays some awareness of the issue with this Western conceptualization of 'nature', with phrases like "despite risking a kind of disrespect for nature, the potential for SSAI to reduce climate-related injustice tips the moral scales" (Svoboda et al., 2018), there is a fundamental treatment of this 'nature' as a removed, depoliticized entity that humans can intervene in. A specific interpretation of governmentality is advanced via the rhetoric of design, as 'eco-managerialist' articulations of earth classify and legitimize this dominant technical approach to the planet. This kind of discourse offers top-down expressions of the planet and environmental change that marginalize other understandings (Fogel, 2003), and it is this fundamental conceptualization of a technical 'Earth' that can be tweaked, optimized, and altered that enables the weighing of benefits and risks and the assessment of SG as a less important means to a more important end.

### *The ends of SG might trump the means, and the ends can be technically known*

Following from the fundamental conceptualization of a separate, treatable climate that can be known first as removed from its societal context, the discourse normalizes a hypothetical justification for a solar-engineered climate via a utilitarian framing of SG and a hypothetical determination of the benefits and risks of SG that *begins* from a context that is removed from the socio-political. If SG is a technical design problem, there is a process of determining the desirable goals and ultimate benefits of SG based on certain 'characterizations of climate change'. Evident in the discourse is again an ordering or primacy tool by which the role of the technical and the role of the socio-political are ordered, with the technical preceding (in time) the socio-political: "The choice of goal is primarily a social and political issue, *informed by* [emphasis added] scientific and engineering assessment" (MacMartin et al., 2016, p. 545). The discourse presents a reliance on technical expertise as the initial birthplace of knowledge for decision-making and governance on SG, with language like *should, it is necessary, must, needed,* etc.

with regards to the initial role of technical knowledge of SG in hypothetical decision-making processes – a rhetoric to be examined as connected with the scientific neutrality narrative examined next in this section.

Following from the idea that technical expertise must precede and form the basis of knowledge in hypothetical decision-making processes around SG, the discourse tends to portray a utilitarian framing of SG. Rhetoric reducing the hypothetical decision-making of SG to its ultimate benefits vs. potential risks (its ends vs. means) normalizes this framing as utilitarian logic establishes a focus on the hypothetical end-goal to be achieved as opposed to its procedural risks. Common in the discourse is the recognition that any potential decision on the deployment of SG is extremely complex, and that "deployment is not a univariate decision" (MacMartin et al., 2019, p. 1328) but is a process of determining goals that "would involve trade-offs between various objectives" (Irvine et al., 2016, p. 826). The discourse presents the idea of a hypothetical, future exploration of the "basic risk-benefit trade-offs" (Keith, 2013, p. 19) of SG, an exploration that eventually must belong to the realm of the social/political. Importantly, the discourse presents moments of resistance to utilitarian thinking, with authors recognizing that some risks may not be offset by "contributions to the greater good" (Morrow et al., 2009, p. 6), that it cannot be asserted that "the risks of a world with some moderate amount of SG would be less simply if the radiative forcing were reduced" (Keith & Irvine, 2016, p. 551), that "the ultimate goals of reducing climate damages are more complicated and multidimensional" (MacMartin et al., 2019, p. 1332), and that hypothetical future decisions "should not be based solely upon the reduction of aggregated physical risks of climate change and solar geoengineering and the maximization of any co-benefits" (Reynolds, 2019b, p. 200). However, while the discourse points to these obvious limitations of asserting the overall benefits or risks to be incurred from SG, the rhetoric simultaneously normalizes a utilitarian framing by which the idea of benefits – of a global reduction in climate impacts – is emphasized:

> "The implementation of solar geoengineering would⋯ be a public good, in that its effects would be nonexcludable. Models presently indicate that, under conditions of elevated atmospheric greenhouse gas concentrations, its judicious use would reduce climate change and it would thus be a beneficial public good, at least for most regions." (Reynolds, 2019b, p. 56)

The discourse normalizes stark value judgments about the benefit to be derived from SG, laying out a subliminal utilitarian framing of this supposedly hypothetical, future, political calculus. The discourse normalizes assumptions about the ultimate value to be derived from SG, with little exceptions to this kind of thinking, ridden with assumptive language about a "net global benefit" (Ricke et al., 2013, p. 6) to be hypothetically derived from SG: "the implementation of solar geoengineering would⋯ be a public good" (Reynolds, 2019b, p. 56), "SRM would likely provide net benefits in the near term" (Horton & Keith, 2016), it would "benefit many regions that are vulnerable to climate change, with few losers" (Rahman et al., 2018, p. 24), and "physical harms or risks that are small compared with the aggregated benefits of reduced climate hazards" (Keith, 2021, p. 813). While this utilitarian framing usually takes

place via hypothetical language regarding specific governance scenarios and is not professed as direct recommendations, the discourse normalizes this kind of framing by which a few experts can speculate (with limitation) as to the ultimate goal to be prioritized for all. From this logic arises the notion of intention with language of a "well-intentioned deployment," "well-designed climate interventions" (MacMartin et al., 2021, p. 17, 31), a "well-informed future decision" (MacMartin et al., 2016, p. 546), "judicious implementation" (Reynolds, 2019b, p. 113), or an intervention that if "properly designed" would "benefit the rest of the world" (Horton & Keith, 2016):

> "A benevolent deployment aims at some measure of distributive justice such as a Rawlsian difference principle (greatest benefit to the poorest) or a utilitarian maximization of benefits. Benevolence is a claim about intentions, not outcomes." (Keith, 2021, p. 813)

The notion of a well-intentioned climate intervention is normalized in the framing of a scenario by which some decision-making entity could pursue 'idealized reductions' by weighing benefits against 'undesirable effects'. The discourse normalizes exceptionalist speculation regarding governance for SG: "Who, if anyone, has the legitimate authority to make decisions regarding intentionally changing the world's climate? Would the threat or onset of extreme climate change justify doing so?" (Reynolds, 2019b, p. 2). While language emphasizing the potential benefits of SG is not Western in itself, the exceptionalist assumption made throughout the discourse that there is indeed one end goal that would be shared by all of 'humanity' that may likely warrant whatever means necessary – "the ultimate goal of climate stability" (MacMartin et al., 2019, p. 1335) – totalizes a reductionist conception of the world based on an expert view-from-above with the rationality to determine 'humanity's' best interests. Though authors in Coalition 1 identify the problematic nature of utilitarian logic in its risks of aggregation and oversimplification (Keith, 2013), they normalize this kind of logic throughout, outlining in simple terms what for Coalition 1 would be a "technically idealized scenario" of SG, one that would "(a) substantially reduce the global aggregate risks of climate change, (b) without making any country worse off, and (c) with the aggregate risks from side-effects being small in comparison to the reduction in climate risks" (D. W. Keith & Irvine, 2016). Such a discourse first bolsters research that makes claims to the benefits and risks of SG as certain and pure in its assessment, and secondly normalizes climate stability as the ultimate goal to be achieved for the entire world.

Finally, language within this utilitarian hypothetical scenario bolsters the discourse's central belief – that research is beneficial and crucial. This kind of rhetoric is enabled via the construction of subjectivity of the 'we' in the discourse that ascribes a category of expert agency to the authors, resulting discursively in power via language of instruction, recommendation, and advice (T. A. van Dijk, 2008). For Coalition 1, assessing the goals of SG is a future decision by policymakers, one that should be informed by current research that addresses such questions of overall benefits to be gained. Such an assessment, a complex process of "risk-knowledge calculus" "would require the input of a wide, interdisciplinary range of experts, including ethicists, lawyers, and representatives of the community—which, in this case, would be the

global community" (Morrow et al., 2009, p. 6). Coalition 1 authors emphasize the importance of this future decision-making scenario as a means to justify current and future research. For Keith & Irvine (2016), "the central justification—and goal—of research on SG should be to inform policy choices about climate policy and the further development of the technology" (p. 550). Importantly, while the discourse claims not to be the one weighing the benefits with the risks and places this decision in the future and elsewhere, the rhetoric of this future, well-informed, well-intentioned decision on SG will rely on such supposedly independent, objective, isolated 'evidence'. Research to inform this future balancing of benefits vs. risks is framed in the discourse as a responsibility of scientists: to "explore it, understand it deeply, and eventually describe the key points of this understanding in terms accessible to the educated public and policy-making communities, in order to support well-informed decisions on geoengineering in the future" (Lawrence, 2006, p. 247) and thus, potentially "considering research as a public good" (Lawrence et al., 2018, p. 5). I find a discursive presentation of the agency of Coalition 1 not only as the scientists (information producers) but also as the 'knowledge brokers' (information framers), those with "a flair for translating science, often with a 'spin', into language accessible to decision-makers," making authoritative knowledge claims under conditions of uncertainty – a form of discursive power (Litfin, 1994, p. 253). Advocating for this agency as a means by which further knowledge must be 'brokered', there is an assumption of credibility and a rendering of values as fact:

> "If we do not conduct careful research now, we will not be prepared to advise politicians on how to best approach large-scale geoengineering applications – including providing sound information on the various risks involved, and on which ideas should not be pursued further." (Lawrence, 2006, p. 246)

The discourse favors a hypothetical manner by which a kind of neutrality is claimed via the removal of subjectivity from the rhetoric, normalizing the idea that research can and would inform good policy decisions on the governance decisions surrounding SG but that the research itself does not reflect such decisions. Importantly, the agency of scientists presented in the discourse implicates their framing of the science itself, a process usually driven by explicit political purposes (Litfin, 1994) – contrary to the depoliticizing claims.

### *Technical expertise for well-informed SG governance is objective and can be unbiased*

The discourse that normalizes a positivist view of natural science and a utilitarian proclivity for framing SG is bolstered by the equally present narrative of neutrality of the research. The discourse presents positivist language that paints the science and the research behind SG as objective fact, with highly common terminology such as *state-of-the-art* knowledge, scientific *evidence*, and technical *expertise* derived from "the community of climate change *experts* [emphasis added]" (Reynolds, 2021, p. 2). The discourse presents its own research with a rhetoric of confidence, with statements such as "the underlying science is sound" (Keith, 2013, p. 7), "there is sufficient confidence in simulations of SAG" (MacMartin

et al., 2016, p. 543), and more optimism that fosters a positive self-presentation of the dominant group (T. A. van Dijk, 2008). What arises in the discourse is an assertion that the evidence being produced can be taken largely as objective. While I seek here to explain the discourse of neutrality identified in the logic advanced in Coalition 1, I account for the balanced presence of resistance to the neutrality narrative (R04.) in the discourse by showing how subjectivity is first made present contextually by the coalition but then erased from the logic of the discourse itself.

While I find that the discourse normalizes a certain logic of objectivity, it is important to examine that Coalition 1 authors *do* understand their own subjectivity. The discourse possesses key moments of resistance to the neutrality narrative in which authors recognize the role of personal biases, norms, values, "personal, value-laden judgments" (Keith, 2013, p. 9), "personal judgments of the moral weight we accord to competing interests" (Keith, 2013 p. 21), and "underlying psychological biases and heuristics" (Parker, 2014, p. 8). There is a tone of regret in the rhetoric illustrating the impossibility of removing completely the political from the technical, acknowledging the necessary subjectivity of research "given the omnipresence of power dynamics in social relationships including those involving scientists, engineers, and supposedly apolitical technocrats" (MacMartin et al., 2019, p. 1335). Coalition 1 exhibits an understanding of the personal nature of research and accordingly exhibits in the discourse some degree of resistance to the neutrality narrative. On the interests of researchers, Reynolds & Parson (2020) note:

> "Researchers' interests, like those of other actors, reflect a combination of material self-interest in professional success and advancement, social approval and reputation, and internal normative commitments to advancing knowledge and doing so in socially beneficial ways." (p. 330)

Further, they admit that "In some fields, scientists act as entrepreneurs promoting commercial applications of their work and thus face incentives that can be in tension with scientific norms" (Reynolds & Parson, 2020, p. 330), and authors tend to agree that, especially given the unique technological context of SG, "In making science a passive discoverer-of-facts it buries the active role of the technology's developers" (Keith, 2013, p. 42). Significantly, however, there is a commonly shared follow-up logic to the coalitions acknowledgments of subjectivity: a profession of the inapplicability of these dangers of subjectivity to the Coalition 1 research itself. On the potential biases and incentives facing scientists in such entrepreneurial fields: "...this is not currently the case for solar geoengineering and appears unlikely⋯ there will not be great fortunes to be made, and state actors will be in charge of making major decisions" (Reynolds & Parson, 2020, p. 330). It occurs commonly that Coalition 1 is first aware of researcher subjectivity, but second sees technical SG research as exempt from this subjectivity due to certain contextual characteristics of the field (which are subjective readings of the context themselves). Despite a general recognition in the discourse of individual subjectivity, for Coalition 1, "The most important constraints to solar geoengineering researchers' ability to contribute to effective governance *pertain not to interests* [emphasis added], but to capacity and knowledge" (Reynolds & Parson, 2020). Similarly, Caldeira & Bala (2017) assert regarding the researchers belonging to the technical, empirical

field of SG that "While their personal opinions may be interesting,⋯their normative or prescriptive opinions are not a part of their fundamental scientific contributions" (p. 12). Thus, arising peculiarly from the very recognition of non-neutrality itself and the existence of subjectivity, the discourse assumes some sort of exemption of Coalition 1 authors, presenting instead the idea that the science produced by these unfortunately subjective researchers is itself fortunately not subjective.

As one of the central themes of the discourse of Coalition 1 is that the current level of uncertainty surrounding SG and its governance translates to a need for more research, there is a relationship created in the rhetoric by which higher certainty is equated with or related to a lack of subjectivity. For Coalition 1, uncertainty can be reduced with more research, which is a major goal to support broader scientific assumptions with clear evidence. They see the issues with modeling in their uncertainty and in the fact that "physical scientists are imperfect, and sometimes make empirical claims that go far beyond the empirical data" (Caldeira & Bala, 2017, p. 13), so are imperfect in their output, not in their input. While authors in Coalition 1 regularly acknowledge uncertainty within the models and research limitations, they also normalize the narrative that the uncertainty stems from insufficient development of the research, not from personal biases, individual subjectivities, or situatedness (MacMartin et al., 2016). The discursive focus on the uncertainties related to SG and its governance as technical in nature and due to insufficient research removes emphasis on the myriad of potential uncertainties that may arise due to the fundamental subjective nature of research. For Svoboda et al. (2018), "While this deep uncertainty should limit our confidence in these early projections of the effects of SSAI, there is currently no reason to believe that there is a systematic model bias that exaggerates either the benefits or the risks of SSAI" (p. 12). The discourse points to model bias as the only problematic bias even as models are "based upon assumptions about the natural and social world" (Reynolds, 2019b, p. 26), asserting that even such a purely technical bias is not present.

The reliance on the technical knowledge of Coalition 1 is yet again emphasized in the discourse via rhetoric that separates science from subjectivity, removing any notion of the subjective/emotional/feminine/natural from the hypothetical 'good governance' scenarios examined in the discourse and thus from the goal of the research itself. The idea of an expert body of technical scientists that possess the rationality to put aside their individual biases or emotions and provide factual evidence for hypothetical future governance decisions on SG is created in the discourse. Both regarding the researchers and the potential subjects involved in hypothetical decision-making and deliberation, the discourse ascribes a negative value to subjectivity: "It might seem remarkable that mere norms would have substantial influence on decision-making in arguably the most consequential of international affairs" (Reynolds, 2019b, p. 220). Similar value-laden rhetoric that enacts a positive tone towards objectivity and a negative tone towards subjectivity alludes optimistically to a body of experts "willing to rationally assess" (Reynolds, 2021, p. 6) SG, language that implies the ability of certain actors to elect to objectivity and others falling victim to their emotions. Here arises the self-determined opposition between those

rational, technical scientists and those irrational others (mostly social scientists who are critically opposed to the proliferation of SG research), whose "discourse is unduly driven by intuition, ideology, and pre-existing conclusions instead of empiricism and rationality" (Reynolds, 2019b, p. 222). The discourse works to erase subjectivity from the realm of its knowledge, aligning natural science with reason and objectivity and social science with emotion and subjectivity. While the discourse presents moments of resistance to the neutrality narrative in understanding the limitations of the coalition, noting that "expertise in one discipline is not strongly correlated with accurate judgments in other domains" (Keith, 2021, p. 814) or confessing on behalf of the coalition the need for "actively opening up discussions to critical questioning and reframing" (Lawrence et al., 2018, p. 13), there is an overall assumption of objectivity in comparison with more irrational, subjective actors, namely Coalition 2.

After erasing the subjectivity from its own space of natural science, the discourse tends to then negatively attribute subjectivity to the domain of non-technical questions regarding SG and its governance. Coalition 1 displays a logic of neutrality that is used to remand questions of a more fundamental societal, historical, political, emotional, spiritual, and embodied nature to the category of non-science, one of modernity's epistemological violences. In addressing the non-technical domain of SG governance questions, Caldeira & Bala (2017) assert:

> "Some of the most important questions facing us are not scientific questions even though scientific information is relevant to their answers: What is right and wrong and what should we or should we not do? Studies that directly address such questions can be of utmost importance, but they are fundamentally not scientific studies." (p. 13)

The discourse advances the idea that the science of Coalition 1 is objective-without-parentheses, while the science of Coalition 2 is subjective, non-empirical, non-valid. By asserting its own objectivity as more just or necessary, the discourse predetermines the qualities by which SG research is deemed legitimate, in turn perpetuating the restricted, homogenous access of Coalition 1 to the discourse and to the knowledge production. The discourse points to opposing attitudes towards SG as not similarly legitimate in their categorization as *reactions*, *instincts*, or *intuitions*, compared with the language associated with the positive, technical views of SG by Coalition 1 as *careful*, *evidence-based*, and *scientifically sound*. The direct and indirect discrediting of less empirical, social science-oriented researchers – and global publics in general – is an act of discursive dominance by which more negative representations of the out-group are contributed (T. A. van Dijk, 2008). Following the removal and demonization of subjectivity, the discourse makes the argument that technical SG researchers will thus play a fundamental role in any hypothetical governance of SG as they possess the objective, non-emotional expertise and knowledge required to inform rational scenario thinking. Echoing the utilitarian logic by which Coalition 1 frame and present the benefits and risks to be measured in the assessment of SG as a climate solution, the discourse reasons that the governance of SG must be facilitated by objective, unbiased scientists:

"…Decisions would be characterized by a need to insulate decision processes from broader debates about the overall purposes, goals, and objectives of geoengineering. Given the specialized knowledge required for making sound operational decisions and probability estimates based on statistical methods, substantial decision-making authority would need to be delegated to technical experts. These decisions would need to be largely 'apolitical' in order to ensure consistency and predictability, in support of the ultimate goal of climate stability." (MacMartin et al., 2021, p. 30)

While here specifically referring to adaptive decisions post-deployment and not to the initial, broader hypothetical decision-making process that would precede pursuit of SG, the language still legitimizes this more important role of the empirical researcher. For Coalition 1, "political processes may… be ill-suited to these decisions because of the technical knowledge needed to determine the appropriate action" (MacMartin et al., 2019, p. 1335), and a rhetoric of worry is cast by the language that warns against subjective interference: "Coherent decision-making in such a setting will pose difficult challenges of keeping decision-making linked to scientific understanding…" (Parson & Ernst, 2013, p. 329). Though on one hand the discourse emphasizes the subjectivity of such decisions on SG, with admissions that "Design requires a designer. Every designer starts with some human need they aim to satisfy, and their conception of that need in turn drives their design" (Keith, 2013, p. 42), and "There is no value-free resolution to trade-offs between the benefits and harms of SG" (Keith, 2021, p. 815), this recognition obscures the temporality of subjectivity, locating it only in the external, political space. Noting the goal of technical research of SG as "ensuring that the results are reported to the public and policy-making sectors as clearly and responsibly as possible" (Lawrence, 2006, p. 245), the active role of the researcher becomes nominalized, and the process of responsible reporting becomes a reified noun, therefore assuming into existence this process of neutral scientific contribution. Importantly, this nominalization occurs even regarding research to inform the ethical decision-making with claims that "whether or not SRM would be morally appropriate in this complex ethical landscape is a question that can be answered *only* [emphasis added] by broad-based research on solar geoengineering" (Horton & Keith, 2016). With the removal of an agent from the landscape of both technical and less empirical investigations for SG, it is implied that only once science moves into the political space does subjectivity re-enter, rejecting the question of the subjectivity within the research itself completely.

### *We (all) are facing climate inaction, but 'we' (us) need to act on behalf of the developing world*

The last central discourse belonging to Coalition 1 offers an intriguing result in that the discourse displays an almost equally balanced usage of the humanity narrative (N10.) and its resistance (R10.). I assert that the balanced usage of the humanity narrative and its resistance within Coalition 1 can be explained by its normalization of language that conceives of a universal 'humanity', a we (all) and its simultaneous, contradictory rhetoric of 'we' (us) advancing research for the purpose of saving the developing world. Evident within the discourse is the normalization of the humanity narrative first in the rhetorical tendency for Coalition 1 authors to employ the 'all-things-equal' notion to speculate on aspects of SG and its

governance. The *ceteris paribus* principle, used commonly in natural science-based research, implies holding all variables constant to observe the effects of a single, chosen variable. A common rhetorical pattern in the discourse, employed by almost each scholar in Coalition 1, is the language of: *all else being equal, all things being equal, holding all else··· equal, all else equal, on equal terms, on equal footing, other things being equal, and all other things being equal.* This language is employed throughout the discourse when addressing a varied manner of topics, with the 'all else' referring to SG-related scenarios, models, impacts, conditions, or policies. The natural science tendency to apply blanket assumptions for universal and equal preferences and/or criteria to isolate independent variables in the treatment of climate scenarios and their potential, investigable impacts in reality normalizes the at least technical possibility of a universalized, undifferentiated, base-line 'humanity' that can be conceived of as severed from its difference in reality. While not problematic in its mere usage, this rhetoric legitimizes a scientific view-from-above gaze of a fictional, technical world, removed of existing, real, critical contexts, normalizing a dehistoricized, depoliticized approach to SG.

The normalization of the humanity narrative for Coalition 1 occurs most commonly as the rhetorical erasure of the critical division of attribution of climate change to the 12%–80% as opposed to the human species as a whole. Subtle language within the discourse erases the historical a-humanity behind climate change by normalizing terms that foster a conception of a universal 'humanity' in relation to climate change: *humanity's role, human action, human impacts, human activities, human decisions, human perturbations to the climate system, we have changed the atmospheric concentrations, the carbon we've pumped into the air, if we keep emitting, humanity's carbon emissions, humanity's fossil fuel combustion, humanity's rapid···transfer of carbon, our greenhouse gas emissions, our emissions, the human footprint on nature, humans' relationship with nature, humans have shaped the natural world, we must cut emissions, until humanity cuts its emissions, our emissions.* The 'we' language in the discourse works to normalize a certain classification of the subject/object via selective humanism. Similar rhetoric is used but that doesn't necessarily use 'we' language, but that paints a picture of universal predicament from collectively caused climate change: "Growing emissions are an unintentional by-product of the striving for comfort and prosperity" (Lawrence, 2006, p. 245) and "*All countries* [emphasis added] have emitted greenhouse gasses, which are the cause of climate change and its risks and have thus each contributed to the state of necessity" (Reynolds, 2019b, p. 90). The discourse displays a high level of rhetoric that normalizes the humanity narrative, erasing the historical fracture of 'humanity' that marked the industrialization of the world, consumption of its resources, and enjoyment of these processes:

> "*Humans* have burned increasing amounts of fossil fuels, especially during the last two centuries. This has led to enormous improvements in *our* well-being. *We* live longer, suffer less, and are more secure than *our* ancestors, in large part due to industrial activities that rely on fossil fuels." [emphases added] (Reynolds, 2019b, p. 9)

The selective humanism advances 'Anthropo-obscene' logic by enabling the idea that 'we' (all) gained similarly from the actions causing climate change. Similarly, a universal humanity is invoked as the agent with the power and collective responsibility to act on climate change, with language like "cutting emissions to zero means replacing a big chunk of the heavy infrastructure on which *our* [emphasis added] society rests," "*humanity* [emphasis added] is doing far too little to cut emissions," "if *humanity* [emphasis added] cannot reach some rough social consensus" (Keith, 2013, pp. 24, 65, 81) and "while *humanity* [emphasis added] makes the transition to a low carbon world" (Parker, 2014, p. 11). The idea of a 'we' normalized in the discourse removes the focus from the 12%–80% with the real responsibility to transition, minimizing lived historical difference and instead painting a fictional picture of a collective 'humanity' with options that can be (to some extent) assessed on an equal basis based on the universal pursuit of the so-claimed ultimate goal of climate stability.

Surprisingly, in stark contrast with the selective humanism advanced by Coalition 1 via the humanity narrative, selective recognition of a differentiated humanity results in an almost balanced presence of its resistance. In contrast with the subtle discursive normalization of a universal 'humanity', there emerges claims that recognize a realistically differentiated humanity, namely via discussions of the disadvantaged, developing world. Coalition 1 authors are of course aware of the historical emissions trends and their differentiated attribution to certain segments of the global population: "most emissions come from the rich" (Keith, 2013, p. 67), "low-emitters who do not benefit from climate change" (Svoboda et al., 2018, p. 1), "those with greater historical contribution to the problem bear disproportionate responsibility to satisfy the commitments therein" (Reynolds, 2019b, p. 79), "historical contributions to anthropogenic greenhouse gas emissions and actions to reduce them vary dramatically among countries and others" (Reynolds, 2019b, p. 90), "many of those who are at risk due to climate change bear little or no responsibility" (Svoboda et al., 2018, p. 5), and "emissions and energy use come mostly from the rich while the burdens of climate change fall most strongly on the poor" (Keith, 2013, p. 68), for example. Thus, while normalizing 'we' language throughout the discourse and constructing a universal, shared contribution to the problem, Coalition 1 simultaneously establishes an awareness of the different realities of the developing world. The presence of both N10. and R10. means that moments of difference are thus consciously selected, with authors choosing when to emphasize the 'we' (all) and when to emphasize the 'we' (us).

I find that resistance to the humanity narrative in the discourse enables, and thus is connected to, the usage of three other narratives that make up the rest of the major discourse of Coalition 1: a combined rhetoric that connects the damage, forced choice, and representation narratives. As Coalition 1 presents a contradictory recognition of the importance of minimizing climate risk for those most vulnerable to its impacts, a narrative is enabled that enacts a passivization of and a subject-object epistemological relationship with the global South. While the humanity narrative is almost solely identified within Coalition 1 at 20% (compared with 3% for Coalition 2 and 4% for Coalition 3), the damage narrative is

also unique to Coalition 1 (16% compared with 3% for Coalition 2 and 0% for Coalition 3). Pessimistic, frank statements of incapacity are normalized that create a sense of distress, damage, and inaction with respect to the global South: "there is a limit to what populations threatened by sea-level rise, biodiversity loss, droughts and hurricanes can do" (Rahman et al., 2018, p. 23), these populations being "people with the least ability to cope…namely the poor" (Keith, 2013, p. 68). There is an overwhelming naturalization of the associative logic of rich/poor in the discourse that organizes socio-systemic hierarchies and naturalizes negative qualities (Walsh, 2018), a form of 'othering' long-employed within Western modernity. Such emphasis on this primary quality as poor combines with the minimization of agency of developing countries with the passivization of the object and the inflation of the role of the subject:

> "Are we trying to protect the arctic or enable the poorest and most vulnerable people to limit the damage they suffer from a changing climate?" (Keith, 2013, p. 42)

Notice here the 'subject' of the discourse, this 'we' (us), that possesses some inflated role as having three different verbs in its agency (trying, protecting, enabling) compared with the 'object' of the discourse, this 'them' (in this case the developing world), having a deflated agency as possessing only a passive ability to *be enabled to* limit their own suffering. Such processes of nominalization and passivization are ideologically charged in their deleting of agency, reification, positing reified concepts as agents, and maintaining of unequal power relations (Fowler et al., 1979). Language perceiving the developing world as 'damaged' places agency in the hands of the subject ('we' (us) over here) and reduces the agency of object ('them' over there) by attributing the subject with action as verbs, those most commonly being *protect, reduce, remove, prevent, counteract, attain, improve, explore, endeavor, implement, develop, build, engage, pursue, intervene, alleviate, resolve, investigate, help, condemn*, and more. While the discourse attributes agency through a diversity of verbs to the subject of the research, the verbs associated with its 'object' (the developing world) are limited to *the receival* of benefits and gains or *the suffering* of risks and losses, and thus are passivized agents: *the benefits… will go to…the poor, benefit the rest of the world, would benefit the poor, would likely benefit disproportionately, it will benefit the poor,* OR *to suffer the consequences, will suffer harms, should not suffer, they suffer, poor ones will suffer,* and more. The majority of the verbs attributed to 'them' in the discourse are indirect, passive, and emphasize incapacity, with rhetoric that developing countries *have most to gain or lose, will require, are unable, have fewer financial resources, are exposed* etc. This language of passivization and damage renders those experiencing climate impacts more violently as 'less than human' (Sultana, 2022b), normalizing the subject/object knowledge structure that reifies logics of incapacity.

Following from the cultivation of 'epistemologies of deficiency' of the developing 'Others,' the discourse requires that these objects be active participants and beneficiaries of 'our' Western systems of knowledge and research on SG. However, even discourse that is more positive with respect to the necessary engagement and potentially leading role for developing countries in SG governance still attribute only indirect, passivized, hypothetical verbs: *must lead, must be in a position, should be particularly engaged,*

*developing countries might take the lead*, OR *build capacity in developing countries*, with these roles never occurring as the verb of these actors themselves. The passivization normalizes dichotomies of "who chooses and who bears the consequences" (Reynolds, 2019b, p. 223), invoking active decision-making over here for the passive sake of those over there. Removing the agency of vulnerable populations in the discourse is an important precursor to the damage narrative, one that due to the removed agency of the global South to act reasons that:

> "a prima facie moral obligation exists to investigate the potential of SRM to help the developing world." (Horton & Keith, 2016)

The discourse follows that because a differentiated humanity exists (resistance to the humanity narrative), one that is made up of vulnerable victims with no agency to address climate change and only the agency to be impacted by expert-driven SG governance (the damage narrative), research into SG and its governance is necessary to protect and advance the interests of the developing world (the forced choice narrative). The removal of agency from the global South enables a reasoning that research on SG and its governance is in the interest of developing countries and thus must be pursued. As according to van Dijk (2008), emphasizing the dominant group's help or sympathy toward the object and the logic of apparent sympathy by which the dominant group makes decisions for 'their' best interest is a critical discursive power relation. The discourse emphasizes a 'moral calculus' that must be made for the sake of the global poor, one in which "the stakes are simply too high" (Caldeira & Keith, 2010, p. 62) to not pursue research – a logic of exceptionalism by which the 'we' over here possess an exceptional moral role to play. This exceptionalism is utilized in tandem with the last narrative that makes up the dominant discourse of Coalition 1, the representation narrative.

The discourse normalizes an ordering and primacy by which research for the governance of SG occurs as primary, and societal approval and the inclusion of developing world perspectives are secondary. Again, the verbs lie with the 'we' (us) over here, with the hypothetical proposed research *supporting, helping, building, engaging, subsidizing, securing, ensuring, opening, integrating, facilitating, prioritizing, responding,* and *sharing* on behalf of the developing world and the active enabling of their passive reception of such actions: "to have a voice in future research and implementation decisions" (Robock, 2020, p. 63), to build their capacity "to develop their own SRM research programs" (Parker, 2014, p. 12), and to ensure they "had sufficient power to ensure that researchers studied the impacts that most concerned those countries" (Morrow, 2020, p. 630). The representation narrative is evident here as the developing world and vulnerable populations are not seen as possessing their own agency, capacity, and methods in their own context, but instead whose voices are viewed as an input to the system 'over here', thus being provided benefits, having access to participate, and sharing in the benefits:

> "Because research can provide direct benefits to its subjects, vulnerable groups should also have equitable access to participate in solar geoengineering research. Furthermore, the researchers

should be responsive to the needs and priorities of the potentially affected groups and share with them the benefits of any subsequent development or invention." (Reynolds, 2019b, p. 111)

The ordering of the rhetoric establishes 'developing country interests' and perspectives as secondary, misrecognizing the possibility that the very initial framing of the problem may be incongruous. A discursive focus on questions of legitimacy and effectiveness enable the logic that the global public's consent is to be secured via processes of integration of interests by which representatives from developing countries "should have genuine power to ensure that the program's activities reflect their needs and interests" (Morrow, 2020, p. 633). Again, the discourse works to ascribe agency to the 'we', attributing the action to the expert-driven program while the developing global South is only hoping to have their interests reflected in it.

In sum, the discourse of Coalition 1 outlined in this section normalizes an overly-technical conceptualization of the planet, of society, of the role of research, and of future decisions surrounding SG and its governance. The conflated role of the technical researcher and technical expertise enables assumptions of neutrality and objectivity and creates the idea of a set of pure, rational, responsible processes of knowledge production from which smart, unemotional decision-making on SG can be based. The discourse advances a Western imaginary regarding the notion of subjectivity and lived difference, effectively ruling out any of this from the research itself and from future 'good governance' scenarios. Drawing from its reliance on the futuring narrative, a reliance it shares with the other coalitions and thus examined subsequently in *Section 4.4.4.*, the discourse focuses on a future temporality of climate change that enables an overwhelming use of hypothetical, future imaginaries to frame its knowledge as removed of political subjectivity. Finally, the humanity/anti-humanity discrepancy in the discourse advances a selected misrecognition first by which a universal humanity is invoked in an ahistorical framing of the problem of climate change, and second by which a highly differentiated 'we' (us) and 'them' are invoked and hierarchized in the ethical resolution of the solution of SG research. The humanity/anti-humanity discrepancy enables the logic of damage, forced choice, and representation that are all present under the larger umbrella of selective humanism in the discourse. Importantly, the discourse normalizes a juxtaposition with its opposing coalition, Coalition 2, with a positive self-presentation and a negative presentation of Coalition 2 based on the dichotomy of objectivity/subjectivity.

## 4.4.2. THE DOMINANT DISCOURSES: COALITION 2

In general opposition with Coalition 1, Coalition 2 is that which takes a more critical stance with regards to the proliferation of research on SG and its governance, instead emphasizing the dangers, uncertainties, risks, and injustices associated with advancing further research and development. The central discourse advanced by Coalition 2 is the idea that the current domain of technical research on SG and its

governance, which makes up the bulk of the most prominent scholarship in the field, advances research and development that cannot currently be fairly or effectively governed. The discourse urges the problematic nature of advancing research on SG and its governance based on the homogeneity of the actors producing it, the overreliance of the research on models, the lack of appropriate governance structures to regulate the current research and development landscape, and fundamentally, the justice concerns that underlie SG research, SG governance, and SG itself. Four out of the 20 authors included in the discourse analysis align with Coalition 2, and thus the discourse is made up of 8 of the 40 analyzed texts. Importantly, one of the twelve narratives is present almost exclusively within Coalition 1 – N09. the inevitability narrative (20% compared with 3% for both Coalitions 1 and 3). The top narratives and resistances identified in the Coalition 2 discourse can be seen below in *Table 7.*

*Table 7.* The top narratives and resistances identified in the Coalition 2 discourse (as a percentage out of the total possible discourse)

| | |
|---|---|
| Top narratives | N09. Inevitability (20%) |
| | N03. Futuring (15%) |
| | N10. Humanity (5%) |
| | N12. Representation (4%) |
| Top resistances | R04. Neutrality (24%) |
| | R06. Utilitarian (17%) |
| | R12. Representation (14%) |
| | R07. Rationalist (13%) |
| | R10. Humanity (13%) |

The CDA resulted in a qualitative interpretation of the Coalition 2 discourse as marked by an overarching concern for justice constituted by the recognition of a critically differentiated humanity, a condemnation of claims of objectivity and utilitarian conceptions of justice, and a critical focus on the North-South divide. In its various, interrelated narratives, the discourse advances its central opposition to the advancement of research and development of SG by refuting directly the discourse of Coalition 1. First, the discourse emphasizes the non-neutrality of SG research and opposing directly the neutrality narrative of Coalition 1, politicizing the context, attributing agency, and working to invalidate the objectivity without parentheses of Coalition 1 (R04. resistance to neutrality). Following this politicization and emphasized non-neutrality, the discourse asserts the particular danger of Coalition 1 research given the exceptional scenario of uncertainty that marks the context of SG, arguing against delusions of reducing uncertainty through the proliferation of research as beneficial in itself. Further, the discourse argues against the utilitarian framings of SG common within Coalition 1, remanding them as illegitimate, partial, and perpetuating injustice (R06. resistance to utilitarian). Finally, the discourse presents the idea that because the global South does not currently have meaningful recognition in the research and in its governance infrastructure (R12. resistance to representation), Northern dominance of SG in terms of

research and in development is inevitable (N09. inevitability), posing serious concerns for justice and justifying only that research that exposes the current injustices, subjectivities, and epistemological violences in the research field.

### *The SG research landscape is highly political and non-neutral*

The discourse advanced by Coalition 2 is driven by the coalition's most prominent resistance – resistance to the neutrality narrative. This resistance is principally employed to counter the Coalition 1 research, first with regards to the context of the research and second with regards to the content of the research itself, challenging the validity, reliability, and motivation behind claims of neutral, technical research. The discourse emphasizes neutrality claims as having been "long rebutted, at least with respect to research into high-risk technologies in a setting of post-normal science" (McLaren & Corry, 2021b, p. 13). Coalition 2 emphasizes the highly political nature of SG research and knowledge creation, opposing the depoliticizing rhetoric of Coalition 1 and countering directly the claims of neutrality that underlie the research:

> "Current governance proposals tend to presume that researchers are value-free, rational and disinterested; instrumentalize (or at least silo) considerations of public engagement; ignore existing structural inequalities in research capacities and reproduce dominant, Northern norms in research practices, values and purposes." (McLaren & Corry, 2021b, p. 14)

Coalition 2 points to the particular susceptibility of the processes of knowledge production in the context of SG as an emerging technological regime given that in the exceptional climate change context, "most research is seen as inherently 'policy-relevant'"(McLaren & Corry, 2021b, p. 3). The discourse challenges claims that SG researchers have taken sufficient steps by enacting forms of self-governance to prevent value-based research practices and to ensure shared norms in the research, asserting instead that the mere establishment of rules or guidelines for research practices "should not distract from reflections upon research as an unavoidably political activity" (McLaren & Corry, 2021b, p. 15). Resistance to the neutrality narrative is employed in support of the overarching discourse that the proliferation of research without substantial research governance is illegitimate and unjust given that SG researchers are in fact uniquely susceptible to vested interests and political pressures:

> "…research sector incentives… and political encouragement to emphasize findings commensurate with the political targets that inform IPCC report cycles, combine to prompt researchers to construct climate scenarios and pathways in which the deployment of solar geoengineering becomes—if not indispensable—at least desirable." (McLaren & Corry, 2021b, p. 5)

Coalition 2 authors urge that in addition to such political pressures, "the growing involvement of private sector interests in the development, deployment, and financing of SRM technologies could have problematic effects on the practice and authority of science" (Szerszynski et al., 2013, p. 2814). The

discourse constructs a sentiment of distrust towards Coalition 1, critically emphasizing the political nature of technical knowledge creation for SG, asserting it as "far from being societally neutral,… already highly intertwined with its emerging politics" (McLaren & Corry, 2021b, p. 1), and "a political project with unstable intent" (Macnaghten & Szerszynski, 2013, p. 3). The discourse attributes an idea of agency to the non-neutrality of Coalition 1 research, asserting that "decisions over how research is conceived, funded and performed are excluding, promoting, or locking in outcomes more properly considered the territory of democratic and/or intergovernmental debate and negotiation" (McLaren & Corry, 2021b, p. 3). In emphasizing not only the political nature of the research field itself but the active motivation of its actors to influence the secondary, material impacts of the research, it opposes the Coalition 1 logic that the research on SG itself remains largely apolitical until it is conferred to or received by decision-makers. Drawing on this emphasized politicization of the research process in the discourse, Coalition 2 contribute to their overall sentiment:

> "…effective and extensive research governance is essential: rather than simply informing policy, geoengineering research is already conditioning and potentially prejudicing future climate politics."
> (McLaren & Corry, 2021b, p. 3)

The discourse establishes a tone of necessity by which the political nature of the current SG research context justifies the main discourse that more governance of the research itself is *necessary*. The discourse critically describes the more specific context in which current dominant scientific SG research is produced, criticizing the "particular and restricted assemblage of actors and ideas" (Szerszynski et al., 2013, p. 2813) producing knowledge "concentrated primarily in developed countries" (Jinnah & Nicholson, 2019, p. 879) and advancing epistemologies and values "that are salient and well-rehearsed in western academies and among western government elites" (Hulme, 2014, p. 58). The discourse is highly critical of neutrality narratives by asserting the use of this narrative as *unsurprising*, attributing a subliminal notion of mal intent to Coalition 1. The discourse emphasizes the active role and political nature of the homogeneity of 'the geoclique', asserting that contrary to its discourses, "the self-regulatory model of de facto governance that has emerged over the last decade" (McLaren & Corry, 2021b, p. 11) "in the absence of consistent governance" (McLaren & Corry, 2021b, p. 2) "creates inequities in… decision-making authority" (Jinnah & Nicholson, 2019, p. 879). The non-neutrality claims spanning the discourse attribute to the *context* of SG research a particularly active, political role, fostering the idea of an anarchical, motivated research landscape and enabling subsequent distrust in the *content* of the research.

The discourse blatantly opposes any notion of neutrality and objectivity-without-parentheses, asserting the current research field as "a model that reinforces existing norms and values in the Northern, elite scientific community" (McLaren & Corry, 2021b, p. 11), "conditioning and constructing particular social and technical manifestations of solar geoengineering in ways that may inappropriately prejudice the politics of future global climate action" (McLaren & Corry, 2021b, p. 2). The discourse points to the contextual aspects of 'the geoclique' that create content-related risks, pointing to the implications of

"unevenly empowered epistemic communities of networked researchers and experts" (McLaren & Corry, 2021b, p. 4) in their active definition of problems and norm-setting. The discourse points to the inequities of the knowledge itself that are generated in this context, emphasizing the certainty for influence of personal subjectivities on the SG research: "imaginaries of deployment will inevitably start to influence the kind of questions that shape scientific research in this area" (Szerszynski et al., 2013, p. 2814), SG as a policy option "is taking on a particular 'social constitution' – a distinctive set of implications about the sort of world that its deployment would likely bring into being" (Macnaghten & Szerszynski, 2013, p. 2), and "the divergent ideologies and interests that are in play" (Hulme, 2014, p. 28). By setting up the non-neutral, political process of knowledge production for SG, the discourse enables its next main discourse that criticizes technical perceptions of truth and objectivity as one of the 'distinctive set of implications' of the dominance of 'the geoclique'.

### *Technical reliance is a function of non-neutrality, and uncertainty enables political influence*

The discourse criticizes the technical reliance of Coalition 1 as problematic evidence of their subjectivity, further justifying the central opposition to research and development. Drawing on the political context of SG research, the discourse speculates that "perhaps in response to climate policy-makers' demands for greater certainty – this literature tends to treat models primarily as truth machines that can be refined and tweaked to provide an ever-improving representation or prediction of reality" (McLaren, 2018, p. 216). The discourse challenges the technical reliance of Coalition 1, asserting that "Technical, risk-based thresholds for research projects are inadequate and may even be counter-productive where the impacts are cumulative, symbolic, political or cultural" (McLaren & Corry, 2021b, p. 13). Resistance to the neutrality narrative is employed to invalidate the technical optimism characteristic of the dominant research, discrediting the neutrality claims of Coalition 1 on the basis that technical reliance itself is a form of claiming neutrality. The rhetoric employs language that makes such technical reliance seem absurd, further negatively presenting the opposing coalition in their central argument against SG research:

> "In part these are products of a broader epistemic problem of implicitly yet hubristically treating and portraying climate and energy models as truth-machines rather than games of make-believe or sandpits." (McLaren, 2018, p. 219)

The discourse asserts as an obvious reality that "modeling practices embody and construct particular ethics and values regardless of modelers' intentions" (McLaren, 2018, p. 210), co-constituting a particular 'sort of world' shaped by a researcher's personal proclivity for technical over other and thus, "technologically-framed worlds, rather than social ones" (McLaren, 2018, p. 210). The non-neutrality of the dominant technical frame is asserted as the principal driving justification for those contrasting critical research endeavors that make up Coalition 2, naming explicitly as a goal of critical research to *expose* "the co-productive relations between models and values which structure climatic imaginaries" (McLaren, 2018, p. 210). The positive self-representation of the role of Coalition 2 in response to the general

criticism of Coalition 1 enables its next dominant logic that the condition of uncertainty underlying the topic of SG is the means by which non-neutrality becomes dangerous.

Concern for non-neutrality is elevated with the claim that because of the uncertainty inherent to SG and its governance, the political process of constructing future climate imaginaries poses real danger. The discourse uses language of exceptionalism to elevate the menacing role of SG research in the context of uncertainty that characterizes the SG governance landscape:

> "Deciding how to enter into this experiment, and on whose terms, raises questions for global governance of a novel kind. This also implies responsibilities for science of a character that is perhaps unprecedented." (Macnaghten & Szerszynski, 2013, p. 13)

Because of this exceptional, unprecedented scenario, the discourse purports that "climate modelers arguably bear an elevated responsibility to consider the possible social consequences of their work" (McLaren, 2018, p. 209). Stemming from the politicization of the context and the negative representation of Coalition 1 in their non-neutral technical reliance, exceptionalist rhetoric further invalidates the research as one that must necessarily be motivated to give particular concern for socio-political questions over technical ones. The discourse emphasizes the uncertainty that characterizes the field of SG regarding the unknown state of future climate change, the unknown effectiveness or feasibility of SG, the unknown implications of its application on a global scale, and the unknown applicability of governance frameworks as the key condition for danger:

> "Because the future state of the climate and the effectiveness of climate policy are complex and indeterminate, the status that models are granted critically structures the interpretation of scientific evidence." (McLaren, 2018, p. 210)

The discourse emphasizes the condition of uncertainty as enabling a particular political power for Coalition 1 actors, as "scientific objectivity is deeply problematic where the objects of research are socio-technical imaginaries whose material configurations are (in part) constructed by research" (McLaren & Corry, 2021b, p. 13). The discourse again emphasizes the agency behind such neutrality narratives and "the assumption (again based in conventional Northern scientific norms) that solar geoengineering is some objective technology waiting to be discovered, rather than emerging through socio-technical construction" (McLaren & Corry, 2021b, p. 12). Language that animates the agency of Coalition 1 alludes to a 'conjurer's trick scenario' by which "research is undertaken by an exclusive group according to their own values, objectives, constraints and conception of the problem (e.g. conditions of deployment), and then put forward for action at the last minute, under pressure of a quickly emerging crisis" (Gardiner & Fragnière, 2018, p. 160). Such a framing emphasizes the mal intent of the actors it criticizes, normalizing critical opposition to neutrality narratives in the form of warnings against danger, trickery, or manipulation. Such rhetoric enables the dominant discourse that because of the emphasized risks of the current research landscape, further research does not reduce uncertainty and thus should not be pursued.

The discourse rejects the "common misconception that research is about reducing uncertainties" (McLaren & Corry, 2021b, p. 12) by first emphasizing the 'dangerous' condition of uncertainty that facilitates the epistemological and material construction of SG by non-neutral actors, asserting the "serious concerns" (Gardiner, 2010, p. 5) with the promotion of research as inherently beneficial:

> "...it is not obvious that any particular research project should be supported just because it enhances knowledge··· the claim that geoengineering research increases knowledge is insufficient to justify our pursuit of it." (Gardiner, 2010, p. 5)

Stemming from the main accusations against Coalition 1-type research, the discourse buttresses the overall opposition to advancements of research and development, employing combative language, negative values, inflated agency, and questions of intent to reduce the credibility of Coalition 1 and the attitudes it advances. The discourse asserts that because of non-neutrality, research that is highly technical and has relied on a separation of SG from its fundamentally subjective, socio-political context not only should not continue, but should rewind to revisit unchallenged assumptions and address the non-technical, non-neutral questions that have been erased from the discourse:

> "...the argument about whether to pursue a global thermostat has to be political before it can be scientific. It is not a case of researching into the risks and benefits of the technology to begin with, and then subjecting the results to a risk calculus." (Hulme, 2014, p. 88)

The strong recognition of non-neutrality in the discourse builds the dominant case against research that does not seek primarily to expose non-neutrality and address subjective, historical, socio-political questions. The attribution of blame via agency to Coalition 1 works to reprimand the dominant logics of its opposing coalition as the central problem to be investigated: "We would argue that the crux of the problem is··· the implicit judgment that what needs governing is impacts of the activity rather than impacts of the knowledge generated" (McLaren & Corry, 2021b, p. 13). Overall, the discourse supports broader calls to return to the socio-political, remove reductionist logic that portrays a technical, stable phenomenon to be objectively evaluated, and instead prioritize a "more complex conversation in which the very nature of geoengineering is put into question" (Macnaghten & Szerszynski, 2013, p. 1) given that the values currently being represented and advanced in the proliferation of SG research "will not necessarily be shared by all those on the planet" (Hulme, 2014, p. 58).

### *Utilitarian logic that advances a reductionist notion of justice must be situated*

Following the rejection of the neutrality of Coalition 1 and the logic that research must not be advanced if fundamental questions of subjectivity are not addressed, the Coalition 2 discourse criticizes utilitarian framings that use reductionist logic to legitimize the benefits vs. risks calculus of SG research. The discourse asserts that the ends of SG cannot justify the act because they are uncertain, they are consequentialist, they ignore means, and they ignore difference. Coalition 2 establishes a discursive focus on the aspect of justice, countering the emphasis of Coalition 1 in its utilitarian narrative on the reduction

of climate risks. The discourse condemns by name the utilitarianism of Coalition 1, with assertions that "The literature mainly displays a utilitarian bent," "the modeling literature embodies narrow, largely utilitarian, conceptions of justice," and "The underlying assumptions – rarely offered explicitly – are broadly utilitarian" (McLaren, 2018, pp. 219, 218, 217). By naming the logic of Coalition 1 as explicitly advancing consequentialist forms of utilitarian reasoning, the discourse sets up an opposition to such logic in which it counters the conception of climate risk as the ultimate goal to be sought and thus "The justificatory narrative for a thermostat" (Hulme, 2014, p. 87). The discourse condemns the reliance of Coalition 1 on "universal benefit conceptions of 'global public good'" (Gardiner & Fragnière, 2018, p. 147) related to SG, asserting these kind of conceptions as problematic because "framing geoengineering as universally beneficial often has the effect of marginalizing ethical concerns" (Gardiner & Fragnière, 2018, p. 147). The discourse directly opposes the utilitarian selection of a singular, technical, reduced climate 'good' in the justification of research, development, and hypothetical deployment of SG, instead emphasizing the necessary priority of climate justice, a 'goal' which "arguably has richer and plural dimensions – beyond those defined in terms of consequential harms and benefits – in which climate risk may be a poor proxy for justice" (McLaren, 2018, p. 210). The discourse emphasizes that "even if universal benefits were possible, this would not suffice to justify implementation, since there may be other grounds for opposing geoengineering (e.g. political legitimacy, procedural and distributive justice, relationship to nature, etc.)" (Gardiner & Fragnière, 2018, p. 149). In directly challenging the utilitarian logic of Coalition 1, the discourse emphasizes what is *excluded* from consideration:

> "...the values and conceptions of justice revealed as underpinning SRM modeling exercises and the representations they produce are predominantly consequential rather than procedural; attending to the distribution of benefits and harms, rather than to underlying capabilities; individualist and aggregative rather than collective; fail to raise questions of recognition, vulnerability and reparation; and largely rooted in western, liberal conceptions of justice which ignore international cultural and political variations." (McLaren, 2018, p. 219)

The discourse emphasizes the focus of Coalition 1 on harms and benefits as illegitimate, asserting that such a focus "tends to overlook the prospect that not all those disadvantaged by climate change could be compensated by SAI" (McLaren, 2018, p. 216). The discourse exposes the inability of Coalition 1 actors to engage with "more fundamental questions regarding the purpose or nature of modeling, nor the values and conceptions of justice embedded in the practices of modeling" (McLaren, 2018, p. 216) based on the inability for such approaches to understand 'goals' or 'benefits' as subjective constructs. Language of "it is claimed" is present throughout the discourse within the critical presentation of Coalition 1 narratives, pointing to and emphasizing the active 'claiming' being done by Coalition 1 in the utilitarian presentation of hypothetical scenarios for SG and its governance, purporting that such acts of claiming are not innocent. The discourse asserts that "to assess the relative desirability of different outcomes, modelers need to assume that all people have the same climatic interests" (McLaren & Corry, 2021b, p. 4), and that "most modeling also presupposes that all affected populations have the same underlying preferences"

(McLaren, 2018, p. 216), further attributing a level of mal intent to the fundamental assumptions that make up the Coalition 1 discourse.

Most significantly, resistance to the utilitarian narrative enables Coalition 2 as favorable to a 'Southern' enunciation of climate justice, a favorability from which it derives its own validity and legitimacy in challenging and discrediting "the rosy picture" presented by Coalition 1 (Gardiner & Fragnière, 2018, p. 166). Resistance to utilitarian framings is presented an active alternative to the active choices made by those actors, leading to the next dominant discourse of Coalition 2 in its rejection of the inflated role of 'good intent'. The reliance of Coalition 1 on the notion of intention behind hypothetical utilitarian scenarios is problematized in the discourse. In line with the resistance to the neutrality narrative, the notion of intention is asserted as irrelevant: "what constitutes a 'good' motivation is itself likely to become the subject of contestation," and "even the intended consequences of SRM are themselves not necessarily unproblematic, not least since good intentions can lead to perverse outcomes, particularly at scale" (Szerszynski et al., 2013, p. 2813). Coalition 2 reject the deontological spin of Coalition 1 by which the benevolent actors 'we' (us) can perform a well-intended calculus as a duty to the world in the face of climate change, opposing at large the Northern conception of justice that underlies Coalition 1. The discourse employs resistance to the utilitarian narrative by emphasizing the importance of procedural and distributive justice, making blatant rejections to the reductionist vision of justice held in Coalition 1: "we *cannot* [emphasis added] presume that reducing climate impacts alone through climate geoengineering will necessarily promote justice" and "it *cannot* [emphasis added] be assumed simply that a reduction in overall climate risks will necessarily enhance justice" (McLaren, 2018, pp. 217, 210). Instead, the discourse adopts a different framing of "justice as recognition" that "demands taking account of existing difference, not just of our common humanity" (McLaren, 2018, p. 217). The discourse advances a fundamental recognition of resistance to the humanity narrative as connected to its resistance to the utilitarian narrative:

> "The ubiquitous language of global temperature and of the nominal two-degree safety limit seems
> to have persuaded some that regulating this quantity will ensure benefits – or limit damages – for
> all. But the relationship between people, weather and their security is intensely local. What matters
> for humans⋯ is not what happens to global temperature." (Hulme, 2014, p. 40)

The discourse's resistance to the humanity narrative in recognizing the a-humanity of climate change emphasizes difference as a means to reject the utilitarian, reductionist, technical approach to SG of the more solutionist/optimist Coalition 1. Such anti-humanity language includes "considering how it might affect people across plural dimensions of distribution, vulnerability, capability, structural inequalities, procedure, recognition, and restoration or correction" (McLaren, 2018, p. 209), "across different social worlds" (Hulme, 2014, p. 22), "it is the uneven distribution of risks that drives politics – as much as does the unequal distribution of wealth and power" (Hulme, 2014, p. 70), "mismatch of vulnerability and responsibility" (Gardiner, 2010, p. 3), "in an unequal world" (McLaren & Corry, 2021b, p. 6), etc. The

discourse emphasizes resistance to the humanity narrative to oppose the utilitarian conception of climate stability as the ultimate goal:

> "It too easily suggests the problematic notion of a global 'we', one that collapses valid and competing interests into a unitary global subject: 'we must limit global warming to no more than two degrees', 'we must avert a climate emergency'. The risks of a changing climate do not self-evidently lead to the creation of a global 'we' in which the same common objectives are shared by all. Nor are all interests equally well served by engineering a specific planetary temperature with its attendant shifts in regional climates." (Hulme, 2014, p. 43)

Coalition 2 employs explicit resistance to the humanity narrative as its principal means of rejecting utilitarian framings of SG and its research, pointing to the complexity and difference that underlies such questions. Coalition 2 consistently seeks to reframe the larger discussion on SG and its governance within its larger historical, socio-political context, rejecting reductionist conceptions of the technical 'Earth', the problem of climate change, and the proposed solution of SG. Drawing on anti-humanist logic and a dominant concern for a Southern conception of justice, the discourse condemns the proposed utilitarian conceptualizations of SG and its governance, implying again a quality of absurdity to Coalition 1 as "It suggests the possibility of a view from nowhere, the possibility of a metaphorical cockpit for Spaceship Earth in which benign and wise experts manipulate the planetary controls for the betterment of humanity" (Hulme, 2014, p. 61). The discourse includes blatant outright rejections of such logic: "The welfare, in relation to weather and climate, of humans and of the things that matter to them cannot be reduced to such a calculus" (Hulme, 2014, p. 43) and "we should reject the public goods framing of geoengineering" (Gardiner & Fragnière, 2018, p. 166). The negative representation of Coalition 1 based on its utilitarian bent for the benefit of a global humanity on the authority of a well-intentioned empirical 'we' bolsters Coalition 2's dominant discourse that research exposing the subjectivities and therefore the constructions of SG in real time by an active 'geoclique' is the only legitimate research: "This is why interventions from those beyond the geoclique are needed to bring us to our senses" (Hulme, 2014, p. 74), validating its own research further. The resistances to neutrality and to utilitarian discourse points to the political role of knowledge production, enabling resistance to the representation narrative, and finally, its subsequent normalization of the inevitability narrative.

### *Because of a lack of global South representation, Northern dominance of SG is inevitable*

For Coalition 2, the non-neutrality of the SG research has direct consequences for procedural and distributive justice on the grounds that "solutionism shifts power and authority from politics to science and technology, but typically without democratizing the latter" (McLaren, 2018, p. 218). The discourse connects its resistance to the neutrality narrative with its resistance to representation logic, warning critically the limitations to meaningful representation and procedural justice. The discourse draws on its constructed non-neutrality grounds the assumption that reductionist/technical approaches not only

"focus attention on specific dimensions of justice, while framing out others, but their effects also appear to structure and even pre-condition the findings that suggest that SRM could be just" (McLaren, 2018, p. 215). Potential justice via representation is asserted as limited given that any procedural representation within future SG research and governance is already limited by a particular, Western, reductionist, utilitarian conception of justice and of the overarching goals of SG, while decisions on SG will "depend on how various cultures interpret and conceive of justice" (McLaren, 2018, p. 217).

By emphasizing the already existing limitations to justice via representation that precedes all future SG research and efforts, the discourse arrives at blatant assertions that "in an unequal world it is implausible that the underlying research programs would not reflect rich-world presumptions and values" (McLaren & Corry, 2021b, p. 6). The anti-representation logic rejects the possibility for other conceptions of justice and related values to be meaningfully included in knowledge production or governance given the active influence of Coalition 1 values as constituting meanings and framings of SG. Coalition 2 emphasizes the procedural aspects of SG and its governance, resisting the representation narrative and the indirect forms of 'pure representation' of interests, instead asserting that "different interests must be given voice and recognition" (Hulme, 2014, p. 62). Importantly, the discourse points to the current incapacity for recognition via representation, suggesting "the kind of 'public participation' needed involves much more substantial moral and political norms" (Gardiner & Fragnière, 2018, p. 155). The discourse again ascribes an active role to this current incapacity:

> "This shortcoming privileges expertise, fails to recognize the necessarily partial nature of scientific knowledge, and treats justice as something determined by elite institutions, rather than something participatory and procedural." (McLaren, 2018, p. 217)

Rejecting the utilitarian narrative that conceives of SG as a universal benefit with defined goals, the discourse points to the necessary inclusion of diverse interests in this process of determining the definition of SG justice itself. For Coalition 2 scholars, a proliferation of research that presents certain framings of SG and its governance directly impacts the ability for diverse interests to be included or represented sufficiently, as "research helps evoke and assemble epistemic communities, stakeholder groupings and even publics with particular orientations towards the topic" (McLaren & Corry, 2021b, p. 3). The discourse urges therefore that utilitarian framings are not innocent and in fact directly hinder the inclusion and recognition of diverse interests, pointing to the impact of certain framing patterns in the research.

By first problematizing the utilitarian framing of SG through which Coalition 1 points to a guiding public interest or public good, the discourse emphasizes the temporality of representation of interests, establishing the idea that the plurality of public interests likely contrast those advanced in the utilitarian understanding of climate justice, and thus are temporally obscured from the process from the outset. The discourse maintains an emphasis on the temporality of representation, asserting that the

determination of the benefits/risks of SG by researchers as done in Coalition 1 can impact public engagement itself, as "in introducing the technologies to its subjects, such research also inevitably frames them" (McLaren & Corry, 2021b, p. 4). For Coalition 2, the idea of engagement as co-creation is emphasized as a "two-way process, one which can question the very purpose and desirability of the research and which can reconstruct the research community and its goals and practices" (McLaren & Corry, 2021b, p. 12). The discourse presents a conception of public engagement as one that is co-conducted, not secondary, asserting that "*the addition* [emphasis added] of fair procedure alone still leaves the analysis within the standard consequentialist paradigm of the dominant social imaginary" (McLaren, 2018, p. 217). Coalition 2 emphasizes the temporality of representation for Coalition 1 as problematic, asserting that by framing certain conceptualizations of climate justice and the benefits of SG prior to pursuing representation of other voices, there is no real procedural justice possible:

> "One needs to introduce public and political deliberations further 'upstream' before prospective research is even mandated or funded… One needs to give voice to a multitude of arguments about why it may not be desirable to embark even on the path of research and development. And voices from around the world must be heard." (Hulme, 2014, p. 88)

The discourse emphasizes the temporality of representation as crucial, criticizing the notions of consent and inclusion common in the Coalition 1 discourse that usually imply some secondary process by which the voices of the world are added onto the research programs and initiatives already begun, framed, and shaped by the existing research. Emphasis on the importance of designing research programs that include different framings of the "political, social, and cultural dimensions of climate policy" and thus of climate justice from an earlier point is repeated, criticizing existing efforts as "merely seeking to abstractly model the political and social alongside the scientific" (McLaren, 2018, p. 218). Coalition 2 imply the representation narrative advanced by Coalition 1 as one that sees representation primarily as instrumental with the current publics that "…are not recruited to shape research objectives or the scenarios modeled, but primarily to 'reveal' the conditions for public acceptability of the technologies" (McLaren & Corry, 2021b, p. 12). The discourse implies that the type of representation advocated by Coalition 1 is not sufficient for procedural justice given its temporal focus on the implementation of research or development, and not on the formation of foundational perceptions of and values for different climate justices.

While Coalition 2's resistance to the representation narrative supports a more situated, complex, multi-dimensional conception of justice that aligns with a 'situated geofuture' that breaks from a Western imaginary in its focus on concerns for procedural justice as recognition, the discourse simultaneously normalizes one of the most problematic narratives. Within the resistance to the representation narrative arises the final dominant discourse of Coalition 2, that which normalizes without any significant level of resistance the notion of inevitability of Northern dominance in the context of SG. Coalition 2 is driven in their research by concerns for justice in the context of SG in terms of global governance, normalizing

in this overarching concern for global justice the inevitability narrative, a narrative that appears almost exclusively in the discourse of Coalition 2 (20% for Coalition 2 and only 3% for both Coalitions 1 and 3). Because the complex, different, situated interests of the world cannot currently be procedurally recognized in the research that normalizes a Western, utilitarian, reductionist notion of justice, Northern dominance in the context of SG is invoked as inevitable. The discourse emphasizes the justice concerns that follow from the coalition's resistances to neutrality, utilitarian, and representation logics:

> "...nonproviders are vulnerable to the decisions of providers, and this raises serious ethical questions, including those of justice, domination, rights and responsibility⋯ nonexcludability raises the worrying possibility of hostile interventions⋯ Once again, geoengineering requires regulation not because of the (probably fanciful) universal benefits it could provide, but because of its potential for harm, injustice and other ethical infractions." (Gardiner & Fragnière, 2018, p. 151)

The notion of a nominalized dominance is introduced in the discourse as justice challenges invoke concerns for potential unethical actions of the 'providers' of SG against the 'nonproviders'. The discourse normalizes the idea of exclusion: "⋯it could generate a closed and restricted set of knowledge networks, highly dependent on top-down expertise and with little space for dissident science or alternative perspectives" (Szerszynski et al., 2013, p. 2812), urging even with regard to indoor research for SG (that which is less controversial) that "domination cannot be prevented by measures such as self-regulation, transparency, and information-sharing" (McLaren & Corry, 2021b, p. 6). While both Coalition 1 and Coalition 2 agree to the uniquely planetary nature of SG research and governance being one particularly susceptible to concentrated, centralized governance, the discourse of Coalition 2 uses language of *certainty* with regards to exclusivity influenced primarily according to 'providers' interests: "SRM will⋯necessitate autocratic governance" (Szerszynski et al., 2013, p. 2812), "Land grabs will turn into sky grabs and territorial disputes will extend to the stratosphere, as potential powers vie for control of the thermostat" (Hulme, 2014, p. 42), and more. Such rhetoric of certainty regarding the exclusive nature of SG invokes a narrative of inevitability regarding power imbalances and inequalities, normalizing the likelihood that SG becomes a means by which dominance by powerful actors/governments is perpetuated. After normalizing the inevitability of the exclusive nature of SG, it advances assumptions regarding who would be excluded, pointing to the differences between "Groups with greater capabilities, strong social capital, and majority recognition" and "those with weak capabilities, limited social capital or suffering misrecognition" (McLaren, 2018, p. 216):

> "⋯analysis by political scientists raises the concern that current research is advancing an expert–elite technocratic form of climate intervention that would further concentrate contemporary forms of political and economic power." (McLaren & Corry, 2021b, p. 6)

While this may be true and concern for these dynamics is important, the normalization of this kind of scenario reinforces a continuation of power imbalances and nominalizes power as an external, unavoidable reality. Here arises a rhetoric of inevitability of who would likely be dominated in the case

of SG, embedding in the discourse the North-South divide as for Coalition 2, the "essentially centralizing and autocratic 'social constitution'" (McLaren, 2018, p. 218) that could be expected of SG is fundamentally a concern of Northern dominance and Southern domination. Coalition 2 discursively portrays powerful Northern countries and actors as those designing and choosing, and poorer, powerless countries as those receiving and suffering, as discussions of unilateral action and thus an autocratic hypothetical scenario are only usually associated with Northern nations/actors: "Unilateral action (especially in a Northern nation) to attempt to establish a research governance regime would be undesirable, likely to replicate unhelpful epistemological and cultural norms and reify existing power relations" (McLaren & Corry, 2021b, p. 14). While the discourse is concerned with the material and political reification of power relations in the hypothetical material/political context of SG, it ignores its own discursive reification of these power relations in conceiving of Northern dominance as inevitable. The discourse, though constructing a less-Western imaginary with regards to justice and recognition, normalizes actions of the powerful that would likely hurt the less powerful in predicting "incentives for powerful nations to prefer distributional patterns that could impose greater risks on poorer and less powerful groups" (McLaren, 2018, p. 218) and "the potential for certain interventions to increase the capabilities of elites at the expense of others" (McLaren & Corry, 2021b, p. 6).

Agency in this narrative is attributed to the powerful North as the group intervening, preferring distributional patterns, and imposing greater risks, while the 'nonprovider' South is passivized in its receival of risks and disadvantages. Even further, the discourse suggests that this likely power imbalance in the context of SG may be *willingly acceded to* by the powerless actors: "Such an outcome need not rely on unilateral imposition, as poorer countries might well accede to a distributional schema designed by the powerful for its generic benefits or for other political reasons" (McLaren, 2018, p. 218). Not only does the discourse erase the agency of the global South in the context of inevitable SG dominance, but such statements identify Southern agencies only in their potential complicitness with their own domination. Such rhetoric normalizes a subjugated role of the South in the context of SG, thus precluding emancipatory pathways for non-inevitable, transformative *future(s)*. Within rhetoric on concerns for global justice, the discourse continuously attributes an active, powerful North that will likely act at the expense of the global South, entrenching language that denies emancipatory pathways by reifying and normalizing Northern power:

> "···a scheme of SRM designed to benefit the poorest (such as those explored by Moreno-Cruz et al.) would seem unlikely to be implemented even if technically feasible." (McLaren, 2018, p. 218)

Within the inevitability rhetoric the discourse invokes an active role of the 'we' (us) similar to that of Coalition 1, warning of the possibility for SG to become "a vehicle through which *we* (e.g., our nation and/or *our* generation) try to disguise our exploitation of other nations, generations, and species" [emphasis added] (Gardiner, 2010, p. 20). The powerful role of an active 'we' (us), referring here to the developed, rich, 'providing' North, is inflated in the rhetoric of an inevitable, active dominance of SG by

the North at the expense of the passivized South. Some Coalition 2 discourse enacts this selective humanism by which the idea of a 'we' (us) in control of the future of a collective 'we' (all) is invoked in the context of the active role of the 'providers':

> "...the decision to pursue geoengineering concerns what it might show about *us*: our lives, our communities, our generation, our countries, and ultimately our species. What kind of people would make the choice to geoengineer? Would *they* be reckless, hubristic, and obstinate people? Would this be a generation or country consumed by its own (perhaps shallow) conception of its own interests, and utterly indifferent to the suffering and risks imposed on *others*?" (Gardiner, 2010, p. 20)

In general, the discourse confines the global South to the inevitable role of the passive, exploited 'nonprovider', reifying the North-South divide and disempowering the South in the context of SG. In connection with its larger discourse, Coalition 2 emphasizes its resistance to the representation narrative in its assessment of the SG research and governance landscape that has seen the formulation of the Degrees Initiative. The program, DEveloping country Governance REsearch and Evaluation for SRM "dedicated to putting the Global South at the center of the SRM conversation" (The Degrees Initiative, 2023), is directly criticized within the discourse with assertions that "important regional interests in the global South are poorly reflected in the existing research community, despite some efforts to engage academics and policy makers in such regions" (McLaren & Corry, 2021b, p. 11). In their concern for meaningful recognition, the discourse argues: "...the norms promoted, and the epistemic community extended, through such mechanisms remain predominantly Northern, and the range of stakeholders is relatively narrow" (McLaren & Corry, 2021b, p. 5), and "the models, norms, and practices applied⋯ remain primarily those of the dominant Northern research community" (McLaren & Corry, 2021b, p. 4). Despite the overall narrative of inevitability of Northern dominance in the context of SG stemming from the critical resistance to the representation narrative and current insufficient efforts, the discourse simultaneously points to the potential for Southern interests to be better enabled, asserting "a critical need for future geoengineering research to be better rooted in Southern theory and epistemology, rather than predominantly reflecting Northern research norms" (McLaren & Corry, 2021b, p. 5). In contrast with its simultaneous, broad use of inevitability narrative, the discourse points to potential for greater Southern engagement in efforts like the Degrees Initiative:

> "Yet it could become a platform for support to be given to research and governance activities which engage broader Southern interests and values and thus open meaningful international discussion and contestation over the purposes and desirability of solar geoengineering research."
> (McLaren & Corry, 2021b, p. 15)

In its anti-representation rhetoric, Coalition 2 asserts the current lack of procedural recognition of the plurality of 'other' Southern values and conceptions of justice in the face of high uncertainties and risks related to SG, risks that "demand a much broader conversation than currently exists, particularly with respect to participation from developing countries" (Jinnah & Nicholson, 2019, p. 879). After normalizing

an inevitability of Northern dominance and Southern passivization, the discourse suggests the possibility of a "*meaningful* [emphasis added] research governance regime," one that would not just include but would "be based upon – public engagement, transparency, and accountability" (McLaren & Corry, 2021b, p. 15). A requirement of this would be to adopt an understanding of engagement and representation that is not instrumental, but that seeks to include and recognize procedurally diverse, namely Southern, interests and values for climate justice. The discourse asserts that this meaningful regime "should be especially sensitive to respecting the self-determination and self-understanding of affected groups, taking particular care in eliciting responses from historically marginalized or oppressed populations" (S. M. Gardiner & Fragnière, 2018). Thus, despite the overall inevitability rhetoric and pessimism regarding current efforts at representation that underlies the discourse, Coalition 2 offers up the possibility of improving such mechanisms so to meaningfully enable engagement processes of co-creation that would rewind the current research to address critical, primary assumptions of norms and goals.

In sum, the Coalition 2 discourse normalizes a justice-based argument against the advancement of research and development advocated for by Coalition 1, asserting as its overall discourse the illegitimacy of advancing such research that poses numerous concerns for justice, recognition, and appropriate consideration of the historical, socio-political context. The discourse is united by an overarching refutation of the claims and narratives that make up the discourse of Coalition 1. The discourse is largely based on its resistance to certain narratives, thus revealing a coalition of research that advances less directly a Western imaginary, one driven by its primary concern with the Western imaginary normalized in the dominant coalition. Drawing on its central rejection of the neutrality narrative of Coalition 1, the discourse focuses on invalidating the universality of the technical, reductionist, utilitarian rhetorics, centralizing the issue of justice in its resistances to humanity and representation logic from which the discourse derives concern for the currently marginalized, vulnerable voices, enabling its only substantial normalization of a narrative indicative of a Western imaginary (other than the futuring narrative to be examined in *Section 4.4.4.*) – the inevitability narrative. Fundamentally, the discourse is constructed in opposition with Coalition 1, similarly demonstrating a positive self-presentation and a negative presentation of its out-group, an opposition that bolsters its position against Coalition 1-type research and in favor of more critical research that produces knowledge not on SG and its governance itself, but that investigates and criticizes the existing dominant research.

## 4.4.3. THE DOMINANT DISCOURSES: COALITION 3

In contrast with Coalitions 1 and 2 and the opposing dominant discourses regarding the proliferation of research for SG and its governance, Coalition 3 is designated as a nonaligned, alternative discourse. Coalition 3 represents scholarship that takes neither the advocacy nor the opposition stance regarding the advancement of SG research. Instead, the remaining two authors who display neither of these general

positions explicitly in the discourse have been designated as Coalition 3 due to their overall neutrality regarding the proliferation of SG research and development. As a result, the research field of Coalition 3 is made up of only four texts. Given the limited pool size and the default nature of the coalition as representing not necessarily a like-minded coalition per se but an outlier sample of the dominant discourses, the analytical results for Coalition 3 are not representative of a similarly generalizable coalition with commonly motivated discursive aims. However, identifying what aspects of that discourse which claims to represent more of an unbiased, unaligned perspective normalize a Western imaginary is of critical significance to this research. The central discourse of Coalition 3 is that the SG research is not neutral or objective and is a politically precarious research field, enabling a principal concern for the legitimacy of the SG research field. Importantly, one of the twelve narratives is used almost exclusively in Coalition 3 (N02. the catastrophe narrative), and the highest overall quantitative usage of any narrative or resistance across the entire research field appears in the discourse (R04. resistance to neutrality at 37%). The coding results for the narratives and resistances within the discourse of Coalition 3 are presented below in *Table 8*.

*Table 8.* The top narratives and resistances identified in the Coalition 3 discourse (as a percentage out of the total possible discourse)

| | |
|---|---|
| Top narratives | N02. Catastrophe (20%) |
| | N03. Futuring (20%) |
| | N06. Utilitarian (16%) |
| | N05. Forced choice (10%) |
| | N12. Representation (10%) |
| Top resistances | R04. Neutrality (37%) |
| | R07. Rationalist (20%) |
| | R10. Humanity (16%) |
| | R06. Utilitarian (13%) |

The CDA resulted in a qualitative interpretation of the Coalition 3 discourse as marked largely by a focus on the legitimacy of the larger research field. As the development of research on SG and its governance is neither directly supported or opposed in the discourse, concern for the legitimacy of the research is driven by underlying concerns for justice, relevance, and salience of the research. Given this more prescriptive aim of Coalition 3 to assess aspects of the research like legitimacy and credibility, one that resembles Coalition 2's goal of investigating the validity and acceptability of the dominant research, the authors belonging to Coalition 3 focus on frameworks for reviewing and improving the current research landscape. First, the discourse establishes the exceptionalism of the SG research context via the narrative equation of *futuring+catastrophe=forced choice*, enabling its dominant critical resistance that asserts the non-neutrality of the research. Next, the discourse reasons that central justice questions are related to the non-neutrality of the research field, thus connecting non-neutrality to concerns for justice that are

based on resistance to the humanity narrative. Further, the discourse follows that because justice is more of a concern for Coalition 2, this field of research is more legitimate, but both opposing coalitions are currently unable to remedy this lack of legitimacy. Finally, the discourse prescribes corrective measures for future research to engage currently marginalized values and norms (representation) and improve legitimacy, pointing to the uniquely corrective capacity of Coalition 3-type research practices to remedy current justice concerns as a form of research governance.

### *SG is an exceptional research topic within an exceptionally political research context*

The discourse, one that primarily reviews and assesses the SG research landscape and of Coalitions 1 and 2, advances an exceptionalist framing of SG as a research topic first, focusing on the context of SG and climate change itself. Both Coalition 3 authors write descriptively about the paradigm and its actors, pointing to the nature of the current research landscape as one marked by personal subjectivity and difference. They address "the climate engineering 'community'" that "consists of multiple, overlapping research, policy, and civic groupings" producing research characterized by the fact that "many basic questions have not produced answers with widespread agreement" (Gabriel & Low, 2018, p. 221). The discourse first points to the make-up of this 'climate engineering community' – on one side being those scientists, philanthropists and 'tech visionaries' who can be "perceived as proponents of SRM research who subscribe to an 'actionable evidence' paradigm" (Low & Buck, 2020, p. 7) (Coalition 1), and on the other side, "the opponents' pool" which "looks larger and includes persons and environmental NGOs with strong positions on rapid decarbonization…, and whose positions contest what they see as engineering or entrepreneurial hubris" (Sovacool et al., 2023, p. 13) (Coalition 2). Coalition 3 highlights the general division between these two groups as research that prioritizes technical knowledge for the former and that which prioritizes concerns for inclusion, justice, and stakeholder engagement for the latter, with Coalition 2 aligning more with "RRI-informed work" – the paradigm of responsible research and innovation (RRI) – in its "forthright disagreement" with Coalition 1 (Low & Buck, 2020, p. 7).

The discourse employs a confluence of language related to the futuring narrative (N03.) – to be examined in detail in *Section 4.4.4.* – the catastrophe narrative (N02.), and the forced choice narrative (N05.) that together bolster the exceptional scenario of the SG field in the climate change context, enabling the dominant discourse that because of this exceptional context, the field is incredibly non-neutral. The combination of the three narratives together enables an exceptionalist framing on which the Coalition 3 discourse relies:

> "These debates generated widespread concern among scientific and environmental communities that the political will needed to effectively mitigate climate change might not emerge in time to avoid serious, potentially catastrophic damage to future populations around the world." (Blackstock & Low, 2018, p. 2)

Though only narrating the emerging context of SG debate, the discourse often presents exceptional framings of the context of climate change and SG as an exceptional solution. Language of catastrophe and a sense of urgency combined with rhetoric that sets up the potentiality of a forced choice scenario between SG and no SG all intertwine within the discourse to present an exceptional framing of the SG research and governance context. This confluence is seen throughout the discourse, with logic that because of an exceptional future climate emergency, SG may become a necessary option: "given the risk of climate catastrophe" (Sovacool, 2021, p. 6), "geoengineering can accrue into a well established contingency plan to a future climate emergency" (Sovacool, 2021, p. 17), "money can be better spent on engineering our way out of a wickedly warmer world" (Sovacool, 2021, p. 6), "may require emergency climate engineering options" (Sovacool, 2021, p. 1), "if climate impacts turn out to be more sudden and severe than currently known, SRM strategies could provide a rapid backstop" (Sovacool, 2021, p. 2), "given these stakes··· a prudent approach requires careful consideration of all options in the fight against climate change, including SRM and other 'emergency measures" (Sovacool, 2021, p. 2), "thus, geoengineering holds the promise of 'solving' climate change" (Sovacool, 2021, p. 6), "when···climate change was not yet considered an 'emergency' by mainstream thinkers" (Low & Buck, 2020, p. 12), and SG "offers rapid climate change abatement in a world where neither mitigation or adaptation can adequately address climate change" (Sovacool, 2021, p. 20). While much of this kind of *futuring+catastrophe=forced choice* rhetoric is presented within the context of the authors summarizing the sentiments advanced by Coalition 1, the rhetoric is either directly invoked or in its affirmation of such concerns it normalizes such framings, ascribing a degree of discursive legitimacy to those aspects of a Western view of climate change itself.

Stemming from the established exceptionalism in context, the discourse enables an exceptionalism in content. Nearly 40% of the entire text field for Coalition 3 exhibits discourse advancing resistance to the neutrality narrative – the highest coding percentage of all narratives or resistances in the CDA. This indicates that nearly 40% of the entire text field of the four texts belonging to Coalition 3 presents language denying the neutrality of research, its actors, or its processes. The discourse connects the exceptional context of SG to the content of the knowledge itself and thus emphasizing the context/content nexus of non-neutrality:

> "...geoengineering reminds us that climate change and low-carbon transitions, especially those to net-zero or a net negative society, involve not only material infrastructures and government regulations but also politics and values; and current geoengineering pathways guarantee perhaps an inevitable clash between local and global interests, between entrepreneurs and environmentalists, between climate policy but also economic and security policy." (Sovacool, 2021, p. 22)

Coalition 3 emphasizes the unique nature of governance for technological transitions to highlight the specific role of SG as an emergent technology, asserting that the SG technology carries "'an interpretive flexibility' given that various social groups··· continue to attach different, and at times conflicting,

meanings to them" (Sovacool et al., 2023, p. 24). The discourse supports with certainty a powerful conceptualization of SG as "polysemic⋯ provok[ing] contrasting reactions based on both the type of relevant social group and the nature of the actor network" (Sovacool et al., 2023, p. 24). Following from this interpretive, constructive nature of the research context, the discourse points to "the constructed and political nature of scientific knowledge" (Low & Buck, 2020, p. 2). For Coalition 3, the rejection of the neutrality of research in the context of climate change points to the exceptional nature of the topic of SG as invoking the political nature of the research surrounding it, asserting:

> "An important caveat is that these contestations take place to a more forceful degree in SRM conversations, where networks and positionings are more coherent and entrenched." (Low & Buck, 2020, p. 8)

For Coalition 3, the non-neutrality of SG is of critical concern, making up the dominant discourse that presents with a critical eye a more objective summary of the research landscape but with attention to this issue of personal make-up and political influence, thus raising similar concerns as Coalition 2. The discourse emphasizes the importance of its resistance to the neutrality narrative, asserting the agency of the SG community:

> "Social groups that constitute parts of the 'environment' for a technology play a critical role in shaping and defining the problems that arise during the development (and deployment) of an artifact; social groups thus give meaning to technology, and define the problems facing that technology." (Sovacool et al., 2023, p. 3)

For Coalition 3, the SG community and thus both Coalitions 1 and 2 possess a unique amount of agency to influence the future discursive construction and material development of SG as an emergent technology. This agency is bolstered via the politicization of the SG context, claiming the importance of "understanding political lobbying across both types of technologies" and "the positionality of actors" involved (Sovacool et al., 2023, p. 5). There is a critical tone similar to that of Coalition 2 when discussing the research field and studies that obscure the non-neutrality of the SG context/content, asserting that such investigations "that ignore these (sometimes hidden) social dimensions threaten to naturalize them as part of the normal environment and depoliticize the contested stances of many actor groups" (Sovacool et al., 2023, p. 23), and that in the current coalition discourses, "the shaping role of the researcher⋯ is certainly underplayed" (Low & Buck, 2020, p. 6). Similar to the resistance to the neutrality narrative of Coalition 2, Coalition 3 is critical of the agency and thus the motivation behind claims to neutrality, asserting the political over the technical, given that as "expert communities contest what is at stake ('benefits and risks' is a popular formulation) and with whom responsibility ultimately lies", they do so in "defining problems and solutions in a manner that reflects their own identities and agendas" (Low & Buck, 2020, p. 8). By emphasizing the non-neutrality of the SG research, the discourse enables its central line of concern, that due to non-neutrality and the exceptional SG context, concerns for justice and inclusion limit the legitimacy of the existing research.

*Current justice concerns impede legitimacy, and research must be legitimate*

Following from its resistance to the neutrality narrative, the discourse becomes concerned mainly with the legitimacy of current SG research via associated concerns for justice. The authors refer to Schnedler & Vadovic's (2011) definition of legitimacy as a property of the research "[whose] key aspect is the process of validation, that is, an agreement among the members of the society that the course of action or type of behavior is in line with their moral values and principles of justice". Language throughout the discourse demonstrates resistance to the humanity narrative as concerns for the current homogenous make-up of the 'climate geoengineering community' pose concerns for justice::

> "Knowledge and capabilities remain concentrated mostly in industrialized countries, perpetuating 'hidden politics' and inequalities in decision making authority and also shaping the types of research projects undertaken in the first place." (Sovacool et al., 2023, p. 18)

Because of the exceptional role of SG's non-neutrality, legitimacy is limited by lack of justice aspects like recognition of diverse values and perspectives in the knowledge production first and in the political hypothetical future second. The discourse emphasizes the dangers being neglected in SG research processes, pointing to marginal involvement of the public. As observing the Coalition 1 and Coalition 2 positions, the discourse emphasizes the importance of justice concerns pursued mostly by Coalition 2 over technical aspects of deployment pursued mostly by Coalition 1 given the severity of concerns surrounding SG on the potential "political reinforcement of unsustainable social and economic structures, ones that resist reforming industrial society, or addressing pressing issues of poverty and global inequality" (Sovacool, 2021, p. 15). The discourse emphasizes the difference in humanity that marks climate change and SG behind overall concerns for justice that limit legitimacy, acknowledging with a level of neutrality the opposing coalitions that "agree on a concentration of effort in the Global North, but differ on whether this reflects an unsalvageable inequity, or whether debate can usefully expand to the Global South" (Sovacool et al., 2023, p. 18). According to Coalition 3, "the CE research ecosystem has often reflected and reinforced a particular paradigm: technical assessment of costs and risks as 'actionable evidence'; a separate and secondary examination of societal dimensions; and treatment of stakeholder engagement as communication of scientific results" (Low & Buck, 2020, p. 2). The discourse critically identifies the ordering of societal concerns as secondary within Coalition 1 as problematic, asserting the importance of such ordering:

> "A number of influential researchers have long claimed that political imaginaries – particular ones focusing on risk – have begun to outstrip actual scientific knowledge and technology development in geoengineering (e.g. Parson and Keith, 2013). These researchers are well aware of societal implications in research and field experimentation, but there is a prioritization of technical knowledge as a basis upon which stakeholder engagement and policy can be built." (Low & Blackstock, 2019, p. 246)

The discourse emphasizes Coalition 2 research and more legitimate, addressing such studies as 'second wave engagements' that are "kin to critiques of the 'actionable evidence' paradigm of authoritative assessments, with the same efforts to refocus attention on society's right to be involved in defining the feasibility, risks, and aims of CE" (Low & Buck, 2020, p. 5). Thus, in its concerns driven by the resistance to the humanity narrative and the non-neutrality of research that gives current primacy to technical concerns over societal inclusion, the Coalition 3 discourse aligns itself as more in favor of those 'second wave engagements' characteristic of Coalition 2. The discourse as a whole establishes the reasoning that "because of this complex and often contestable nature of geoengineering – that is both ethically reckless or morally righteous to different stakeholders – the debate may be impossible to resolve" (Sovacool, 2021, p. 22). The exceptionalism of SG and the two opposing coalitions, according to Coalition 3, leads SG research to an impasse,

> "…where technologists were waiting for a more permissive climate, while social scientists concerned themselves with mapping imaginaries. This formulation is generous to technologists and unkind to social scientists, but it seems accurate that RRI practice has since SPICE pragmatically treated research itself as a form of governance. There is, in our estimation, nothing wrong with this avenue of activity— imaginaries are resonant, and interrogating the evidence and actors that underpin them is, as we have noted, its own form of 'de facto'." (Low & Buck, 2020, p. 11)

For Coalition 3, the priority of research that seeks to improve the legitimacy of the entire research landscape is therefore not to support/oppose further research on the governance of SG alone, but to imbue the research practices with principles aligned with RRI that seek to expose existing imaginaries as a form of research governance. The discourse prescribes avenues for such future studies, which could "examine the core beliefs that actors hold, as well as their attempts at coordination and the stability or fragility of the coalitions they form" (Sovacool et al., 2023, p. 22), "explore which narratives, visions, and discourse are being employed by various actors and actor groups" (Sovacool et al., 2023, p. 23), "produce assessments that are grounded in RRI which map not just technologies and narratives, but actors involved" (Low & Buck, 2020, p. 12), emphasize "socio-political and ethical questions instead of technical ones" (Low & Buck, 2020, p. 8), and connect analyses "to initiatives that generate narratives and include constituencies based on inequities in knowledge construction" (Low & Buck, 2020, p. 10). While the discourse points to justice concerns of such Coalition 2-type research regarding the 'actionable evidence' paradigm of Coalition 1, however, it also criticizes the situated discourse of Coalition 2 and its 'deliberative' engagements:

> "Deliberative engagements based in northern Europe (however unintentionally) give the impression of delivering generalizable insights from some globalized public, while the much smaller set of foresight and scenarios activities has often taken a catch-all, global approach to mapping concerns." (Low & Buck, 2020, p. 10)

Coalition 3 are critical of both coalitions in their ability to recognize and include diverse interests via meaningful processes for representation, emphasizing the importance of engagement that must account for the current imbalance of actors, norms, and interests and the reality that "assessments have largely taken place within a handful of wealthy northern European states with comparatively strong climate ambitions" (Low & Buck, 2020, pp. 10-11). The role of Coalition 3 itself comes into view from the confluence of these discourses, with the authors themselves asserting: "We investigate emergent knowledge networks and patterns of involvement across space and scale··· to comprehend the locations of actor groups and potential patterns of elitism; and to assess relative degrees of social acceptance, legitimacy, and support across these actor groups" (Sovacool et al., 2023, p. 1). The discourse claims to advance research that assesses the involvement, representation, and potential marginalization of certain actors/values/interests, with a specific goal to expose 'potential patterns of elitism' – that same critical research I seek to conduct here – asserting that "Mapping them is crucial, especially considering criticisms surrounding elitism and colonialism in knowledge production and deployment" (Sovacool et al., 2023, p. 2), and especially considering that SG "can be depicted as an act of neocolonialism" (Sovacool, 2021, p. 15). In their concerns for justice, Coalition 3 point to the possible coloniality behind SG research and development, however they maintain a sense of neutrality of such investigations:

> "Arguments that geoengineering debates are limited to the global North or have the potential to perpetuate certain dynamics of the present··· are welcome warnings against undesirable futures... However, they do not reflect any intent that we, as long-time participants in this debate, can see."
> (Low & Blackstock, 2019, p. 245)

Not only does the intent of the dominant coalition researchers become relevant in the discourse, but the intent of Coalition 3 becomes clear. The intended neutrality of Coalition 3-type research is preserved as the discourse refrains from criticism or ascribing negative values to the subjectivity of actors, unlike the discourse of Coalition 2 that takes a more political, critical stance. A specific level of agency is given to the authors of Coalition 3 by which they can more neutrally and legitimately determine – and later ameliorate – key justice concerns arising from the SG research field via certain prescriptive research focuses. After determining the exceptionally problematic context/content of SG and its polarized research landscape, the discourse implicates itself as a third-party observer that emphasizes the need for certain RRI-type research frameworks that though align partially with Coalition 2 are introduced as an external, corrective solution.

### *Legitimacy can only be fostered via Coalition 3-type research*

The Coalition 3 discourse enables a corrective assessment by which the research field as a whole can be improved thanks to a more unaligned, reflexive, trustworthy observer. According to the authors, some research approaches can alleviate certain concerns, like RRI which "has arguably been moderately successful as a corrective in the previous decade's context" (Low & Buck, 2020, p. 12). The discourse is professed as able to assess the major concerns/disagreements of the dominant coalitions from a place of

self-ascribed separation. Here, the justice and legitimacy concerns that underlie the Coalition 3 discourse become potentially resolvable via the active role of certain, 'corrective' forms of research. Here, the exceptional non-neutrality of the field enables a simultaneous reinforcement of the idea of Coalition 3 as more neutral and objective, with good intention and inflated agency for alleviating justice concerns through Coalition 3-type research. Thus emerges an interesting context in which resistances to the humanity and representation narratives are situated, one in which justice is mostly addressed by particular research agendas for the purposes of remedying legitimacy concerns:

> "If critical analyses map the knowledge and political economies with an eye to inequities, RRI also generates engagements with those missing constituencies, and develops 'futures' that represent under-investigated discourses⋯The objective is to be explicitly 'generative'... and not simply to recognize the (perverse) signals and effects of existing imaginaries, but to create alternative narratives." (Low & Buck, 2020, p. 5)

The discourse moves from identifying Coalition 2 investigations as the most promising in terms of addressing justice concerns to asserting itself as able to surpass the boundaries of such critical analyses to actively engage with those missing dialogues, not only recognizing but generating new narratives. By emphasizing justice concerns as a function to remedy lacking legitimacy, the discourse constructs itself as a body of research able to enact a certain agency to improve the legitimacy of the field. Such potentially corrective research "should highlight the responsibilities of expert communities in shaping knowledge, rather than transfer responsibility for 'using' that knowledge to society" (Low & Buck, 2020, p. 3). In its concerns for representation, humanity, and justice, therefore, Coalition 3 establishes a positive reflection of its role and its agency to remedy concerns of "underrepresentation of actors from the Global South in geoengineering discussions, meetings, and workshops" (Sovacool, 2021, p. 18):

> "...comparative work and inclusion could help researchers, policymakers and other stakeholders to better prioritize efforts for geoengineering development towards opportunities that are more feasible in different time frames, and more likely to yield societal or financial benefits." (p. 18)

The discourse alludes optimistically to aspects of its own kind of research, creating an inflated role of beneficial agency with positive verbs working to bolster the role of Coalition 3-type research: "Anticipation provides useful guidelines for how to proactively explore and manage concerns in future-oriented research, alongside regulatory mechanisms that seek to constrain the negative side effects of research..." (Low & Blackstock, 2019, p. 247). In contrast with Coalition 1, the discourse prescribes directions for RRI-informed future research that counters the utilitarian tendencies of research: "It should engage in open-ended questioning, rather than normalize CE approaches via metrics of 'costs' and 'effectiveness' that make it digestible for policy" (Low & Buck, 2020, p. 3). Further, the goals established in the discourse for future research emphasize a necessary focus on resistance to the neutrality narrative that directly challenges the dominant technical framings advanced within Coalition 1:

> "RRI argues that societal concerns must be explored through open-ended deliberation and imaginative futuring, rather than shaped by proxy via modeling parameters and results. In this way, RRI-informed work (especially in SRM) redefines the terms of debate in such a manner that technical disciplines… possess less authority to speak to what is at stake than arenas more amenable to RRI-based expertise: stakeholders, 'publics,' 'democracy,' worldviews, and the social sciences." (Low & Buck, 2020, p. 8)

Coalition 3 recommends its own type of research be conducted to remedy what it sees as the most critical differences and shortcomings of Coalitions 1 and 2, assigning itself a more benevolent role in comparison to the rest of the research field. With regards to Coalition 2 and other social science-based critical scholarship, the discourse argues that such critical analyses "can play a more purposefully corrective role" (Low & Buck, 2020, p. 10) if they were to "operate more often under guiding questions relevant to a specified political context and audience" (Low & Buck, 2020, p. 10). While the discourse does not argue against or criticize the coloniality of the global tendency of both coalitions, it asserts that the kind of RRI-informed practice that could play a corrective role in the context of SG research would focus on specific, local contexts for the purposes of legitimacy. This accounts for the logic in the discourse that exhibits the representation narrative, as it sees potential for interests and values to be included or injected via RRI-type research practices:

> "...a sandbox within which one can pose context-driven but RRI-informed activities, bounding the plurality of imaginaries and stakeholders, and coming down explicitly on the side of embeddedness rather than divorced critique." (Low & Buck, 2020, p. 10)

Limitations of the coalition are explained by the coalition itself. One limitation is that it does advance certain conceptualizations/narratives of course: "RRI does not preclude the emergence of dominant narratives and ensuing policies" (Low & Buck, 2020, p. 6), but asserts that what narratives are advanced can in fact themself avoid being "perverse, inequitable, or recklessly enabling" and "reflect a considered consensus that emerges from sustained engagement with publics and stakeholders deemed relevant" (Low & Buck, 2020, p. 6). While the discourse recognizes that "RRI in CE is not even-handed in its pursuit of reflexivity, tending to interrogate—and thereby emphasize—actors outside of their own practice: modelers, engineers, perceived technophiles, the media, and policy and civic participants" (Low & Buck, 2020, p. 8), there is established via the discourse the idea that the dominant narratives that emerge from such research processes – if meaningfully legitimate and representative of varied/context-specific, diverging interests – may not be problematic if dominant. Leads to the representation narrative that some researchers' interests and processes can indeed meaningfully reflect currently excluded values and norms even despite the temporality of these research practices. Big discourse is that they correct current injustice. Overall, while the discourse sides with Coalition 1 on RRI and research regulations as a form of governance itself, which is context by Coalition 2.

In sum, the discourse of Coalition 3 distinguishes itself from the other coalitions, emphasizing critical weaknesses of both Coalitions 1 and 2 to bolster its own positive, active role in addressing and perhaps correcting for these current weaknesses. The discourse advances three Western imaginaries regarding climate change that work to accompany the exceptionalist logic of the context of SG, thus enabling the extremely high presence of resistance to the neutrality narrative in the discourse. Drawing on this confluence of narratives and this resistance to the neutrality narrative, a focus it shares with Coalition 2, the discourse points to concerns for justice as its driving motivation. In emphasizing resistance to the humanity narrative and the current domination of European interests in the larger field, Coalition 3 buttresses its argument for improving the legitimacy of such research. Ultimately, the discourse works to enable the idea that its own research is marked by certain practices that extend beyond the bounds of Coalition 2 but that align with the idea of Coalition 1 that research can act as a form of de facto governance that can correct the current injustice and lack of representation in the field. Importantly, while the discourse works to set itself apart from Coalitions 1 and 2, it demonstrates moments of alignment with the other coalitions.

### 4.4.4. THE DOMINANT DISCOURSES: THE ENTIRE FIELD

As shown in the previous sections, the prominent scientific research on the governance of SG is characterized by its dominant opposing discourses regarding the research itself, with contrasting discursive themes and narratives challenging each other and defining the field accordingly. The central discourse of Coalition 1 discredits Coalition 2 and exhibits the highest degree of narratives totalizing a Western imaginary. The central discourse of Coalition 2 similarly works to discredit Coalition 1 based principally on this high degree of thinking from a Western imaginary, itself portraying more usage of the resistances, however with two prominent narratives totalizing a Western imaginary. Finally, the central discourse of Coalition 3 blames this 'impasse' between Coalitions 1 and 2 and proposes its own research as a corrective measure for improving legitimacy, itself advancing some narratives totalizing a Western imaginary. The dominant discourses that characterize and differentiate the three coalitions, while clearly diverse, all portray one concerning narrative theme that spans the research field as a whole. One of the narratives (N03. the futuring narrative) is not only present across all coalitions but is also employed similarly, contrasting with the other narratives and resistances that contribute to starkly different coalition discourses. Despite the general stances that align the researchers with either the advocacy, opposition, or neutral coalitions, the futuring narrative totalizing a Western conception of climate change is utilized similarly across the research.

Each of the discourses advance the futuring narrative by which a Western, linear conception of climate change is normalized (22% for Coalition 1, 15% for Coalition 2, and 20% for Coalition 3). The nature of climate change research and governance necessarily engages the future, and the presence of the futuring

narrative within the field as a whole is of course in part due to the fact that discussions of SG and its governance are treating a potential future case of technology and its governance, and thus the language itself is oriented to future considerations. However, mere engagements with the future are not contributing to the coding results, and the high percentage coverage of the futuring narrative for each coalition indicates language that conceives of, treats, and presents climate change itself according to a linear, Western conception of time and of effect. All three coalitions are of course aware of the important historical context of climate change, with critical moments of resistance to futuring rhetoric pointing to the historical context of climate change that invokes "the root cause of the problem" (Caldeira & Keith, 2010, p. 58), the "cause of human-induced climate change" (Sovacool, 2021, p. 18), "the growth in fossil fuel use over the last two centuries" (Szerszynski et al., 2013, p. 2812), the role for "those with greater historical contribution to the problem" (Reynolds, 2019b, p. 79), and the general reflexive understanding that "had high-emitters complied with their obligations in the past, they would have pursued aggressive mitigation in the preceding decades" (Svoboda et al., 2018, p. 11). Even further, the Coalition 2 discourse expresses concern that the future-framing of climate impacts in the general SG discourse tends to mean that "historic injustices embedded in their causation are easily overlooked" (McLaren, 2018, p. 214), and the Coalition 3 discourse recognizes that "the 'future' is often used as a rhetorical device with which to make claims on the shape and direction of current research and politics" (Low & Blackstock, 2019, p. 247). While each coalition is concerned with the temporal framings of climate change and SG and points in some way to the importance of the historical context of climate change, the overall language in each discourse works to nominalize climate change as a *resulting* phenomenon and point of arrival either emerging in the present or future, and not as a historical *cause* of violence, degradation, and injustice.

The language in all three discourses constructs a conception of climate change primarily as a phenomenon presenting risk, not as a historical act of violence itself. In line with Bettini's (2013) place of future climate crisis, the research field normalizes a future temporality of climate change via language that either places climate change as yet-to-come or the agency of relevant actors or processes in a present tense in anticipation of future events. Language that conceives of climate as yet-to-come includes but is not limited to: '*future* climate change', "a *threat* such as climate change" (McLaren & Corry, 2021b, p. 3), "the *looming* climate change crisis" (Parson & Ernst, 2013, p. 317), "this *impending* challenge" (Lawrence et al., 2018, p. 2), "climate change *will* interfere with the enjoyment of several human rights" (Reynolds, 2019b, p. 105), "Climate change *will have* generally negative impacts" (Reynolds, 2019b, p. 197), and "these impacts *potentially* involve injustice" (Svoboda et al., 2018, p. 2). Language that conceives of the agency of actors in a present tense in anticipation of future climate change includes but is not limited to: "the *promise* of '*solving*' climate change" (Sovacool, 2021, p. 6), "*avoiding* climate change" (Irvine et al., 2016, p. 826), "*prevent* climate change" (Reynolds, 2019b, p. 16), "action *will* be required to reduce its harms" (Harding et al., 2020, p. 2), "in time *to avoid* serious, potentially catastrophic damage" (Blackstock & Low, 2018, p. 2), "*to avoid* dangerous climate change" (Macnaghten & Szerszynski, 2013, p. 465), and "*anticipated* climate change harms" (Sovacool, 2021, p. 9). The futuring language of the research obscures the

temporality of climate change, normalizing a vision that prioritizes the present and future role of climate change. The problematization of climate change first as a future point of arrival and thus as a problem to be solved in the present obscures climate, portraying it as a *resulting* phenomenon to be addressed in the present or future, not as a systemic *cause* of historical harms, impacts, injustices, and with long-known 'solutions'. The research field focuses to varied degrees on intergenerational justice as justification for this temporality and for the respective discourses on either the proliferation or opposition to research and development, minimizing focus on existing or historical justice and addressing or repairing past injustices: "future generations would suffer from climate change" (Reynolds, 2019b, ), "the present generation has a duty to future generations to implement major reductions in carbon emissions, whatever the efficacy of solar geoengineering turns out to be" (Horton & Keith, 2016), "potential impacts on future generations" (Nicholson et al., 2018, p. 323), "The impacts of climate change are subject to major time lags, implying that a large part of the problem is passed on to the future" (Gardiner, 2010, p. 3).

While for each coalition the futuring narrative works to support or enable other narratives and rhetorics unique to those coalitions, the future temporality of climate change is used commonly across the field as a whole to enable an exceptional scenario of climate, SG, and the research. Coalition 1 uses futuring language to create exceptional scenarios of future harm to justify its humanity and damage narratives with statements like "the effects of climate change *will* disproportionately affect the poor," "climate-induced ecosystem stresses *will prove* particularly harmful to the least well off," and most problematically, "The rich have got richer doing things that *will* hurt the poor most of all" (Horton & Keith, 2016). For Coalition 1, the damage and utilitarian narratives by which strong research must be advanced is enabled by the future temporality of climate change, one in which "the crux of the matter is the rights of the poor in the coming decades compared to the poor in the distant future" (Horton & Keith, 2016) as opposed to redressing past harms. Overall, the discourse nominalizes climate change by portraying it as some entity, not an action, as a thing: "as climate change sets in further" (Parker, 2014, p. 10). Ultimately enabling its other narratives that work to bolster support for research and development:

> "For simplicity, we consider two time periods, the near term, or roughly the next half-century, and the long term, more than half a century out. Climate change is a slow-motion problem." (Horton & Keith, 2016)

In contrast, Coalition 2 displays an interestingly balanced degree of futuring and its resistance, using both in their exceptionalism to counter the utilitarian and damage narratives of Coalition 1, asserting that "the 'supply of universal benefit' framing tends to be perceived as exclusively forward-looking" (Gardiner & Fragnière, 2018, p. 151) and "insomuch as debt rests on a promise to pay back in the future…, it weakens the responsibilities of the present" (Asayama & Hulme, 2019, p. 939). Coalition 2 authors possess the highest degree of resistance to the futuring narrative, asserting that indeed, "The dangers of climate change are not somehow 'out there'" but "are 'in here' – a function of human technologies, social relationships, economic and political systems" (Hulme, 2014, p. 85). Contesting the narratives of the

others, the discourse recognizes the role of research that constructs 'futures' as political (McLaren & Corry, 2021b). However, even in its more critical view of climate change as complex, multifaceted, and unjust and its declared understanding of the problematic lens of the future to the context of construction of climate futures, Coalition 2 displays the futuring narrative in its rhetoric of climate change as principally a *resultant* justice challenge to be addressed in emerging contexts:

> "...global climate change *constitutes* 'a perfect moral storm': the convergence of three nasty *challenges* (or 'storms') that *threaten* our ability *to behave* ethically. These three storms *arise* in the global, intergenerational and theoretical dimensions." [emphasis added] (Gardiner, 2010, p. 3)

Similar in their central concern for justice of research and processes, within Coalition 3, the futuring narrative works to bolster the exceptionalism of the SG research field in order to display the dominance of certain interests in the current research. Each coalition normalizes a future temporality of climate change in their exceptionalist conception of the SG research context, using future climate change to create urgency for the purpose of each coalition's central discourse. As examined in the individual sections, Coalition 1 employs urgency to advocate for improved, mission-based technical research, Coalition 2 employs urgency to advocate against research that does not seek to expose current partialities in the research, and Coalition 3 employs urgency to bolster the need for more improved legitimacy. However, all coalitions normalize the futuring narrative discursively, a normalization that obscures the historical, lived, embodied harms already incurred by the historical, systemic *causation* of climate change. The research field as a whole normalizes the temporality of climate change that inflates the role of present actions and decisions, and while it is employed for various reasons, this kind of logic can solidify the increasing focus away from the past inherent in Western hegemonic climate discourses.

## 5. DISCUSSION

This section elaborates on the results of the CDA and the ways in which a Western imaginary is either totalized or resisted within the discourse and the subsequent implications for climate coloniality in the context of research on SG and its governance. In formulating in this section a critique in relation to the decolonial analytical frame outlined by Mignolo & Vázquez (2013) and Vázquez (2022), I answer the following research sub-question:

> *SQ5. How is the prominent scientific discourse on SG and its governance situated in Western modernity, how does it establish universal claims to knowledge thereby erasing other realities, and what plurality of existences can be recalled and restored?*

The discussion begins with a section on the limitations of the analysis and the interpretation of the results. Next, the decolonial analytical theme is applied to the results to name the ways modernity/coloniality works to totalize certain narratives and disavow other imaginaries and entrench climate coloniality both materially and discursively within the research. Next, the discussion points to the third moment, the decolonial horizon with respect to a critical climate justice, revealing what epistemological practices and material pedagogies exist that work towards modernity/coloniality's 'otherwise' relative to the current discourse on SG and its governance. Lastly, the implications of the findings for future research and the socio-political context of climate change and SG are discussed.

## 5.1. LIMITATIONS

I acknowledge several significant limitations to the reliability and validity of my interpretation of the analysis and its application to the decolonial analytical frame. First, coalitions might not be entirely generalizable. The context of a text, its discourse, its investigation, and its output are extremely important to understanding the power dynamics that lie within a form of knowledge, and here I lump them all together in terms of coalition and in isolated segments of language based on narratives. By determining the results across coalitions and not more thoroughly of each individual text or author in their own specific context, I risk an analysis that is less valid. According to Anshelm & Hansson (2014), it is difficult to find 'pure' advocates or pure critics and it is important to claim that the authors within one coalition do not necessarily agree on the diverse range of views presented by others in the discourse. However, while this generalization in terms of coalition is a limitation to the validity of the analysis in terms of strictly defined coalition borders, those authors designated within a particular coalition generally contribute to the same patterns of normalization of certain narratives. Thus, despite the limited validity of grouping the results and the analysis based on coalition type and an obscured focus on important contextual considerations, the analysis still provides strong insights into what aspects of a Western imaginary are employed in the proliferation of particular, often coalition-based discourses.

Second, the less substantiated and interpretive nature of the discourse analysis methodology by which the presence of the twelve narratives and their resistances was identified poses a serious limitation to the results. First, the guiding framework of PCDA which informed the method is not highly developed in existing literature, and as a framework itself faces limitations as is, let alone in its projection/extension to another domain, in this case, to decoloniality. Despite the extensive literature review and the efforts to establish a highly informed analytical method, the discourse analysis itself is limited in its application to diverse contexts, and its use here should be reflected upon and critiqued as such. The interpretive analysis that emerged through the analytical framework as a deductive coding process is highly subjective and thus the reproducibility of the methods is limited given the potential for some actors to disagree with certain coding choices. While the subjectivity of the method limits reproducibility and validity,

contributions to critical discourse analysis are importantly subjective and political, and thus I recall the necessary claim that this method is not intended to be a neutral, entirely reproducible process, for it is highly targeted and subjective. Further, as this research seeks less to provide a quantitative result on the presence of certain narratives within the discourse and more to provide a qualitative interpretation of what colonial mechanisms of totality within certain discourses currently are normalized, I urge further critical inquiry by other actors and methods with different subjectivities into this important topic.

Third, and most substantially, this research takes a global governance scope, producing an analysis of discourse that is highly abstract and generalized in nature. This lens limits the ability for this research to provide more meaningful local output. The level of scope should be remedied by looking into specific instances of SG research, with more thorough analysis of the specific local context of certain forms of research, the actors implicated, and the geographical places impacted, producing more localized results that can offer more tangible outcomes to specific populations and specific contexts. To ground analysis in local praxis is critical, and thus my focus on only the larger, more abstract processes of narrative and theories poses a limitation to the validity and reliability of this research. Because of this limited global scope, I am limited in interpreting the results so to apply or provide direct recommendations, as I am providing less policy/governance/practice-oriented results and more commenting on the larger, more ingrained, systemic patterns of knowledge within the research field, a result that is thus limited in its impact. Further research could remedy this limitation by focusing on the actual, local processes by which these imaginaries are constructed, and by which they can be challenged or negated in praxis by more localized research attempts. Decolonial work *is* local work, and thus my purely desk-based research on global discourses is highly limited in that it normalizes a kind of gaze-from-here into issues that must be understood as primarily local, embodied issues, not primarily for global theory and disembodied research.

Finally, this research is again limited in its situatedness, recalling the principal limitations to this endeavor. First, this research was produced within the same kind of institution that contributes to such research at large the same narratives, the same systemic injustices of epistemology in totalizing certain conceptions of earth and of climate, and the same global focus and non-local gaze-from-here approach. Second, the application of the results is inherently biased, as I am basically directly contributing to Coalition 2-type research and thus cannot claim to be some external form of research able to arrive at non-neutral, pure conclusions about the research field and the coalition discourses. With this research, I am *part of* one of these general coalitions and thus cannot avoid bias in the analysis. Most critically, this research would have been made much more valid, reliable, and reflexive if it were not produced in isolation, but with a number of other inputs and perspectives, and from an engagement with different institutional settings. However, in seeking within my institutional boundaries and the guidelines for this research as a thesis, I seek to make cracks in the ways that I can. Overall, as relationality means that there is not one way to do and conceive of decoloniality but it is the way we, the authors do and conceive of it (MLDSS), I rearticulate the fundamental limitation in this analysis as it is entirely my own personal

interpretation of modernity/(de)coloniality, especially in discussing the implications of the analysis.

## 5.2. THE DISCOURSES: MODERNITY & CLIMATE COLONIALITY

By identifying the resulting presence of the twelve narratives in the discourse, I name the origin of certain concepts, ideas, and discourses within the prominent knowledge on SG as Western, and in this recognition, "they become located and therefore lose their claim to universality" (Mignolo & Vázquez, 2013, p. 8). Further, by identifying how these concepts, ideas, and narratives are "not only not universal but that in their coloniality they conceal the diversity of ideas and ways of relating to the world that do not belong to the genealogy of the Western tradition" (Mignolo & Vázquez, 2013, p. 8), I expose the coloniality that these narratives disguise. The discourse normalizes certain conceptions of climate change, of knowledge, of earth, of the future, of the world, and of populations that originate from a distinctly Western imaginary. Sultana's (2022b) fundamental comprehension of climate coloniality as those forms of, processes for, ideas preserving, and mechanisms behind coloniality in the context of climate change designates both a material/political and a discursive/epistemological domain within which coloniality disavows the lived experiences of Western modernity's 'Others' and 'otherwise'. The prominent knowledge produced on SG and its governance as a global climate change solution has through this research been revealed as advancing certain conceptions of the world that claim totality but that are grounded in a Western imaginary. Further, the way the discourse is structured in the form of juxtapositions across contesting coalitions of thought and discipline impacts how the knowledge itself is shaped, resulting in a unanimous reliance on the dominant systems of knowledge production and subject/object relationships that has implications for the practical implementation of methods to challenge such systems and make possible a plurality of 'otherwise'. Certain SG discourses and structures of knowledge entrench climate coloniality both in the discursive/epistemological realm and the material/political realm, requiring recommendations both for future scientific research and for non-scientific relationality by delinking from dominant frameworks of research.

### *Discursive/epistemological of climate coloniality*

As modernity/coloniality is above all a question of knowledge, the epistemological workings of climate coloniality are fundamental to understanding how it is preserved and in what ways it can be dismantled. While the discourses clearly vary across coalition type, certain tendencies within the field have been exposed as totalizing a Western approach primarily to the *context* and *subjects* of climate change and SG. Most explicitly, the discourse normalizes a conception of climate change with a linear future temporality, as a *certain* phenomenon to arrive, one that through accordingly present and forward-looking research can be known and its governance and justice challenges can be addressed. The entire field, though distinct in attitudes towards research and development of SG, sees climate change as a

nominalized event and fundamentally of future concern, warranting for different coalitions either an urgent scenario calculus or an urgent moral storm – either way legitimizing the role of action now to address the looming, external, intergenerational threat. The dominant Western imaginary of climate change as an impending, 'ecological' crisis erases colonial experiences (Ferdinand, 2021). The normalized future temporality of climate change minimizes the political and historical spatiality of climate change and diminishes the possibility of futures 'otherwise', reifying certain discourses of the future that preclude emancipatory pathways for worlds and for earth. 'Anthropocene' rhetoric throughout the field normalizes the discursive frame of climate change as future, facilitating the common tendency to invoke exceptionalist logic in the face of this 'unprecedented' problem. However, the research engages in moments of selective humanism by which 'Anthropocene' collectivity that justifies various attitudes towards SG is simultaneously negated in the similarly exceptionally framed recognition of concerns for justice and inequality regarding the victims of climate change, a concern held to varying degrees throughout the field.

The discursive focus on concerns for justice – whether that begets calls for more technical research or calls for more critical research to expose existing inequities – is facilitated by a rhetoric of exceptionalism throughout the field as a whole. The interpretation and framing of the *context* of climate change as exceptional is employed by authors regardless of coalition type, invoking exceptional scenarios to buttress a diverse range of concerns and recommendations. Critically, such an interpretation of climate change is subjective, and its normalization precludes a plurality of epistemological approaches to climate change that instead center the long-embedded, historical, slow violence of climate change and the long-embedded knowledge of its solutions. Such exceptionalism can entrench climate coloniality in the marginalization of other epistemic ways of thinking through climate change and its solutions, and the urgency created by such framing can work to hinder the possibility of challenging such fundamental interpretations of the problem itself and the development of knowledge on SG in response. Exceptional rhetorics are often employed in connection with justice concerns abstracted to the level of the globe as a whole, entrenching a coloniality of the discourses that treat the governance *subjects* of climate and SG via an abstracted, disembodied lens of aggregation. Despite variations namely with Coalition 2 in its attention to the importance of difference and of locality in the context of climate change, the dominant scope of the global within the discourse normalizes SG as a 'world-object' that exists on the universal level and not the local (Serres, 2013). The normalized exceptional scenario of climate change in the context of SG rearticulates an extremely global scope, diminishing the applicability of other epistemologies that prioritize climate change as local, thus creating a field of influence within the research landscape that hinders both epistemological and material access by imaginaries that conceive of an embodied, located approach to climate and SG that seeks to account for difference and relationality.

As concerns for justice dominate the research in variegated ways but commonly through the lens of an exceptional, global context of SG, a partial and situated epistemological framing of justice is advanced

from this place of abstraction and homogenization. Because the research at large engages homogenized justice concerns that are perceived at the abstracted level of the globe, it reinforces such engagements as relying on a Western subject/object knowledge structure and the parasitical aspect of knowledge in which the subject takes everything and the object receives nothing (Serres, 2013) and the paternalist/imperialist aspect of knowledge in which the subject can defend a partial view of the object without knowing them fully (Plumwood, 1993). Coalition 2, that which most critically prioritizes concerns for justice and whose discourse possesses the least active entrenching of climate coloniality, still relies on the subject/object structure of knowledge to theorize justice concerns on behalf of an often homogenized global South. Despite critical, meaningful concern for the injustices associated with climate change and with SG itself, approaches to justice throughout the field are limited in their approach to knowledge via such subject/object dichotomies that enable a lens of abstraction and homogenization and that precludes relationality and listening. Such partial approaches to justice manifest in the discourse as the representation, damage, or inevitability narratives, despite moments of attention on the complexity of interpreting diverse values for justice itself, often recognized by Coalitions 2 and 3. Importantly, such abstract, disembodied, homogenized accounts of justice in the research are not innocent, as they actively construct vulnerability and entrench coloniality. Climate vulnerability is discursively constructed in the research as vulnerable populations in the developing world are homogenized as the collectively vulnerable global South, further enabling their passivization via the normalization of a perceived incapacity of this global vulnerable world, entrenching the subject/object relationship in the discourses that preclude a plurality of global futures.

In their prioritized concern for justice, Coalition 2 explicitly and Coalition 3 less explicitly challenge the totalization of a Western imaginary regarding the determination of goals based on certain frameworks for justice advanced by the dominant body of technical research. Their contestation of the emphasis of the bulk of the research on climate stability as the ultimate place of justice challenges the partiality and reductionism of the relevant narratives. However, the way justice concerns are framed in the discourse takes on a fundamental subject/object relationship where those vulnerable actors are not portrayed as already transformative agents in their own climate contexts, but as inactive agents with interests to be included in and tacked onto the systems and knowledge that seek to address for their sake this vulnerability. While Coalition 2 aligns directly with a critical climate justice conception and points to the necessary role of the global South in determining its own climate futures and to difference and locality, the discourse does not emphasize in its discussion of global justice the resistance activated within the many places of struggle, instead obscuring the transformative capacity of the South and its already existing resistance to dominance and to climate coloniality. The discourse at large does not include the aspects of learning from those who resist or listening to climate's exteriorities as not a homogeneous global South or developing world but as a cultural and epistemological plurality of lived resistance to climate change. Instead, the discourse, regardless of coalition type, primarily normalizes an enunciation of climate justice that is *deliverable* through certain actions of the subjects, with differing forms of the

desired justice still commonly being perceived as determinable by the subjects *for* the objects. While at moments recognizing the return to the root causes and disparities of climate change, and for Coalition 2 especially in its attention to the reparative aspect of a critical climate justice, the discourse largely conceives of a scientific or political *implementation* of either new technical research developments (Coalition 1), new governance arrangements and efforts to expose and discredit these attempts (Coalition 2), or new research agendas to imbue the knowledge production with new narratives (Coalition 3) as facilitating the pursuit of justice. Rhetorics that challenge the coloniality of climate change itself do so by interpreting what needs to be done in an anticipatory nature to either promote, oppose, or make more legitimate the research on SG, instead of recognizing as potentially incapable those structures and contexts of knowledge and instead looking and listening in a relational nature to those places of resistance to injustice themselves.

Fundamentally, language throughout the research carries deep assumptions of climate coloniality without addressing in an embodied approach the role or entanglements the authors and their practices themselves play, as even the critical, more justice-concerned discourses treat coloniality or injustice as either some sort of external, unfortunate thing or as a process of construction directly entangled with and shaped not by subject/object forms of research but by Coalition 1-type research. A generally de-racialized conception of climate justice throughout the discourse allows its authors to forget that climate justice itself historically comes from the struggle of Black and other minorities resisting environmental racism (Ferdinand, 2021), enabling the interpretation of justice as a disembodied global deliverable to be facilitated by the (more critical and thus more legitimized) structures and processes of SG research (albeit in contested ways). The research presents a series of deeply contested and juxtaposed discourses that contribute to the discrediting or reinforcing of certain attitudes towards and narratives behind SG, all without substantial recognition that the proliferation of such polarized, opinionated, targeted research only further entrenches exclusion of others who may seek not to take a side in or contribute to the debate as such but who seek to go back to the beginning and challenge not only the most fundamental assumptions that the field takes as universal but also the structures within which such engagements take place and derive validity. While Coalition 2, and Coalition 3 to a lesser extent, identify this notion of a necessary 'return' to the fundamental questions that have been skipped over by the current most prominent research field, they rely on the role of research itself as the central space from which to enact such a 'return', diminishing the spaces of non-science and of non-expertise only from which such a 'return' would enable the decolonial recovery of plurality of values and epistemologies. While various discourses criticize the problematic fundamental assumptions put forth in the research and their connection to the contextual make-up of the research field, they do not challenge their enabling structure *as research* that allows such assumptions to be made and advanced as unchallenged. As long as the embodied, entangled role of research within the dominant structures of Western modernity is unproblematized in the discourse, the normalization of fundamental attitudes based on central subjective assumptions about the world and our role in it can maintain validity. Modernity controls knowledges

that are outside itself (MLDSS) not only in the normalization of its narratives but in the protection of its fundamental attitudes and sentiments disguised as valid in their universality, a protection enabled by the structures of knowledge that mark modern science:

> "We may use these powers for good or ill, but it is hard not to delight in these newfound tools as an expression of collaborative human effort to understand the natural world." (Keith, 2013, pp. 81-82)

In addition to the perceived discourses that advance certain narratives of modernity in the discourse on SG and its governance, the field protects fundamentally unchallenged sentiments regarding more broadly the trajectory of human civilization and the role of humanity vis a vis the planet. Such sentiments further protect as unchallenged the very idea of climate change and of grappling with 'a changing climate' – the transcendent, subliminal idea normalized in the discourse and protected within the dominant structure of the research that we are facing something that threatens the world, instead of embodying, locating, and localizing climate change *as us*. The Western structures of knowledge within which the discourse on SG is constructed can disguise as unchallenging what may necessitate the fundamental rethinking of normalized concepts like the very enunciation of 'climate change' as an enunciation that in its taking as universal protects the underlying sentiment that it is to be grappled with by natural science. The material/political of climate coloniality is intricately enabled and constructed by its discursive/epistemological, as what is constructed and universalized in the discourse translates as material outcomes for access, recognition, participation, and relationality.

### *Material/political of climate coloniality*

The results show the genealogy of certain prominent discourses on SG in Western modernity, challenging the universal validity claims of certain conceptions regarding the context, ethos, modes, and subjects of climate governance and of SG and their disguised coloniality of knowledge. As discourse is political, it is critical to consider the ways in which such discursive forms of coloniality generate material outcomes for knowledge production on SG including the entrenching of inaccessibility, misrecognition, and inequality. The most dominant knowledge being produced on the topic of SG as a global climate solution is conducted by an epistemological network of mostly white, European and North American men, and while this is not surprising, it is one of the principal functions of modernity that preserves coloniality of knowledge *materially*. Despite numerous critical acknowledgments of and self-reflections on the domination of the research community by a homogenous group of affluent, Northern men from the same set of institutions, the knowledge on SG discursively works to preserve this material reality by normalizing Western epistemologies and ontologies despite unanimously voiced calls to diversify the research field. The central institutions that preserve modernity are centers of knowledge production, and the exclusion of a plurality of genders, races, geopolitical identities, and classes from the prominent epistemic community on SG is a direct, political outcome of the discourse. The fundamental domination of Western man over its 'Others' within regimes of reductionist, modern science is enabled by the exclusion of

women and other races from participation as partners in science (Shiva, 1996), and further by the erasure of other languages from the knowledge practices. To see the prominent scientific community on SG as a community of power is important in recognizing the genealogy of the knowledge it produces and its material outcomes that uphold the marginalization of those knowledges already excluded.

The prominent scientific discourse on SG and its governance is made up of a series of criticisms that seek to discredit other coalitions and discourses, thus uniquely influencing the material/political landscape of the research. In doing so, the various discourses and their actors thus seek specific material outcomes regarding the role of the research itself, determining the favorability of material outcomes by drawing on certain understandings of the world, of climate change, and of SG that are grounded in a Western imaginary. While Coalition 1 argues that research should be in support of the ultimate goal of climate stability and while Coalitions 2 and 3 argue that research should be in support of exposing certain values and working towards climate justice, each coalition advances the idea that it is through certain material outcomes of the *research* that such respective objectives can be delivered. As examined in the discursive realm of climate coloniality, the discourse exhibits the idea that research (whether more developmental or more critically challenging) can arrive at lessons for climate justice in the context of SG. Even for Coalition 2 scholars, the urgency to engage others in research as a way to work towards climate justice is centered on the role of research as that which "must extend beyond experts and government officials to engage all the peoples of the world" (Hulme, 2014, p. 58). Fundamentally, however, the discourse diminishes the possibility that such efforts at engagement based on recommendations derived from scientific research be those that 'all the peoples of the world' *can* even engage in given the ongoing exclusivity of the science, the homogenization of the community, the inaccessibility of the terminology, the required English format, and the more common (Coalition 1) assumptions for engagement to be based on 'scientific' evidence. While the discourse poses meaningful concerns for justice and Coalitions 2 and 3 justify only that research that exposes the current injustices, subjectivities, and epistemological violences in the field, the authors ascribe favorability to certain material outcomes based on an approach to engagement that centers the role of research and that thus is limited by Western subject/object knowledge structures.

Extending from the reliance on research reinforced by the discourse, an interpretation of efforts to remedy marginalization and the material dominance of the field by Western actors can further entrench climate coloniality. Critically, the role research is ascribed in the discourse (more extensively by Coalition 1 but to some degree as well in Coalitions 2 and 3) as an enabler of processes for reducing inequity of the knowledge is itself problematic, for the very process of 'research' is inextricably linked to and based upon Western modernity and the coloniality of knowledge via subject/object dichotomies (L. T. Smith, 2021). Science is "conditioned by a context of exercise and power logic" by which the master-slave relationality generates gaps between 'us' and 'others' in dominant epistemological frameworks (Passada, 2019, p. 5), and the normalization of such gaps in the discourse on SG works to bolster certain preferred

methods of engagement and representation that rely on the privileged/expert role of the researcher. Each coalition normalizes the discursive construct of a 'we' that is capable of engaging, representing, recognizing, and including the interests or voices of the global South 'them', seeking to remedy power imbalances with the same knowledge structures that preserve them by constructing the 'object' of the global South as alien to the knower – without relation. As asserted poignantly by Escobar (1995) on the expertise imperialism by which Western regimes of science assert the unique capability of determining solutions to global environmental change:

> "God forbid that a Peruvian peasant, an African nomad, or a rubber tapper of the Amazons should have something to say in this regard." (p. 194?)

All three coalition discourses articulate concern for the global South in their lack of presence in and access to the discourse itself, and though this concern leads to different lines of favorability for certain research and governance trajectories, these discursive engagements with inequity remain largely unconcerned with the material limitations of its own geopolitical, societal, epistemological context. Concerningly, even the discourse of Coalition 2 that aligns with a Southern enunciation of a procedural critical climate justice and that urges for the meaningful inclusion of marginalized voices and knowledges constructs a favorable view of such engagements as within the capability of the research, recognizing the need to go beyond experts and government officials but not recognizing the need to do so in a way that challenges its own Western structures of and ways to knowledge. In connection, common approaches to justice that assert as desirable the engagement of the peoples of the world – principally within discourses that call for the improved engagement of the global South in particular and most often within the Coalition 1 discourse specifically – often universalize a Northern enunciation of the Global South as a homogenized, similarly-interested geographical population to be more actively engaged in the debate. Thus, the discourse constructs certain practical trajectories based on a reliance on subject/object relationships and a homogenized, passivized enunciation of the geographical developing south, thus hindering future material developments of the research based on the transformative agency of the global South as epistemological plurality and the need to transcend current Western frameworks and systems of knowledge.

As a direct correlation of the material control over access to the prominent discourse maintained by the Western homogeneity of the top-20 community, the kind of research that makes up the majority of the most powerful knowledge on SG is maintained as dominant. The bulk of the prominent scientific discourse on SG – 70% – aligns with the 'actionable evidence' paradigm of research (Coalition 1) that first bolsters the role of technical, natural science as purely unbiased and beneficial, advancing a Western view of science and knowledge as universal. 70% of the field that is the most accessed and that would (currently) be the most utilized by future decision makers on SG politically preserves a reductionist, technical science. The Royal Society – one of the most common affiliations behind the most prominent natural science research on SG and to which the foundational development of the terminology,

technicalities, and norms behind SG have been connected – emerged in what year with the blatant intention "to raise a masculine philosophy… whereby the Mind of Man may be ennobled with the knowledge of solid Truths" (Easlea, 1981). The Coalition 1 research and thus the majority of the prominent, powerful knowledge on SG and its governance preserves a Western rationalist interpretation of science that within discussions of justice locates the source of violence in the material/political *application* of science. The epistemic community of SG as a network of 'experts' advancing specialized knowledge on SG within the discourse preserves and protects claims of objectivity-without-parentheses, retaining a power that is derived from the "perceived ability to make authoritative knowledge claims" (Litfin, 1994, p. 251), an ability perceived as depoliticized. Despite the extensive resistance to the neutrality narrative by Coalitions 2 and 3 that directly seek to either discredit or correct for such claims, the fundamental preservation of a Western technical approach to knowledge maintains the dominant structures and the subsequently homogeneous make-up of the field.

We are made not to see coloniality in modernity (MLDSS), and the material/political of the discourse on SG by which its dominant forms of knowledge are preserved in isolation for the technical, expert-based, reductionist paradigm of science further rearticulates exclusion of those remanded to the field of 'non-science'. In its material dominance by Coalition 1, the research remands both those within the 'less empirical' field of social investigation and those whose knowledges are entirely 'unscientific' in the Western sense of the world to its exteriority or inferiority, in effect marginalizing access to the discourse by those who oppose or offer a plurality of alternatives to the current hegemonic field of knowledge, oppositions perceived by the dominant technical field merely as "sharply divergent – and sometimes trenchant – reactions" (Reynolds, 2019b, p. 3). Material exclusion to the discourse is entrenched by the fundamental sentiment of the most prominent knowledge on SG that emotional, non-scientific, embodied rejections of or resistances to certain developments of SG and of its research do not hold validity as knowledge:

> "The romantic embrace of the primitive is ever a tempting response to the powerlessness that many feel in the face of globalization." (Keith, 2013, p. 67)

The material/political dominance of the discourse that begets such blatantly Western sentiments entrench control over the discourse and over its processes by remanding the imaginaries and knowledges 'otherwise' to a place of inferiority in the context of contributing to well-informed decisions on the global climate future. The dominance of the field by Western approaches to a technical/reductionist/rationalist science, despite the plurality of critical studies (largely making up the bottom 48 of the total author yield) that resist such logics of climate coloniality, preserves modernity by promising modern science to know what is best for the world and remanding fundamental normative differences that thus reject such promises as merely reactive, nonsensical 'political contestation', something to be overcome through improved empiricism and legitimacy. The material/political control over the knowledge on SG as a global climate solution by 'the geoclique' not only poses concerns for the further entrenching of Western, partial

subjectivities and interests within global climate discourses, but risks the lock-in of potentially irreversible systems of climate coloniality that disavow relationality and plurality in the pursuit of non-critical forms of Western enunciations of climate justice.

## 5.3. THE DECOLONIAL MOMENT

By humbling modernity and recognizing coloniality, the decolonial moment is made visible (Vázquez, 2022). The discourse's erasure of epistemologies and ontologies 'otherwise' brings about the third most critical moment of the analysis, as by exposing Western modernity's totality and thus its coloniality, I finally "allow for the recognition of the plurality of ways to relate to the world of the sensible that have been silenced" (Mignolo & Vázquez, 2013, p. 8). The prominent scientific knowledge on SG and its various dominant discourses that normalize a Western imaginary in the context of climate change construct notions of the universe, erasing from view the 'pluriverse', and recalling the 'pluriverse' as those ways and knowledges 'otherwise' in the context of climate coloniality makes visible the decolonial horizon. Decoloniality undoes, disobeys, and delinks from the CMP, constructing paths toward an 'otherwise' of thinking, sensing, believing, doing, and living (MLDSS). After revealing the ways in which diverse epistemologies and ontologies are disavowed both discursively and materially in the context of knowledge production for SG and its governance, I seek here to engage a space that is instead open to the plurality that has been silenced, recalling the imaginaries 'otherwise' that "emerge from lived experiences that were/are devalued in Eurocentric modernity and climate coloniality" (Sultana, 2022b, p. 3). The decolonial turn as a means to arrive at plurality and to resist the coloniality of knowledge holds central the recognition that:

> "…the knowledge and the lived experience of people that have been most marked by the project
> of modern death and dehumanization are highly relevant to understand the modern forms of power
> and to provide alternatives to them." (Maldonado-Torres, 2008, p. 65)

In line with the decolonial turn and the importance of re-existing those embodied ways and knowledges that modernity/coloniality subjugated and erased, I turn to such spaces in which the plurality of alternatives to modernity hold critical lessons for challenging dominant structures of thought and of practice, thus delinking from the logics of climate coloniality. The decolonial horizon means "accounting for and reflecting on the past and present, in order to configure future pathways to remove colonial and imperial powers in all their forms" (Sultana, 2022b, p. 6). Similarly, the moment of critical climate justice "demands systemic changes to address structural inequalities and destabilize power systems that produce various climate injustices" (Sultana, 2022a, p. 119). Thus, in the context of climate change and the production of knowledge on SG, both the decolonial praxis and critical climate justice praxis necessitates a fundamental dismantling of the logic of climate coloniality that preserves modernity both materially and epistemologically in discussions on, knoweldges for, and actions to address climate change. According

to (Wilkens & Datchoua-Tirvaudey, 2022), critical climate justice praxis that takes in mind the decolonial horizon must develop a framework that accounts for diverse ways of knowing climate change and climate injustice.

To follow Escobar's (2004a) call and take seriously the "epistemic force of local histories and to think theory through from the political praxis of subaltern groups" (p. 217), I thus turn to think through climate change with these spaces and places, discussing in what ways knowledge and being in the long-endured struggle of climate change as historical, as political, as complex, as local, as embodied, as cyclical, as systemic, and as a particular violence of Western modernity provides a plurality of ways other than that advanced in the current dominant framing of climate and SG. While I do not claim in this section to myself voice the interests or name the imaginaries of those who modernity/coloniality has othered, I seek to move from a place of studying *about* to thinking *with* these places and spaces, opening consideration to the ways in which those currently the 'objects' of global climate discourses produce their own emancipatory knowledge by living the colonial difference (MLDSS). I engage with Spivak's (2015) 'planetarity' and Mignolo's (2011b) border thinking to unlearn the totality of the Western imaginary and modernity's narratives that conceal climate coloniality, instead learning new possibilities to reflect on those critically missed questions in the context of climate change including who counts as human, what are the needs of 'non-humans', what is the need of earth, and how to learn from other imaginaries.

Yuvelis Natalia Morales Blanco is a 23-year-old Colombian anti-fracking leader and environmental defender from the community of Puerto Wilches in the Santander department of northeastern Colombia. Her community lies in the Magdalena Medio region, a region of wetlands along the breadth of the Magdalena River that has endured almost a century of conventional hydrocarbon extraction. Much of the community of Puerto Wilches is below the poverty line, a population that receives nothing from the royalties of these extractive operations led by the massive corporate entities of Ecopetrol and ExxonMobil. Yuvelis is one of the founding community members of the Aguawil Committee and the Alianza Colombia Libre de Fracking which have fought for the protection of the river, making visible the harms and injustices that come with the building of these fracking wells and organizing to defend the area from ongoing projects of destruction. Yuvelis and other community and committee members have been subject to increasingly violent threats to their lives, including for Yuvelis a physical assault and accompanying threats that forced her to leave her home and Colombia in 2022, warranting international concern and *appeals* (Amnesty International, 2022). Colombia is the world's most dangerous country for environmental defenders, with 60 of the at least 177 documented murders of environmental activists in 2022 taking place in Colombia (Buschschlüter, 2023). Yuvelis has *lived* climate coloniality, both via the experiences in her own life, through the histories of her ancestors, and in the memory of the river with whom she is intrinsically connected. I include in this process her words and her perspective as a means by which her lived, local resistance to climate coloniality and her struggle *for* an 'otherwise' offers a place and space *with which* I can think through climate change from this space of plurality. Her words – those

in red – as explained previously have been translated from Spanish to English. Recognizing translation as a form of erasure and one of modernity's epistemic violences (Vázquez, 2011), I admit to the ways in which including her words here in English for the purposes of this research works to enact epistemological violence against her and her experiences. I include her original words in Spanish in *Appendix 3*. Critically, I include her words in this process of thinking not to buttress my own or as an integration of her words for the purpose of my analysis. Instead, they are here to show the place and the experience *with which* I attempt to think through climate, unlearning what has been learned in the production of this research.

Accompanying this process of border thinking with the place Yuvelis inhabits and to think through the lessons her praxis-as-resistance offers to the context of a decolonial horizon of climate coloniality and SG, I include throughout this process the lessons offered by Tina Sikka from our conversation on the so-imagined decolonial horizon of knowledge on SG. Tina, an intersectional justice, technoscience, and feminist scholar has examined the potentially emancipatory role for feminist science frameworks within the context of climate change. She has called for the development of a feminist climate science and for feminist approaches to the science on climate technologies like SG, a paradigm that would imbue new questions and methods for knowledge production based on the central principles of feminist science that "strives to account for and include the experiences of marginalized groups,… groups whose knowledge has been historically dismissed as 'unscientific'" (Sikka, 2019). Tina has specifically investigated the ways in which a feminist science framework could be extended to produce 'more inclusive' research on SG (Kravitz & Sikka, 2023), a framework that by definition as a feminist approach would involve "interventions that are inclusive, local, contextual, interested, non-productionist and interactionist" (Sikka, 2018, p. 2) – approaches determined by this research as significantly absent from the current field. For Tina, a feminist approach to science enables a 'science from below' that elevates marginalized knowledges and seeks to dismantle dominant power structures as part of its scientific practice, requiring in the context of SG the radical re-imagination of climate science itself so to elevate forms of experiential and non-scientific knowledge that embraces material sensation/embodiment and rejects universalizing logics (Sikka, 2019a). By incorporating within this process of border thinking Tina's words – those in blue – on the subject of a decolonial option for knowledge production on SG, I seek to connect the space that Yuvelis embodies as the political praxis of decoloniality with Tina's practical implications for a critical climate justice in the context of knowledge production for climate change.

To think climate change through with the place of struggle that Yuvelis embodies as the political praxis of decoloniality, I think *with* her epistemologies and ontologies that not only resist Western modernity's coercion and totality but that struggle for something better, for an 'otherwise'. As guided by Walsh (2018), the lived embodiment of the praxis of struggle is the place in which decolonial theory is made, for it is "in this concrete making and doing – particularly that which creates hope and advances projects of life against and in spite of the projects of violence, death, war, extermination, and attempted extractivism (of lands, nature, life, and knowledges) – that decoloniality is constructed and unfolds" (p.

35). To make visible the decolonial moment in the context of climate coloniality, I think from the borders of climate modernity, listening to the story of Yuvelis as resistance to the systemic violence of modernity/coloniality and as struggle for something 'otherwise':

> One day fracking arrived in Puerto Wilches. And nobody knew what fracking was, we wondered what it was. Because access to information is another issue, you can't talk about climate justice if people don't know what has arrived in their territory. We were scared because the name is harsh, the name fracking is harsh. We are children of a precious ecosystem. We are next to a very beautiful and large river, which has always given us life, in good times and bad. It's not a marriage, but an ancestral union that is present and we want it to continue being present. For the sake of that river, we decided to oppose fracking one day. We are an impoverished community. Dad is a fisherman, mom is a homemaker, and speaking out is difficult in this reality. It's a macho and capitalist society where being more or less Black gives you a status, a level of formality. Even though about 50% of society is black, Colombia is a very racist country. It's a country where white people are in charge. We've adopted foreign customs. We look at other places as a big dream to achieve because we've been told that we won't achieve anything, and it's worse if you're a young Black woman. Life isn't the same and I don't think we aspire to another life. If I were to wake up tomorrow and want to be white, as if that were possible. Or if I wanted to have money, or have their privileges. It's not possible. The only privilege we have is the inheritance of that river, from past lives, and that's why we defend it, because it gives us everything. It's our greatest wealth. So, we decided to stop talking about fracking, because we became experts, and we started talking about ourselves, the river, the mountain, the birds. We started talking about our territory, painting it, singing to it, writing poems to it, crying with it, living with it.

I feel Sultana's (2022b) 'fleshiness of climate' in Yuvelis' words, in her voice – those pasts-presents-futures of climate change embodied in "bodies, minds, soils, kin – where the theory is in the flesh, and struggles form the basis of political consciousness and oppositional epistemologies against oppression in shared worlds" (p. 3). The decolonial horizon of climate change and the critical climate justice horizon is fundamentally *not* about a changing atmosphere that carries a threat of future impacts. The imaginaries that modernity disavowed have always known the disharmony and the death that for a Western imaginary emerges as 'climate change'. Thinking with this 'otherwise' reveals an embodied reality of this so-called 'climate change' that is much more local, cultural, historical, and connected than currently acknowledged in the dominant discourses. In her own/communal embodied fight against destruction, Yuvelis practices decolonial pedagogies – those "struggles, practices, processes, and wagers for life" that enable the possibility of re-knowing plurality (Walsh, 2018, p. 95). Confronted with Western modernity's project of death, she resists the unchanging material violences disguised epistemologically only by new names, she struggles against the coloniality of gender and race in not staying silent, she challenges the elected whiteness of her own country in the shadow of Western modernity's promises of progress, and she recognizes through resistance the plurality of futures possible for her community, the river, and for life, regardless of the conditions of destruction and silencing imposed. I recall Sultana's (2022b) painful urge: "We do not know what might have been and must now live through what is, yet continue to yearn for a

better tomorrow" (p. 10). In opposition to the Western world's future enunciation of violence and loss from a 'changing climate', Yuvelis conceives of the local, lived experience not just of herself but of her community, of her country, of earth, of non-human animals, of the river – conceiving not of climate change but of modernity's destruction of life, one that is embodied, continuous, and plural, not disembodied, future, and singular.

The decolonial moment is visible in dialogues that reject the Western abstraction of climate change so to achieve something 'otherwise', emphasizing the lived experiences of individual people, communities, environments, and of those connections between them all that reject Western modernity's disembodiment of the problem as one of the atmosphere. Thinking from the places modernity disavows, it is evident that climate change is *not* an atmospheric phenomenon, one occurring as a point of arrival in the future to the planet at the global level. It is the accumulation of violences of extraction that have always existed since Western modernity's enrapture of all systems of life, and as such, the concept of climate change becomes non-relational. For Yuvelis and the community of Puerto Wilches, the local imposition of destructive projects of fracking is one face of the capitalist-colonial 'hydra' and the long-standing, historical, not just environmental but *very* socio-political assault on life. Climate change is not the vocabulary of the plurality, it is not the conception that enables relationality. Instead, Yuvelis explains what is visible to her community:

> The climate change discussion is not there, because there is nothing being said about climate justice. The communities where extractions are being made, they are poor and there is no energy and favorability of life, but that is where the biggest mine is. We can't talk about climate justice without talking about social and environmental justice. We can't talk about global justice while they extract our mountain every day, or when we don't have water.

Yuvelis does not conceive of climate change in the abstract, global sense required by a Western control over the discourse. Instead what is visible is the embodied destruction of life via the relentless march of extractive industries that continue to destroy and exploit local, disempowered communities who are the last defenders of earth, while simultaneously, global communities of Western experts produce knowledge on and discuss the problem of 'global climate change' and dreams of *climate* justice. As illustrated by Vázquez (MLDSS), the plantation system during times of colonialism as a project of death against Western man's 'Others' including against earth still remains the dominant system we are in today, only it has transformed itself via projects of globalization, industrialization, and resource extraction. To unlearn climate change and to learn the 'earthlessness' of Western modernity, we must unlearn climate justice and learn the 'worldlessness' this modernity has simultaneously enacted. Yuvelis urges the non-relational nature of the very notion of climate change as a concept by which to engage in concerns for ecological or social justice, demanding I unlearn the structure of this research as that which seeks to engage those 'Others' currently marginalized, those 'peoples of the world' on such a non-relational concept, asserting instead that to meaningfully engage with such epistemologies would mean an

overcoming of such Western conceptions of climate change and of justice as they are dominantly understood, framed, and approached:

> *I don't like discussions about climate change because I don't have much to say. I like talking in an environment where we are already being transformative agents. Discussions about climate change are unequal because we're not taught about this. Our discussions are about living in a working-class world. You can talk about climate change because you have education. We didn't have the possibility to talk to people or think about what you're doing.*

For Yuvelis, to engage in discourses on climate change is an engagement that from the beginning removes herself from her own context as someone already working as a transformative agent to resist what in the West we may associate as 'climate change' but what in her own context is far from the enunciation. Fundamentally, to engage other epistemologies in Western discussions on climate change is to remove them from this subjective transformative context, *from* their space of resistance and struggle for 'otherwise'. Climate change is not a concept, not a phenomenon, not a research focus, not a field, not an event, not an external happening – and its interpretation as such is a mark of the Western imaginary and the situatedness of those who are not themselves currently and historically fighting against those projects of destruction that are necessarily both the cause and the effect of climate change. Climate change is the lived colonial difference, the embodied accumulation of the violence of modernity/coloniality, an infinite set of lived experiences of marginalization, colonization, exploitation, subjugation, and destruction. Thinking from a place of plurality puts in question the idea of knowledge, as for these places 'otherwise', real knowledge is not about knowing, it is about feeling the heart of earth (MLDSS). While the West introduces 'education' and 'formal' 'scientific' knowledge to engage in discussions about climate change, it disavows those other knowledges, knowledges of territory, of connection, of embodiment, of sentiment. For Tina, embodiment is removed from dominant climate conversations and from what is included as important knowledge in the context of climate solutions: *The idea of even the heat that people are feeling in different parts of the world that are getting accounts of what that heat feels like is something that is important. And it's an important kind of knowledge.* A feminist transcorporeality of climate change enables in the face of currently marginalized forms of knowledge on the embodiment of climate change a 'politics of possibility' of engaging with our communal entanglements of which we are apart (Neimanis & Walker, 2014). Because of this conception of the embodiment of climate change and of its struggle for 'otherwise', Yuvelis dismantles the anticipatory mode of narratives that ask 'what should we do to stop climate change?', instead asking those questions raised by a feminist take of 'how is climate change me?' (Neimanis & Walker, 2014). Thinking from this place of 'otherwise' shows the absurdity in notions of actors 'acting now to stop climate change' in their complete disembodiment and neglect of the communal, of the relational of climate change. Yuvelis urges:

> *There's a big mistake that those who defend the global territory tend to make, which is to pretend that their individual action will save the world. That their figure can help contribute something, and that's always*

*for media attention and fame. But we all save the world. A world that isn't tried to be saved in community won't be saved... A way I believe this change is possible is if we put aside our individualism.*

What modernity/coloniality disavows in the discursive realm of knowledge on climate change is the recognition of the communal as derived from the local, embodied places and spaces that the world holds in relation. To take a global gaze-from-above of an abstract notion of climate change removes the lived difference that makes up climate change as transcorporeal, instead enabling absurdly individualist/rationalist thinking from a non-communal place of 'we' over here on behalf of the world and its communities as a whole. Knowledge is never an individual's alone, it is a mosaic of others (MLDSS), and *the sense of the individual and individual subjectivity is an outcome or an effect of relational relationships.* To think with the praxis and struggles of those living the colonial difference and from modernity's 'otherwise' necessitates a different conceptualization of a global humanity, one in which specific, place-based struggles are given attention over humanist efforts to abstract the local for the sake of the global. Decoloniality necessitates difference, and according to Tina, a feminist materialism *challeng(es) the idea of an individual subject with agency that is really connected to capitalism.* Unlearning the Western conception of individual agency in the face of climate change is to learn an anti-capitalist ethic of care by which Western knowledge regimes and cosmologies are overcome so to account for lived difference and human needs. In unlearning a Western logic of both individualism and of *commonality* as selective humanism, *communality* can instead, according to Yuvelis, be a way in which such Western imaginaries are brought away from their isolated approaches to climate research and governance and instead find solutions in the communal, thus in this recognition of embodied difference as part of the communal path of healing and of transformation. Communality is decoloniality, and the dominant climate discourses that neglect communality enables the individualist, rationalist, reductionist approach that dominates current thinking about climate change:

*They have this way of thinking, "How do we engineer things for our benefit?" At the end of the day, green energy ends up being another form of exploitation for us.*

'Epistemologies of mastery' are visible for Yuvelis in her own confrontation with the capitalist-colonial 'hydra', an epistemology that is strikingly visible in the most fundamental assumption of SG as a possibility for engineering the climate for our benefit. Critically, however, what is promised by modernity as 'the good life' is an existence that depends on the mastery and ownership of and over the life of others and of earth. In modernity, time is endless and growth is endless, enabling the endless futurity of modernity that is used as a salvation, instead of for remembering (MLDSS). For Tina and a materialist feminism, what is neglected by a Western capitalist reality is value for the nonproductive, and thus, to dismantle the universality of this neglect, we must question *what kind of relationships we can have that are nonproductive, that don't contribute to the economy in the way we understand it, but that are helpful and that are useful and that are significant to communities.* The Western hegemonic understanding of climate solutions as a function of this capitalist bent against the nonproductive necessitates recognition

of the plurality of ways outside of Western modernity to conceive of relationality, to refocus the tasks of listening and remembering instead of imposing, saving, making productive, or controlling. The logic of 'saving the world' is an attempt at interrupting communities without relating ourselves at all, and this need for an individual master plan is indicative of a Western training and a Western loss of consciousness (MLDSS). Instead of this capitalist politic of control over *x* for the purpose of y, the politic of the decolonial is an ethic of liberation through love and care, dismantling a white, masculine ethic of domination (MLDSS). For Yuvelis, the colonial difference is perpetuated by such approaches that impose saviorist solutions without engaging in relationality:

> *That's the key point, us against them. They will implement this new way of saying, "This is how the world is built. This is how we need the world to be saved." Instead of allowing the global South to rise in its own way.*

Yuvelis dislodges the saviorist politic within damage narratives that perpetuates the colonial difference. Echoing Sultana (2022b) and her assertion that colonialism is not in the past but in the present and future, though those who live the colonial difference are made vulnerable, marginalized, and misrecognized, they are "not passive agents in this" (p. 10). The decolonial moment makes visible the notion of re-existence by which the Souths of the world are re-existed as transformative agents in their own contexts of resistance and existence. This notion of re-existence refers to "the configuration of ways to exist and not just resist – to re-exist resisting and to resist re-existing – as subjects, to build projects of society and life despite adverse conditions" (Walsh, 2018, p. 95). Thinking from this place of 'otherwise', it becomes central to unlearn the obviousness of Western rhetorics of salvation, instead learning as obvious the agency of the global South in conceiving of and constructing their own emancipatory futures of not climate justice but of decolonial healing in the face of climate-capitalist-coloniality. For Tina, in the context of climate discourses, the failed recognition that *what we really need to do is completely overhaul our economic system of production and consumption* reflects the paradox of even producing such knowledge, as such a substantive conclusion is what knowledge for climate justice necessarily pushes us to. The absurdity in taking an abstract, global approach to conceiving of and addressing climate change is enhanced by its simultaneous inability to conceive of the necessarily substantive transformations of the same globally abstracted, extractive practices. Such global approaches find criticism in feminist frameworks for science, with *the idea of the universal being a particularly kind of more masculine framing, where the local is seen as something that is less significant.* In climate discourses, neglect of differential local impacts, focus on global temperatures, and abdication of Western *doings* of consumption/extraction reflects a Western/masculine knowledge regime, one helpful for and in service of corporate entities and governments. For Yuvelis, this resulting absurdity of 'global climate justice' is a fundamental source of *injustice*:

> *I think about these global issues, and they don't seem global to me in terms of climate inequality for the people defending their values. You have everything, you have so much that you can't defend it. They don't*

*kill you for wanting to go to a river… If we protest, the guerrilla will come and we have to run because the guerrilla will come to kill us. These inequalities are not explored by the global North.*

The reductionist thinking of climate justice as a global, abstract, future *deliverable* enables an idea of the reduced, abstract, global technical parts of the problem of climate change to be mistaken as knowledge of (and care for) the whole, without knowing or even recognizing the local. For a decolonial climate justice, a focus on specific sites of contestation and embodied, local realities is critical to understand the acknowledgment and reciprocation of diverse knowledge systems in the conceiving of what climate justice entails (Wilkens & Datchoua-Tirvaudey, 2022). The disembodied abstraction of climate justice neglects ongoing injustice in the local and in the present. For Tina, *building in an ethic of care,… mutual obligation and to otherness,… and having a sense of global health and planetary health that is attendant to issues of race and class and sexuality* would be part of a critical climate justice that accounts for this local level, necessitating a restructuring of the practices of science surrounding climate change *to take account of power relations to take account of what human people need to survive and how is that correlated to the natural world.* This ethic of care prescribed by feminist frameworks offer as visible re-structured and re-related efforts towards planetary health that attend to the racialized, gendered fracture of modernity and of climate coloniality, a kind of vision prescribed similarly by the decolonial horizon. Yuvelis asserts the injustice of neglecting or precluding such an ethic of care:

*This is a very local saying, "What is not known with the eyes is not defended with the heart." This is because in the world now there is something like climate change, everything is like showbiz, a world that at the end of the day forgets about social realities. It becomes very media-focused, because the environment is very biased and racist, and sometimes we don't realize the territorial struggles that are taking place in small corners of the world where biodiversity is not measured in hectares, but by culture and tradition.*

To think from this place which Yuvelis embodies opens up the unlearning of climate change as removed from its social realities, as removed from its racialized, gendered politic, and as removed from its manifestation within societies and within embodied memories. To unlearn this fracture and to conceive of an ethic of care in the context of knowledge and discourse on climate change, Tina locates the reparative role for *science rooted in feminist empiricism: making science heterogeneous, looking at relations of power, that complexity is to be embraced, and that human needs are important.* Such a restructuring of knowledge to break down modernity's binaries would enable an ethic of care, and in the context of climate change thus enable a more generative form of knowledge and of relating, both to other people and to earth, overcoming 'worldlessness' and 'earthlessness' respectively. To make visible the decolonial horizon in the context of climate coloniality is to work towards the reconstitution of harmony in the face of duality (MLDSS). For Yuvelis, we must transcend the most important duality that perpetuates climate coloniality, our fracturing from nature and the normalization of Western ways of relating to 'nature' – in separation. The absurdity here is that all the most rigorous 'formal' knowledge production on climate cannot arrive at the fundamental recognition that as we come from earth and thus earth is our mother and our life source, if we do not stop consuming so much we will consume our life

source (MLDSS). As the modern/colonial subject is made in separation, instead of in relationality, to think with the space of plurality is to seek connections and correlations, and to unpractice the logic of superiority, division, and individuality, instead practicing the logic of multiplicity, relation, and interdependence (MLDSS).



*Image 2.* Yuvelis Natalia Morales Blanco and one of the Puerto Wilches community murals painted as action by the Aguawil Committee in peaceful resistance to fracking projects, image from Vasudeva & Zemmouche (2022)

Practicing relationality is about connecting with the territories in which we are embedded, connected to, and in relation with; it is about asking how we can think back with the earth in the places in which we are standing now (MLDSS). *Sentipensar* or *sentipensamiento*, the art of living and way of knowing based on thinking with both heart and mind, "does not separate thinking from feeling, reason from emotion, knowledge from caring" (Escobar, 2020, p. xxxv). Decoloniality enables thought to re-engage with life, to feel-think what is real and possible, and thus to *sentipensar* with earth, to listen to its cries and to the cries of its caretakers who defend against the still ongoing causation of climate change, thus enabling the reconstitution of knowledge for earth (Escobar, 2020). For Yuvelis, *sentipensar* with earth is part of living in relation to our home as a life source, as a being, as a mother:

> *In Colombia and on the border between Colombia and Ecuador, there's a tribe called Ugua. The Ugua people say that oil is the blood of the earth and that a body without blood has no life.*

Contrary to radical love and the nature of humanness that is remembered by think-feeling in relation with earth, Western cosmology's naturalization distances us from life and from the entity of nature, and through its naturalization we have become the ones who forgot earth (MLDSS). The decolonial horizon seeks to repair such loss that has occurred with modernity's naturalization and thus our 'earthlessness'

and 'worldlessness'. Decoloniality is understanding the many stories of how we got here, not trying to change these stories, but remembering and accounting for them so we can return to relationality, interconnectedness, accountability and responsibility (MLDSS). In the context of climate coloniality, we must think-feel with earth and with worlds so to ask critically of our, the West's, current refusal to remember and to account for climate change: "would the hidden interests of our descendants really involve their finding out that our current generation tried to cover up the errors of our ancestors?" (Whyte, 2018, p. 238). For Yuvelis, relationality and recalling earth is the recognition that *the way we'll be conscious is if we change the reality we create.* To glimpse the decolonial horizon is to glimpse the return of the future: those ways and epistemologies that were always possible that were lost to Western modernity's totality (MLDSS). But the return of the future in the context of climate change depends on a reciprocal journey of relationality and accountability and an unlearning of climate change in its dominant form. To repair such loss of earth and of worlds requires the recognition of the ways in which we *continue* to forget earth, for example in the context of SG the need to unlearn the idea of climate 'solutions' to the problem that is *ourselves*, instead learning that reparation can only begin when we recognize the absurdity of thinking that we could change the atmosphere before we could change ourselves. For Yuvelis, the decolonial horizon occurs with listening to those who have been erased and displaced by the very notion of climate change as the 'global problem' to be solved:

> *But we need people to listen to us, look at us, hear us. Because everyone is shouting, but among so many voices, which one sounds the most beautiful? But talking about climate change isn't easy, the climate won't change, the only thing that will change is us. Let's talk about individual and communal changes. Our habits. The climate will continue, with or without us, and the real question is how we're going to change so that this reality isn't ours. Reality is us, just like change is.*

Yuvelis demonstrates a strength through insurgency – a political, epistemic, and existence-based insurgency that "urges, puts forth, and advances from the ground up and from the margins, other imaginaries, visions, knowledges, modes of thought, other ways of being, becoming, and living in relation" (Walsh, 2018, p. 34). Yuvelis' struggle is not merely a resistance, it is an insurgency by which her own ways of existing, knowing, and being in relation with the plurality of earth and worlds constructs and acts out decolonial theory from the ground up. In the context of the discourses on SG that currently preclude the plurality and relationality embodied by spaces 'otherwise', efforts to make visible or determine the critical climate justice horizon must re-engage with the fundamental questions it currently precludes. By thinking with the spaces and knowledges of climate coloniality's 'otherwise', it becomes evident that such fundamental questions and their associated processes of unlearning/relearning that can be facilitated by materialist feminist principles reveal the possibility of re-engaging with climate change in a way that enables a decolonial climate justice horizon: a process of delinking and healing that can only happen in communality and in listening to those who can teach us think-feel with earth (MLDSS).

By engaging in border thinking to conceive of the ways and knowledges 'otherwise' currently erased from the global discourses on climate change governance and SG, I derive critical implications for the research field and for knowledge production on climate change as a whole. The results of the CDA reveal that researchers normalize as universal a Western imaginary in the various contexts of and logics for climate change to various degrees and in various discourses according to various overarching attitudes and subjectivities towards climate and towards its 'solutions'. Importantly, the research reveals the tendency for the coalitions that more often and to a more concerted degree universalize a Western imaginary in the discourses on climate change and SG (Coalition 1) to ascribe to its own knowledge on climate change a more concerted degree of validity and legitimacy (a validity itself derived from Western values for and approaches to science). These actors producing the bulk of the most prominent knowledge on SG as a potentially global climate change 'solution' and who assert the necessity that all future governance decisions be based on the most prominent, rigorous, 'best available evidence' thus seek to base all *universal* future knowledge of, decisions for, and negotiations about SG on its own, *partial* field of research. The problematic universalization of such Western, situated knowledge and its further validation as objective fact to be taken up by the rest of the world in reasoning about climate solutions reveals critically the notion that such actors thus seek (at least theoretically) to inform and construct entire planetary futures based on its own unchallenged, individual arrival at truth and universality.

Such a Western hegemony of climate discourses on SG implies that we, 'the world', base everything on this one Western way to knowledge, that way which is the very source of the destruction of worlds and of earth that it seeks to address by the same logic. While such climate coloniality occurs at the highest, most prominent levels of research and governance for the most global of climate 'solutions' to universalize a stable climate *future* – simultaneously – the plurality of worlds, of knowledges, of ways, of values, of experiences, of relations, of beings, and of global *future(s)* is demanded by those who theorize climate change in praxis. This research shows that the prominent science on SG and its governance does not adequately reflect, or sometimes even recognize, the plurality of ways and knowledges regarding climate change not as a concept to be studied with solutions to be delivered by experts, but as a lived embodied historical condition of the colonial difference maintained by the West's ongoing destruction of worlds, of earth, and of knowledges. To recognize plurality would be to recognize climate change as a struggle against one subset of humanity, not a struggle against the climate or the sun. The decolonial climate justice horizon, theorized through the process of thinking with those spaces of resistance that climate coloniality obscures, reveals the current inability for global climate discourses to engage in relationality and thus to situate its own structures, processes, and ways in order to make possible the critical horizon of repairing and healing. Research that contributes to the hegemonic control over climate discourses and narratives by a Western imaginary precludes possibility for relationality and for the recovering of what it continues to erase, *unless* the science – via its actors – comes to terms with its/their own totalization

of and erasure of all other conceptions of earth, worlds, people, knowledges, temporalities, interests, and visions that come together as the plurality of ways of knowing and feeling climate change.

Those engaged in research for climate change and its 'solutions' cannot paradoxically rely on those modern structures of knowledge and ways of relating to the world that not only enabled climate change but that continues in the current moment to preserve it into the future. Critically, as decoloniality "is revealing that without truth in parentheses there are no solutions to the problems created by modern/colonial truth without parentheses" (Mignolo, 2018, p. 115), this research points to the fundamental incapacity for current Western approaches to knowledge production on SG to determine a 'just' climate *future* in its exclusion of those other ways to knowledge within which the possibility for many different just climate *future(s)* lies. This research reveals that those systems (and their beneficiaries) who have gained the most from modernity/coloniality and its cause/effect of climate change are those seeking to address it using the same systems and ways of relating that enabled and maintain it. Fundamentally, until the discursive and material colonial violence of Western modernity is recognized as the underlying cause of climate change and its ongoing accountability for the problem is recognized, climate discourses preclude a horizon of reparation. Simply put, we cannot find a cure if we are prevented from diagnosing the cause. Because decoloniality does not pretend to provide global solutions to 'global problems', I assert the limitations of this research in its ability to offer direct 'solutions' regarding the problematic findings on climate coloniality in the context of the research on SG and its governance. While there is no global solution provided, however, I derive certain implications for the developments of prominent research on SG and for approaches to discussions on climate change more broadly, perhaps illuminating emancipatory pathways and their limitations.

Research on SG and its governance (both advocacy-based and critically opposed) will continue to proliferate as knowledge is sought for the purpose of informing future decisions, improving research legitimacy, including diverse perspectives, and reducing uncertainties. Thus, research belonging to each broad coalition will continue to normalize certain fundamental conceptions of the problem of climate change, the role of research, and the role of the global public. I determine from the results a favorability of Coalition 2-type research that extends Coalition 3 concerns for justice and legitimacy and its more politically neutral form of corrective research to investigate in a more politically targeted manner the problematic narratives of that most powerful coalition of the research and to expose the personal subjectivities that construct the emergent epistemological and political regime of SG. Coalition 2-type research, which I identify my research as contributing to, critically exposes the ways in which current discourses are dominated by and thus constructed according to certain conceptions and interests, with more explicit studies connecting particularly the dominance of Western imaginaries and thus the entrenching of coloniality within such discourses. Coalition 2-type research derives purposefully contested criticism of the more Western-totalizing research of Coalition 1, thus exhibiting knowledge that is more oriented to the challenging and dismantling of a Western imaginary in the context of climate change and its governance. While all coalitions demonstrate their own degree of Western thinking and

their own reliance on research as a means to address concerns for justice, Coalition 2 is *closer* to contributing cracks to the foundation of Western thought and to enabling the delinking required for the recovery of plurality. While Coalition 2-type approaches seek a more decolonized form of knowledge based on their exposed subjectivity of actors connected with Western dominance, however, they advance an approach to research that is still reliant on the Western structures of knowledge maintaining climate coloniality. The Coalition 2 research exhibits largely no interest in the dismantling of larger power structures, only resisting totalization by making visible the researchers and the epistemologies at play, and further in its limitation remands the excluded plurality of knowledges 'otherwise' to an abstracted, homogenized, often un-engaged category of 'object'.

While critical research that exposes coloniality of knowledge in the context of SG is on the right path to relating its own knowledge and thus to engaging with plurality, there is a critical gap that occurs as such investigations usually find answers lying in the proliferation of research within the dominant frameworks for knowledge production. Drawing on the process of thinking through climate change from the spaces climate coloniality disavows and the horizon by which climate is necessarily re-engaged and re-theorized via the plurality of knowledges 'otherwise', I derive limited implications for current and future research practices based on feminist frameworks for science that offer transformations of research principles. To retain as visible (not necessarily as attainable) the decolonial/climate justice horizon within critical knowledge production on SG, I assert the need for either new collaborative research structures imbued with feminist frameworks for science that actively seek to dismantle dominant structures as part of the scientific pursuit (Sikka, 2019b), or the need to delink from these frameworks entirely by focusing the critical climate justice horizon in the spaces of 'non-science' should such approaches fail to dismantle dominant knowledge structures. As expressed by Tina, building an ethic of care in the context of knowledge production for SG and for climate that embraces complexity and prioritizes human needs is essential. Imbuing research agendas on SG with feminist empiricism can lead to the making of the field more heterogeneous and more able to reveal and dismantle relations of power by elevating marginalized knowledges and requiring in the context of SG the radical re-imagination of the science itself so to elevate forms of experiential and non-scientific knowledge that embraces material sensation/embodiment (Sikka, 2019a). Imbuing research on SG with such principles must not be only for the sake of making knowledge more legitimate, however, but for the purposes of dismantling dominant structures of knowledge.

While such collaborative, feminist approaches within the domain of Coalition 2-type research could enable appropriately concerted efforts to dismantle the Western/masculine invalidation of more embodied forms of knowledge, Tina reflected on her experience collaborating on such a feminist approach to the SG research with Ben Kravitz, one of the principal authors belonging to Coalition 1, revealing the limitations of such integrations of the aims of feminist science within research contexts that do not sufficiently enable the pursuit of re-imagining the role of science itself. In integrating

principles of feminist empiricism with the context of technical Coalition 1-type research on SG as a climate solution, Tina expected that such a framework would lead to *an ouroboros snake eating its tail kind of thing… where my hope would be that in infusing decolonial and feminist science into research we do around solar geoengineering, it would create the results of we should not do this… but that's not the conclusion that's being reached.* While imbuing research methods and aims on SG with feminist frameworks can perhaps provide pathways by which currently marginalized voices and actors can become included via the dismantling of Western structures of knowledge production, such a practice can find limitation in its adoption as a framework that for the meaningful dismantling of the structures of research would require serious, embedded, institutionalized commitments to the *programmatic* of feminism.
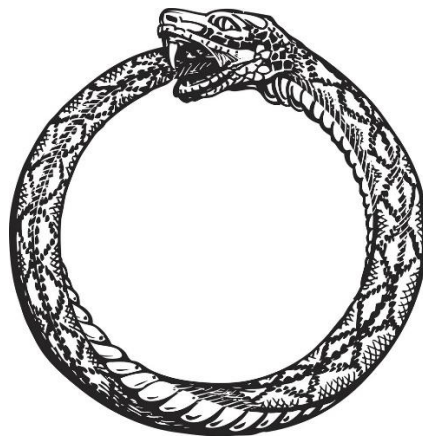


*Image 3.* The ouroboros snake

In this sense, such a sufficiently concerted feminist approach to the SG research works towards the destruction of its own science – thus revealing the ultimate decolonial horizon of the coloniality of knowledge. However, according to Tina, the incorporation of critical frameworks into research on SG *is not doing anything substantive to the research or to the proposals or to the trajectory of the research itself,* as the dominant systems that integrate feminist principles still fundamentally see knowledge rooted in values or emotion as irrational or inferior, retaining a gendered and racialized understanding of knowledge. Tina warns that efforts to imbue decolonial or feminist frameworks in the research on climate change that do not dismantle dominant structures *just becomes a really good article in a diverse piece and it asks significant questions, but it doesn't do anything towards tangible decolonization, which must be a more radical thing.* However, while such collaborations may not result in the radical changes required, they are an important first step, for though they not always make cracks they do bring the hammer closer to the wall. As the so-perceived decolonial/climate horizon necessitates an engagement with the spaces and knowledges of climate coloniality's 'otherwise' in the critical research on SG, the possibility for feminist frameworks to elevate within the persisting dominant research structures the role and validity of non-scientific forms of knowledge becomes limited. In this moment of proliferating normalization of the dominant discourses on SG, critical research must decenter, reframe, and reimagine

the role of research itself, placing the local at the center of the discussion and in turning to non-scientific knowledge dismantling the current exclusion of the plurality of knowledges 'otherwise'.

Currently, efforts proliferate to address the material/political and discursive/epistemological inequities that underlie knowledge production on SG – efforts that currently normalize mainly Western conceptions of justice and frameworks for inclusion. Most critically, the very concept of justice in the context of wide-scale climate intervention is being determined at the highest levels of global climate governance. In February, a UNEP *report* led by authors of the Degrees Initiative called for the proliferation of 'just' research on SG, that initiative led by members of 'the geoclique' and the 'actionable evidence' coalition of the SG research field that seeks to "put developing countries at the center of the SG conversation" (The Degrees Initiative, 2023). A *report* by the UN Human Rights Council has praised the initiative for its attempt to "fill the voice gap" in terms of Northern dominance of the research on SG, raising serious concern for the ways in which such material efforts to improve inclusion are extended based on the fundamental, unchallenged assumptions and proclivities by Western technical/reductionist researchers in the context of climate change, and the alarmingly quick degree to which such partial, situated, Western approaches are normalized as universal in the most powerful governance frameworks on climate. Critically, the Degrees Initiative and other similar efforts, though well-intentioned, seek to advance the representation of global South actors based on the fundamental assumptions of research as beneficial, climate justice meaning climate stability, and scientific knowledge as the only knowledge relevant to contributing to sound decisions on SG. Most problematically, the Initiative is guided by the goal that "its participants form their opinions, to the extent possible, based upon the best available evidence" (Reynolds, 2019b, p. 205). Such efforts at inclusion that disavow other, non-Western ways to and forms of knowledge by limiting the engagement of currently marginalized voices to taking as fact the 'best available evidence' on SG entrenches climate coloniality by precluding a fundamental recognition of plurality necessary for a critical climate justice horizon.

In line with the Coalition 2 discourse, proliferating efforts through which Southern voices (often experts) are being increasingly included in the discourse based on the unchallenged, technical 'evidence' do not 'represent' the epistemic plurality of the South, and by precluding a primary, normative co-construction of fundamentally diverse values of climate justice, such initiatives risk diminishing a meaningful ethic of care that accounts for relationality and for difference. Instead, what this research urges is a path of recognition of the already transformative agency and already legitimate knowledge of the plurality of those actors and epistemologies that may not ascribe to or accept the so-called 'best available evidence' as evidence, but who would perhaps resist it as an impartial, situated, Western field of subjective assumptions and false attempts at totality and truth. Problematic, however, is the growing political influence of the epistemic community on SG within the larger field of climate governance, given that largely unchallenged risk-based frameworks for climate justice characteristic of the Coalition 1 research are taking root within UN climate discourses. The February UNEP *report* normalizes within UN

governance frameworks a Coalition 1-type interpretation of the role of technical research on SG to enable well-informed, 'inclusive' decision-making processes in the context of climate stability as the ultimate goal. I encourage urgent critical examination of the narratives in such texts as the Western conceptions of climate change and the world appear to be finding acceptance within the (arguably) Western-favorable governance entity of the UN.
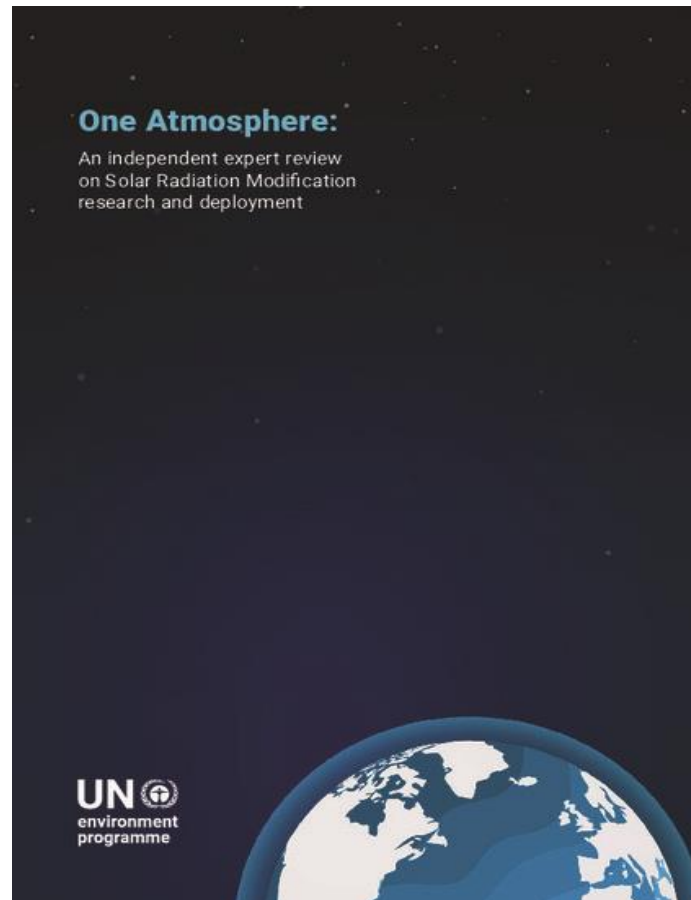


*Image 4.* The cover of the 2023 UNEP report calling for 'just' research on SRM

The report advances in its title and its presentation alone the universalization of a Western, reductionist conception of earth and of climate change, portraying what for a plurality of epistemologies 'otherwise' is not the abstracted, global, atmospheric enunciation of climate change but the embodied, local, situated, socio-historical resistance to modernity's active destruction of earth. Such a conception is erased by such a collective perspective, instead containing the 12%–80% of Western modernity and the ongoing violences that *are* climate change neatly beneath the collective atmosphere of the technical 'Earth'. In line with Vázquez (2017), such a 'blue dot' framing of earth as can be seen as representing modernity's 'earthlessness', with the unchallenged, abstracted, depoliticized, nominalized Western notion of climate change reducing our necessary grappling with the active destruction of life to a question of our 'one atmosphere and not an infinite plurality of local entanglements with and relationships to air, earth, sky,

and sun. While I have pointed to the ways in which the current prominent knowledge on SG can either seek potential avenues for relationality and delinking or further entrench climate coloniality in advancing universal visions for a global future both in research and in the quickly emerging governance regime, I urge most critically projects outside of the realm of 'scientific' research to pursue not the accumulation of more knowledge, but projects and relationships towards healing. Southern frameworks for theorizing decoloniality – and 'climate change' – *through praxis* and political struggle are seeking, as they always have, to resist projects of destruction. Research concerned with critical climate justice must transcend the confines of research alone, instead of working towards regimes of representation looking to these existing transformative contexts as a *source* for knowledge and for relationality, turning to the places where climate is really being lived and felt as a process of repairing relationships based on an ethics of care. A plurality of knowledges for, embodiments of, and relations with climate change exists – knowledge like Yuvelis' which dismantles the climate universe and reveals the climate pluriverse. The global North cannot raise the voices of the global South or cry out for them – they have their own cries (MLDSS). Research on the injustices advanced by knowledge for SG must transcend its current inability to recognize and challenge its own partiality. If the Souths must raise their own voices in their own ways, the role for research is not to 'facilitate' but to 'listen', instead pursuing knowledge mainly to unlearn climate coloniality and relearn its 'otherwise', delinking from our own individualist, non-relational Western interpretations of the pathways for climate justice reliant on only one kind of science.

## 6. CONCLUSIONS

This research exposed the ways in which the prominent scientific discourse on the governance of solar geoengineering entrenches modernity/coloniality, further critically revealing what making visible a decolonial horizon for a critical climate justice requires of the dominant approaches to knowledge. By deriving from the concepts and practical implications of a decolonial critical analysis the mechanisms by which to assess those concerns of decolonial investigation within the fields of political ecology, climate justice, and ecofeminism, I developed an extensive theoretical framework through which the interpretation of climate coloniality in the existing field of research on the governance of SG was enabled. Overall, I found the presence of discourses totalizing a Western reliance on the role of research, subject/object knowledge structures, and an abstracted, disembodied conception of climate change, a tendency most characteristic of Coalition 1-type research and thus revealing such approaches as the most problematic in the context of emerging global governance for SG. The more social science-oriented Coalitions 2 and 3 hold the patterns of totalization of Coalition 1 to account, constructing a field of research characterized by internal contestation, however still with its own optimistic role of research to be corrective of such injustices. In revealing the explicit make-up of the epistemic community producing

the *most* prominent research on the governance of SG as a climate solution, I connect implications for climate coloniality in the context of the material/political space of the knowledge production. Overall, this research presents serious limitations given the subjectivity and situated nature of the research that aligns specifically with that research it investigates, necessitating critical examination of the findings and of my attempts to make visible the ways in which a plurality of knowledges is excluded from the discourse on climate intervention.

*Appendix 1.* The total yield of the 68 most prominent authors on SG and its governance ranked according to average $g$-index across the 13 representative literature fields for each of the SG terminologies (T1-13)

| No. | AUTHOR | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 | T11 | T12 | T13 | AVG. |
|-----|--------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|------|
| 1. | David W. Keith | 45 | 35 | 40 | 31 | 40 | 52 | 1 | 30 | 35 | 14 | 38 | 30 | 18 | 31 |
| 2. | Douglas MacMartin | 40 | 31 | 30 | 41 | 30 | 25 | 50 | 10 | 17 | 15 | 22 | 18 | 2 | 25 |
| 3. | Mike Hulme | 27 | 27 | 25 | 35 | 13 | 14 | 41 | 40 | 40 | 11 | 14 | 5 | 20 | 22 |
| 4. | Ken Caldeira | 31 | 24 | 24 | 30 | 16 | 17 | 35 | 20 | 22 | 15 | 17 | 22 | 6 | 21 |
| 5. | Peter J. Irvine | 40 | 25 | 1 | 35 | 24 | 18 | 34 | 10 | 17 | 20 | 27 | 9 | 3 | 20 |
| 6. | Edward A. Parson | 23 | 20 | 25 | 24 | 7 | 17 | 1 | 21 | 34 | 7 | 21 | 20 | 32 | 19 |
| 7. | Jesse L. Reynolds | 25 | 20 | 22 | 22 | 23 | 22 | 1 | 12 | 27 | 19 | 22 | 18 | 15 | 19 |
| 8. | Benjamin K. Sovacool | 19 | 25 | 31 | 23 | 5 | 8 | 27 | 24 | 18 | 9 | 14 | 22 | 12 | 18 |
| 9. | Alan Robock | 21 | 29 | 30 | 40 | 1 | 1 | 22 | 12 | 12 | 16 | 30 | 18 | 3 | 18 |
| 10. | David R. Morrow | 21 | 18 | 1 | 19 | 17 | 16 | 49 | 13 | 32 | 9 | 18 | 4 | 17 | 18 |
| 11. | Juan Moreno-Cruz | 21 | 20 | 18 | 23 | 20 | 28 | 1 | 15 | 22 | 16 | 21 | 19 | 3 | 17 |
| 12. | Ben Kravitz | 32 | 20 | 20 | 15 | 10 | 20 | 35 | 5 | 8 | 8 | 16 | 16 | 3 | 16 |
| 13. | Joshua Horton | 21 | 18 | 22 | 23 | 15 | 20 | 24 | 4 | 23 | 9 | 19 | 10 | 4 | 16 |
| 14. | Stephen M. Gardiner | 22 | 7 | 22 | 21 | 9 | 10 | 48 | 13 | 29 | 2 | 16 | 10 | 1 | 16 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15. | Duncan McLaren | 25 | 19 | 20 | 18 | 8 | 6 | 41 | 8 | 25 | 2 | 8 | 7 | 14 | 15 |
| 16. | Andy Parker | 20 | 25 | 20 | 35 | 10 | 12 | 30 | 3 | 25 | 1 | 8 | 5 | 1 | 15 |
| 17. | Simon Nicholson | 22 | 13 | 21 | 13 | 19 | 26 | 23 | 6 | 18 | 9 | 9 | 10 | 6 | 15 |
| 18. | Sean J. Low | 23 | 17 | 1 | 19 | 10 | 15 | 24 | 12 | 15 | 11 | 16 | 20 | 6 | 14 |
| 19. | Bronislaw Szerszynski | 21 | 18 | 1 | 16 | 12 | 10 | 28 | 9 | 30 | 8 | 13 | 9 | 8 | 14 |
| 20. | Mark G. Lawrence | 18 | 26 | 4 | 16 | 15 | 18 | 27 | 3 | 14 | 9 | 18 | 12 | 4 | 14 |
| 21. | Nick Pidgeon | 22 | 8 | 16 | 15 | 9 | 10 | 20 | 10 | 23 | 7 | 18 | 8 | 5 | 13 |
| 22. | Robert Bellamy | 20 | 12 | 16 | 13 | 13 | 15 | 22 | 10 | 16 | 9 | 11 | 6 | 9 | 13 |
| 23. | Richard Owen | 16 | 12 | 17 | 10 | 5 | 5 | 44 | 1 | 25 | 3 | 7 | 6 | 20 | 13 |
| 24. | Andy Stirling | 15 | 8 | 11 | 10 | 2 | 2 | 38 | 12 | 22 | 0 | 12 | 2 | 35 | 13 |
| 25. | Nils Markusson | 20 | 9 | 19 | 15 | 7 | 6 | 30 | 15 | 22 | 3 | 10 | 2 | 11 | 13 |
| 26. | Phil Macnaghten | 17 | 14 | 1 | 14 | 5 | 5 | 45 | 2 | 24 | 1 | 10 | 4 | 20 | 12 |
| 27. | Konrad K. Ott | 16 | 12 | 14 | 20 | 8 | 9 | 20 | 15 | 13 | 9 | 12 | 9 | 4 | 12 |
| 28. | Masahiro Sugiyama | 18 | 0 | 13 | 16 | 12 | 14 | 22 | 15 | 20 | 10 | 8 | 6 | 4 | 12 |
| 29. | Holly Jean Buck | 24 | 9 | 18 | 11 | 11 | 13 | 1 | 5 | 23 | 7 | 10 | 10 | 7 | 11 |
| 30. | Aarti Gupta | 15 | 2 | 1 | 8 | 4 | 4 | 44 | 4 | 27 | 2 | 5 | 2 | 28 | 11 |
| 31. | Jennie C. Stephens | 12 | 5 | 13 | 14 | 7 | 25 | 14 | 10 | 18 | 2 | 5 | 9 | 10 | 11 |
| 32. | Frank Biermann | 18 | 7 | 15 | 11 | 5 | 6 | 24 | 10 | 14 | 3 | 8 | 2 | 20 | 11 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33. | Christopher Preston | 14 | 10 | 20 | 14 | 8 | 9 | 1 | 5 | 18 | 10 | 12 | 8 | 7 | 10 |
| 34. | Katharine L. Ricke | 18 | 12 | 14 | 15 | 9 | 11 | 1 | 8 | 15 | 10 | 16 | 6 | 0 | 10 |
| 35. | Govindasamy Bala | 18 | 14 | 12 | 14 | 1 | 8 | 18 | 11 | 10 | 8 | 10 | 8 | 1 | 10 |
| 36. | John Shepherd | 6 | 9 | 12 | 13 | 3 | 4 | 31 | 9 | 12 | 5 | 4 | 11 | 14 | 10 |
| 37. | Jason J. Blackstock | 17 | 18 | 20 | 20 | 5 | 5 | 2 | 4 | 12 | 6 | 10 | 7 | 6 | 10 |
| 38. | Ryan Gunderson | 13 | 9 | 11 | 14 | 9 | 9 | 19 | 4 | 17 | 5 | 11 | 6 | 4 | 10 |
| 39. | Sikina Jinnah | 11 | 8 | 15 | 8 | 9 | 10 | 26 | 4 | 12 | 5 | 4 | 5 | 13 | 10 |
| 40. | Stefan Schäfer | 1 | 12 | 2 | 18 | 9 | 12 | 1 | 9 | 16 | 11 | 13 | 15 | 4 | 9 |
| 41. | Adam Corner | 15 | 5 | 10 | 12 | 8 | 10 | 20 | 0 | 20 | 3 | 5 | 8 | 6 | 9 |
| 42. | Olaf Corry | 17 | 4 | 5 | 5 | 6 | 6 | 30 | 6 | 21 | 4 | 6 | 2 | 10 | 9 |
| 43. | Daniel Bodansky | 1 | 8 | 7 | 10 | 7 | 6 | 16 | 20 | 15 | 2 | 10 | 10 | 9 | 9 |
| 44. | David Tyfield | 10 | 4 | 11 | 10 | 1 | 1 | 20 | 9 | 15 | 1 | 5 | 2 | 30 | 9 |
| 45. | Diana Stuart | 11 | 7 | 10 | 11 | 8 | 8 | 15 | 5 | 19 | 4 | 10 | 5 | 5 | 8 |
| 46. | Brian Petersen | 9 | 8 | 9 | 11 | 8 | 8 | 12 | 4 | 19 | 5 | 9 | 5 | 9 | 8 |
| 47. | Oliver Geden | 14 | 6 | 10 | 6 | 7 | 8 | 20 | 15 | 10 | 2 | 3 | 5 | 6 | 8 |
| 48. | Jonathan B. Wiener | 9 | 8 | 11 | 10 | 5 | 8 | 15 | 10 | 7 | 4 | 9 | 1 | 10 | 8 |
| 49. | Miranda Boettcher | 10 | 8 | 14 | 12 | 6 | 7 | 12 | 3 | 10 | 5 | 6 | 9 | 6 | 8 |
| 50. | Karen N. Scott | 9 | 9 | 10 | 10 | 6 | 6 | 10 | 9 | 8 | 6 | 9 | 6 | 8 | 8 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 51. | Harald Stelzer | 10 | 7 | 9 | 8 | 10 | 10 | 10 | 4 | 8 | 5 | 10 | 9 | 0 | 7 |
| 52. | Matthias Honegger | 18 | 1 | 1 | 13 | 6 | 6 | 1 | 5 | 13 | 5 | 11 | 9 | 9 | 7 |
| 53. | Chad M. Baum | 7 | 7 | 7 | 7 | 7 | 7 | 10 | 6 | 10 | 5 | 7 | 7 | 10 | 7 |
| 54. | Albert C. Lin | 1 | 10 | 8 | 9 | 5 | 6 | 12 | 6 | 12 | 6 | 1 | 8 | 12 | 7 |
| 55. | Victor Galaz | 5 | 5 | 6 | 5 | 2 | 4 | 15 | 6 | 18 | 4 | 4 | 2 | 12 | 6 |
| 56. | Martin Weitzman | 8 | 4 | 3 | 1 | 4 | 4 | 20 | 10 | 8 | 8 | 10 | 1 | 2 | 6 |
| 57. | Kevin Surprise | 9 | 5 | 7 | 7 | 7 | 7 | 10 | 1 | 10 | 5 | 6 | 6 | 2 | 6 |
| 58. | Andrew Lockley | 8 | 8 | 6 | 7 | 8 | 8 | 8 | 4 | 6 | 5 | 6 | 4 | 2 | 6 |
| 59. | Catriona McKinnon | 10 | 2 | 1 | 10 | 6 | 5 | 19 | 3 | 10 | 1 | 5 | 4 | 3 | 6 |
| 60. | David Humphreys | 3 | 6 | 5 | 5 | 2 | 2 | 20 | 10 | 4 | 2 | 3 | 4 | 11 | 6 |
| 61. | Ina Moller | 8 | 6 | 8 | 8 | 6 | 6 | 10 | 0 | 9 | 6 | 6 | 3 | 0 | 5 |
| 62. | Robert O. Keohane | 6 | 2 | 5 | 5 | 0 | 1 | 12 | 3 | 18 | 0 | 6 | 4 | 10 | 5 |
| 63. | Jane C. S. Long | 10 | 5 | 11 | 9 | 4 | 4 | 1 | 2 | 11 | 0 | 8 | 6 | 0 | 5 |
| 64. | Jane A. Flegal | 9 | 6 | 8 | 7 | 6 | 6 | 0 | 3 | 8 | 4 | 7 | 5 | 2 | 5 |
| 65. | Alexander Gillespie | 2 | 7 | 2 | 7 | 4 | 5 | 10 | 8 | 10 | 0 | 0 | 5 | 10 | 5 |
| 66. | Janos Pasztor | 8 | 4 | 9 | 9 | 5 | 5 | 9 | 1 | 7 | 2 | 4 | 1 | 2 | 5 |
| 67. | David A. Wirth | 2 | 6 | 3 | 5 | 1 | 4 | 13 | 9 | 8 | 0 | 1 | 4 | 8 | 5 |
| 68. | Peter Frumhoff | 8 | 5 | 5 | 4 | 4 | 4 | 0 | 10 | 10 | 5 | 3 | 2 | 0 | 4 |

*Appendix 2.* The 20 most prominent authors on SG and its governance according to average *g*-index, their scientific field of discipline & their two selected texts for analysis and corresponding data type

| No. | TOP-20 AUTHOR | *g*-INDEX | FIELD | TEXT 1 | TYPE | TEXT 2 | TYPE |
|---|---|---|---|---|---|---|---|
| *1.* | David W. Keith | 31 | Applied physics, energy, climate science | "A case for climate engineering" (2013) | Book | "Toward constructive disagreement about geoengineering" (2021) | Article |
| *2.* | Douglas MacMartin | 25 | Engineering, climate science | "Geoengineering with stratospheric aerosols: What do we not know after a decade of research?" (2016) | Article | "Technical characteristics of a solar geoengineering deployment and implications for governance" (2019) | Article |
| *3.* | Mike Hulme | 22 | Climatology, human geography | "Can science fix climate change? A case against climate engineering" (2014) | Book | "Engineering climate debt: Temperature overshoot and peak-shaving as risky subprime mortgage lending" (2019) | Article |
| *4.* | Ken Caldeira | 21 | Climate science, physics | "The need for climate engineering research" (2010) | Article | "Reflecting on 50 years of geoengineering research" (2017) | Article |
| *5.* | Peter J. Irvine | 20 | Earth system science | "Solar geoengineering could substantially reduce climate risks - A research hypothesis for the next decade" (2016) | Article | "The potential for climate engineering with stratospheric sulfate aerosol injections to reduce climate justice" (2018) | Article |
| *6.* | Edward A. Parson | 19 | Environmental law, policy, science | "International governance of climate engineering" (2013) | Article | "Nonstate governance of solar geoengineering research" (2020) | Article |
| *7.* | Jesse L. Reynolds | 19 | Environmental law, policy, science | "The governance of solar geoengineering: Managing climate change in the anthropocene" (2019) | Book | "Is solar geoengineering ungovernable? A critical assessment of governance challenges identified by the IPCC" (2021) | Article |
| *8.* | Alan Robock | 18 | Climatology | "Is geoengineering research ethical?" (2012) | Article | "Benefits and risks of stratospheric solar radiation management for climate | Article |

| | | | | | | intervention (Geoengineering)” (2020) | |
|---|---|---|---|---|---|---|---|
| 9. | Benjamin K. Sovacool | 18 | Energy policy, environmental policy | “Reckless or righteous? Reviewing the sociotechnical benefits and risks of climate change geoengineering” (2021) | Article | “Actors, legitimacy, and governance challenges facing negative emissions and solar geoengineering technologies” (2023) | Article |
| 10. | David R. Morrow | 18 | Climate policy, ethics, law | “Toward ethical norms and institutions for climate engineering research” (2009) | Article | “A mission-driven research program on solar geoengineering could promote justice and legitimacy” (2020) | Article |
| 11. | Juan Moreno-Cruz | 17 | Energy policy, climate policy | “Strategic incentives for climate geoengineering coalitions to exclude broad participation” (2013) | Article | “Climate econometric models indicate solar geoengineering would reduce inter-country income inequality” (2020) | Article |
| 12. | Ben Kravitz | 16 | Climate science, modeling | “An overview of the Earth system science of solar geoengineering” (2016) | Article | “Characteristics of a solar geoengineering deployment: considerations for governance” (2021) | Article |
| 13. | Stephen M. Gardiner | 16 | Climate policy, ethics | “Is ‘arming the future’ with geoengineering really the lesser evil? Some doubts about the ethics of intentionally manipulating the climate system” (2010) | Article | “The tollgate principles for the governance of geoengineering: Moving beyond the oxford principles to an ethically more robust approach” (2018) | Book section |
| 14. | Joshua Horton | 16 | Climate policy, governance | “Solar geoengineering and obligations to the global poor” (2016) | Book section | “Solar geoengineering and democracy” (2018) | Article |
| 15. | Duncan McLaren | 15 | Environmental law, policy | “Whose climate and whose ethics? Conceptions of justice in solar geoengineering modeling” (2018) | Article | “The politics and governance of research into solar geoengineering” (2021) | Article |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *16.* | Andy Parker | 15 | Climate policy | "Governing solar geoengineering research as it leaves the laboratory" (2014) | Article | "Developing countries must lead on solar geoengineering research" (2018) | Article |
| *17.* | Simon Nicholson | 15 | Environmental, climate governance | "Solar radiation management: a proposal for immediate polycentric governance" (2018) | Article | "The hidden politics of climate engineering" (2019) | Article |
| *18.* | Sean J. Low | 14 | Climate, technology governance | "Geoengineering our climate" (2018) | Book section | "The practice of responsible research and innovation in 'climate engineering'" (2020) | Article |
| *19.* | Bronislaw Szerszynski | 14 | Political economy, environmental social theory | "Why solar radiation management geoengineering and democracy won't mix" (2013) | Article | "Living the global social experiment: An analysis of public discourse on solar radiation management and its implications for governance" (2013) | Article |
| *20.* | Mark G. Lawrence | 14 | Atmospheric sciences, sustainability | "The geoengineering dilemma: To speak or not to speak" (2006) | Article | "Evaluating climate geoengineering proposals in the context of the Paris Agreement temperature goals" (2018) | Article |

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"Lo que sucede es que, y esta es una discusión muy local, en el mundo hay bastantes dichos, uno de ellos es que no se defiende con el corazón lo que no se conoce con los ojos. Esto se debe a que en el mundo actual hay algo como el cambio climático, estas vistas de activistas y personas que hacen campañas en Change.org. Que todo es farándula, un mundo que al final del día se olvida de las realidades sociales. Se vuelve muy mediático, porque el ambiente es muy blanco y racista, y a veces no nos damos cuenta de las luchas territoriales que se están llevando a cabo en pequeños rincones del mundo, donde la biodiversidad no se cuenta por hectáreas, sino por la cultura y tradición.

El mundo está dividido en dos, el norte global y el sur global. El norte paga al sur global los bonos de carbono para hacer algo, pero al lado están las empresas de carbono, aceite. Es una cara más limpia del activismo que se está implantando. Esta injusticia se reconoce desde la misma desigualdad, la de no poder decidir sistemas extractivistas. El mismo mundo no lo podemos pensar como activo.

Pienso en estas miradas globales y no me parecen globales a la desigualdad climática a esta gente que defiende sus valores. Vosotros lo tenéis todo, tenéis tanto que no se puede defender. A vosotros no os matan por querer ir a un río. En el tiempo que estuve en Europa, la gente salía a manifestar sobre la creación de puertos y aeropuertos, y la policía les hablaba, se comunicaban. No había violencia, eso con nosotros no pasa. Si salimos, vendrá la guerrilla y tenemos que correr porque viene la guerrilla a matarnos. Estas desigualdades el norte global no ha explorado.

Ese es el punto clave, nosotros contra ellos. Implementarán esta nueva forma de decir, así es como se construye el mundo. Así es como necesitamos que el mundo sea salvado. En vez de dejar que el sur global se resurja a su manera. Pensemos en América como de México para abajo. Tienen esa manera de pensar de cómo hacemos esta ingeniería que nos convenga a nosotros. Al final del día, la energía verde acaba siendo un extractivismo de y para nosotros. Como no se piensa en el bienestar de una casa bien concebida, sino en un sur global.

No podemos hablar de justicia climática si no hablamos de justicia social y ambiental.

No podemos hablar de justicia global si extraen nuestra montaña todos los días, o no teniendo agua.

Sería darle razón a la gente. Sería reconocer que su presencia está contribuyendo a las personas que viven allí y su cultura. La discusión sobre el cambio climático no está ahí, porque no se está diciendo nada sobre la justicia climática.

Las comunidades donde se hacen extracciones son pobres y no hay energía ni favorabilidad de vida, pero eso es donde está la mina más grande. Estamos en Colombia implantando la idea de la transición climática. En Colombia y en la frontera entre Colombia y Ecuador, hay una tribu que se llama U'wa. Los U'wa dicen que el petróleo es la sangre de la tierra y que un cuerpo sin sangre no tiene vida. Hay un gran error que suelen tener los que defienden el territorio global, y es pretender que su acción individual va a salvar el mundo. Que su figura puede ayudar a contribuir algo y eso es siempre para el mediaticismo y para la fama. Pero al mundo lo salvamos todos y todas. Un mundo que no se intenta salvar en comunidad no va a ser, porque no logramos muchas cosas aunque las propongamos. Una manera en que creo que este cambio es posible es que dejemos a un lado las individualidades que tenemos. Cuando venimos de vacaciones a un lago o montaña, no como un descanso, sino como una vida que tiene que ser y una vida que ya está. Como si así tuviéramos que vivir siempre, no como si fuera un privilegio que puedes permitirte. Sino que la manera en que vamos a ser conscientes es si cambiamos nuestra realidad que creamos, es cuando entendamos que esta naturaleza debería ser una realidad tangible, algo a lo que todos podemos ir. Todos tenemos un patio lleno de plantas, como si el bosque no fuera algo lejano imposible de llegar e inaccesible. Estar en el bosque debería ser nuestra naturalidad. Moviendo desde lo individual para construir este sentimiento comunal y construir juntos. Sé que has construido murales en nuestra comunidad, pero tal vez puedas compartir algo sobre cómo ves la construcción de la fuerza juntos en un mundo que se enfoca en lo individual, y qué prácticas valoran tú y tu comunidad y de las que obtienen fuerza.

Yo pertenezco a la lucha antifracking de Colombia y a un comité que se llama U'wa'i, que ya no está... Un día llegó el fracking a Puertoalgo. Y nadie sabía qué era el fracking, nos preguntábamos qué era eso. Porque el acceso a la información es otra cosa, que no se puede hablar de justicia climática si la gente no sabe qué llega a su territorio. Teníamos miedo porque el nombre es duro, el nombre fracking es duro. Somos hijos e hijas de un ecosistema precioso. Estamos al lado de un río muy grande precioso, que siempre nos ha dado vida, en las buenas y en las malas. No es un matrimonio, sino una unión ancestral que está y queremos que siga estando. Por ese río un día decidimos oponernos al fracking. Somos una comunidad empobrecida. Papá es pescador, mamá es ama de casa y es una realidad en la que soñar cuesta mucho. Sociedad machista y capitalista en la que ser más o menos negro te da un estatus. Un nivel de formalidad... Colombia, aunque un 50% de la sociedad sea negra, es un país muy racista. Es un país en el que gobiernan blancos. Adquirimos costumbres extranjeras. Miramos a otros lugares como el gran sueño a realizar porque nos han dicho que no conseguiremos nada, y peor si eres mujer, joven negra. La vida no es igual y creo que nunca aspiramos a otra vida. Si yo me despertara mañana y quisiera

ser blanca, como si eso fuese una posibilidad. O quisiese tener dinero, o que sus privilegios también sean míos.

No es posible. El único privilegio que tenemos es la herencia de ese río, de vidas pasadas, y por eso lo defendemos, porque nos lo da todo. Es nuestra mayor riqueza. Así que decidimos dejar de hablar del fracking, porque nos volvimos expertos, y empezamos a hablar de nosotros, el río, la montaña, los pájaros. Empezamos a hablar de nuestro territorio, a pintarlo, cantarlo, escribirle poemas, a llorar con él, a vivir con él. No teníamos la posibilidad de hablar con gente o de pensar en hacer lo que estás haciendo tú.

Pero necesitamos que la gente nos escuche, nos mire, nos oiga. Porque todo el mundo grita, pero entre tantas voces, ¿cuál sale más bonito? Pero hablar de cambio climático no es fácil, el clima no va a cambiar, los únicos que vamos a cambiar somos nosotros. Hablemos de cambios individuales y comunitarios. De nuestros hábitos. El clima va a seguir, con o sin nosotros, y aquí el planteamiento real es cómo nosotros vamos a cambiar para que esta realidad no sea nuestra. La realidad somos nosotros, igual que el cambio lo es. Las discusiones de cambio climático no me gustan, porque no tengo mucho que decir. Me gusta hablar en un ambiente en el que ya estamos, seamos agentes transformadores. Las discusiones de cambio climático son desiguales porque a nosotros no se nos enseña sobre esto. Nuestras discusiones son como vivir en un mundo obrero. Vosotros pueden hablar de un cambio climático porque tenéis estudios, es una conversación injusta porque nosotros sabemos del día a día. Nosotros nunca hemos."

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