



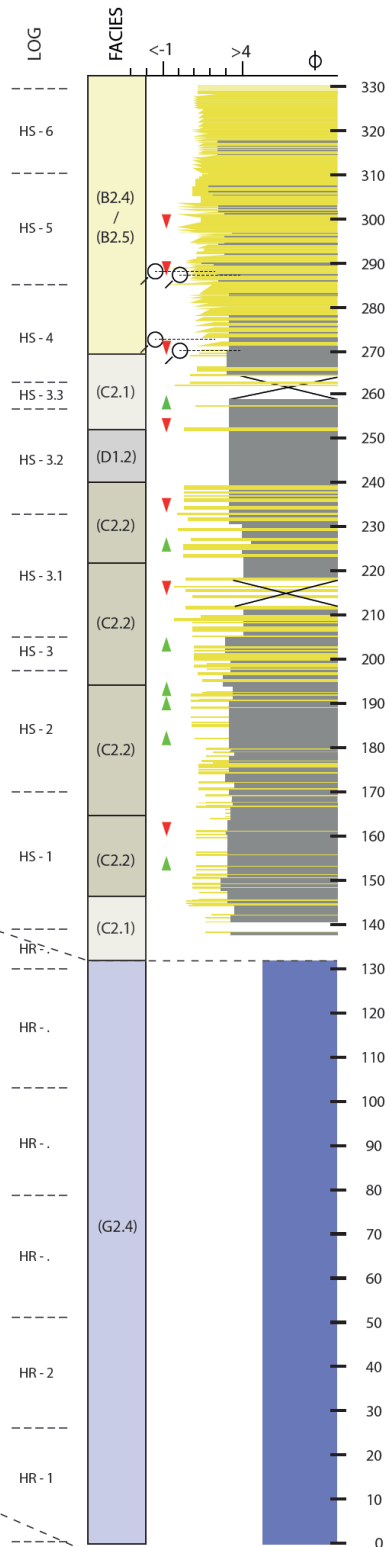
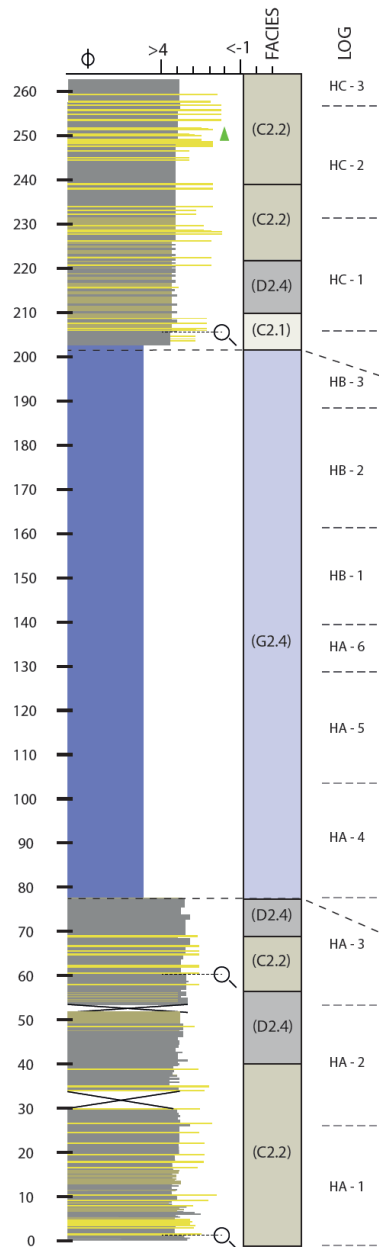
**APPENDIX 1** Overview of the study area including the location of the sections.  
Source: Google Earth

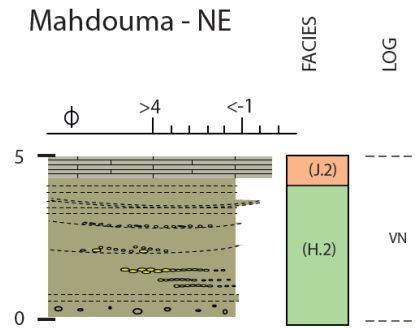
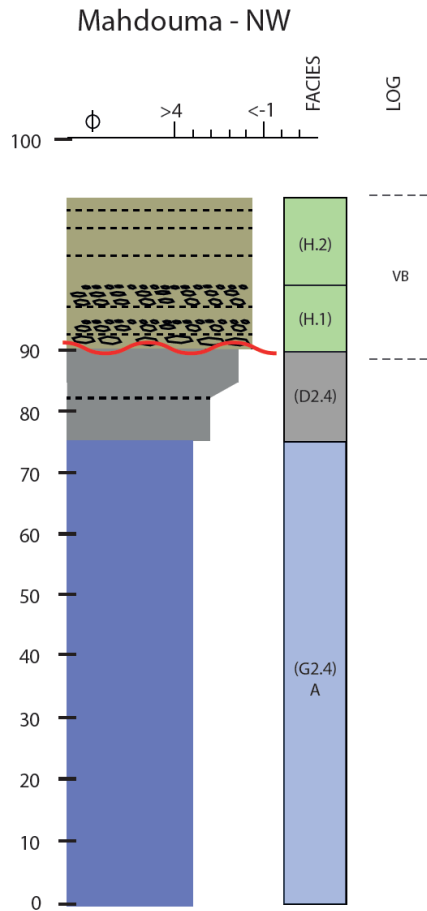
**APPENDIX 2.1** Overview of the Jebel Haicha sections including the location of each individual log. 27 log sheets have been produced, and are added to the following pages.

(i) indicates stratigraphic unit from which palaeo-current directions have been determined as used in section 6.2 of this paper.

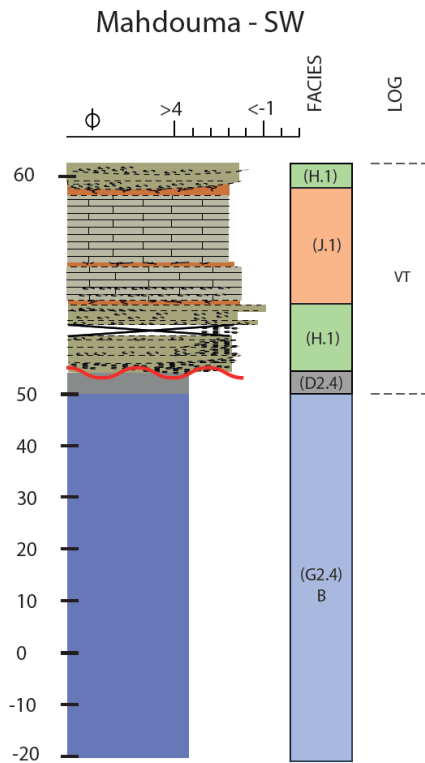
### Jebel Haricha North

### Jebel Haricha South



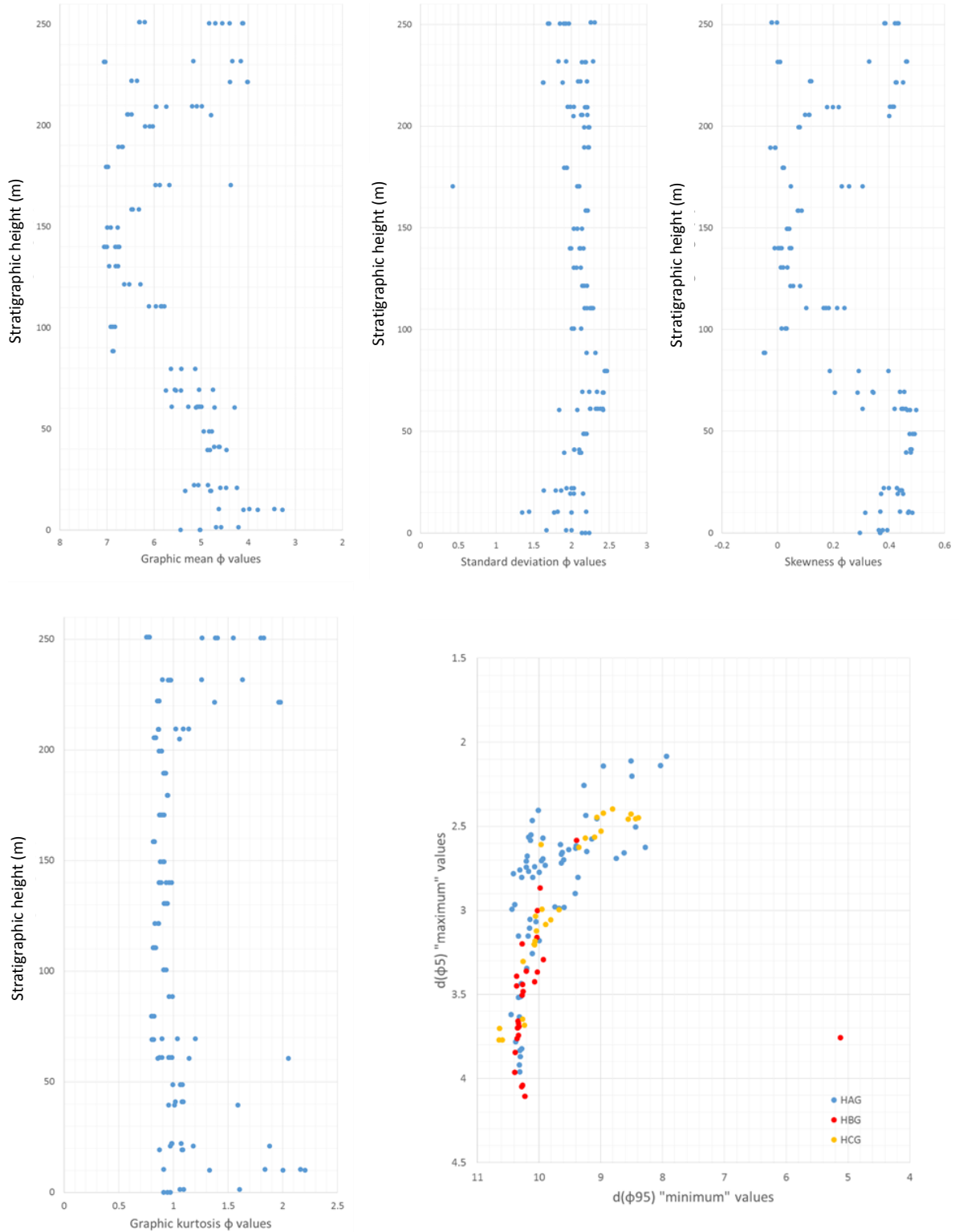


**APPENDIX 2.2** Overview of the Mahdouma sections including the location of each individual log. 3 log sheets have been produced, and are added to the following pages.



Section	Height	Picture	Species	Environment
Mahdouma		DSC_0081	Pactinidae indet.	Marine - (in-situ)
HA	6 m	2109_02	Pectinidae indet.	Marine -
HA	72 m	DSC_127	?Lutraria indet.	Marine – Lutraria – burrows in mixed soft substrata, from the lower shore to about 100 m
HA	78 m	2509_02	Lutraria or Tellinidae idet.	Marine – “ “ Marine – Tellinidae indet. Common on the low shore
HA	~ 90 m	DSC_0132	?Corals or bryozoans	Bryozoans – generally in tropical waters at depths less than 100 m
HA	~ 90 m	2509_03	?Amussium cristatum	Marine – Proximal and distal platform settings
HA	~ 100 m	2509_05	?Lagomare	
HA	~ 100 m	2509_06	Echinoderm	Marine -
HA	~ 100 m	2509_09	?Abra spec.	Marine - (in-situ) Depths down to 200 m (prefers very fine sediment).
HA	120 m	DSC_0136	Uncertain	
HA	130 m	2509_10	Amussium cristatum	Marine – Proximal and distal platform settings
HC	2 m	2809_01	?Pectinidae indet.	Marine -
HC	2.5 m	2809_02	Pecten ?Jacobaeus	Marine – Below the littoral zone
HR	1 m	3009_01	Echinoderm fragment	
HR	1 m	3009_01.1	Echinoderm fragment	
HR	1 m	3009_01.3	Ficus sp.	Marine – All marine habitats, most are benthic
HR	1 m	3009_01.4	Ostrea spec.	Marine - Generally in the intertidal zone
HR	1 m	3009_01.5	Amussium cristatum	Marine – Proximal and distal platform settings
HS	~ 100 m	0510_01	?Corraline algae	Marine – Photic zone, up to 270 m water depth

**APPENDIX 3** Overview of the fossils found in both fieldwork areas. *NB; The fossils were not only found in the chronologic height indicated in this table, this height is the location where they were examined. Furthermore, as indicated earlier the section code starting with an H stands for the Jebel Haricha section.*

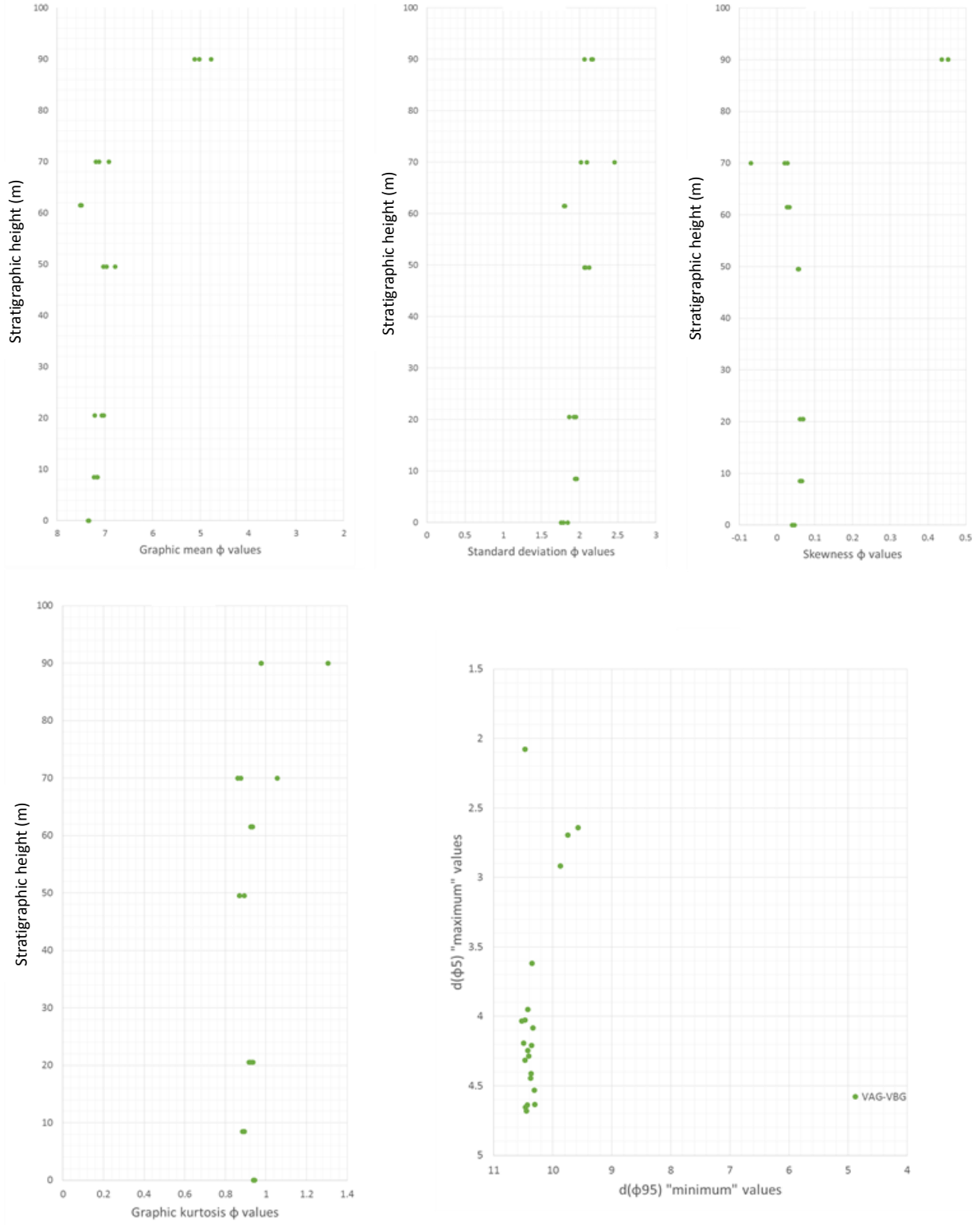


**APPENDIX 4.1** Results of the calculated grain-size  $\phi$  values for section **JH-S**, plotted respectively; Graphic mean, Standard deviation, Skewness and Kurtosis against the chronologic height in stratigraphy. The graph in the lower right corner shows the tails (minimum and maximum) values of the distribution curve.

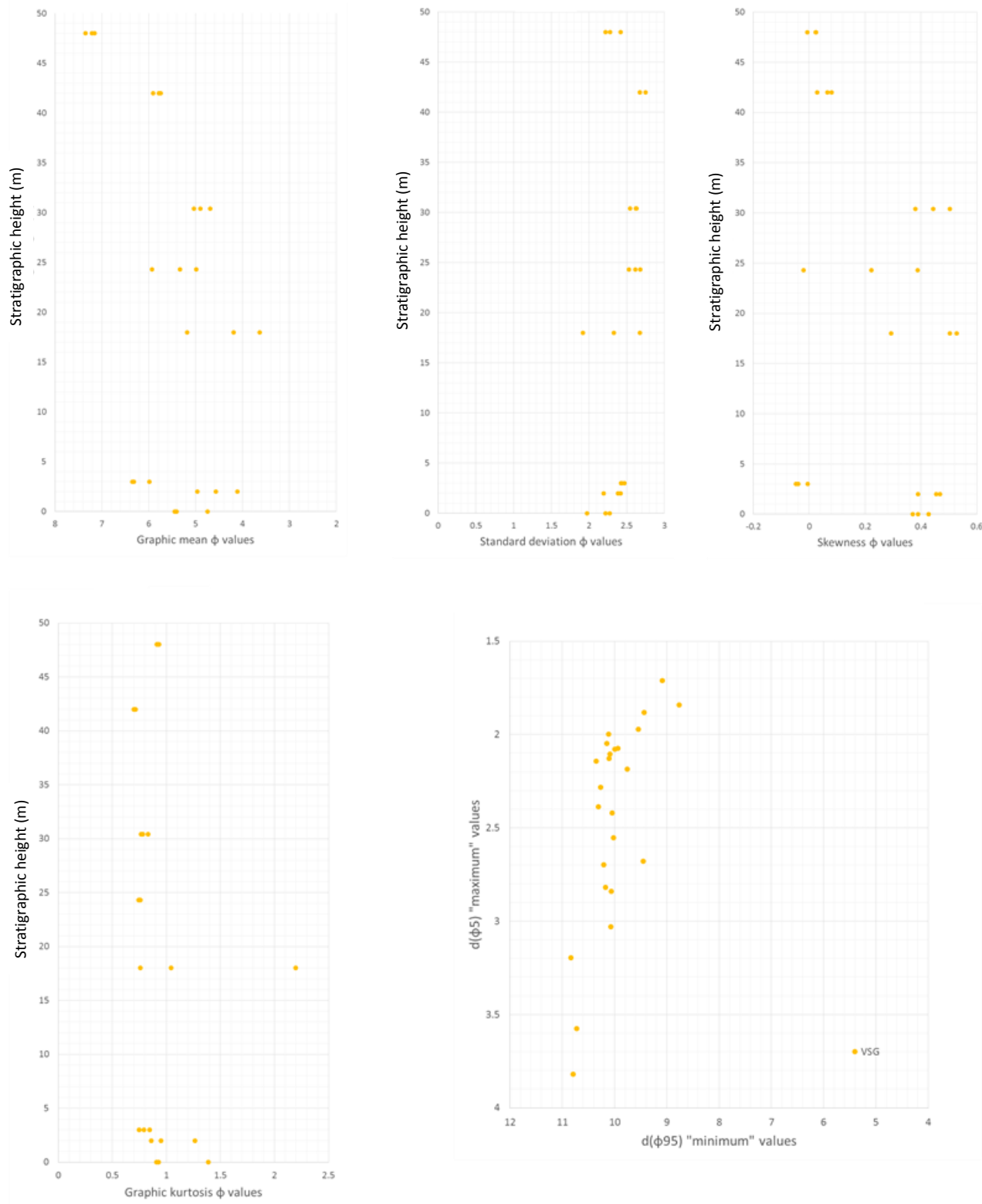


**APPENDIX 4.2** Results of the calculated grain-size  $\phi$  values for section JH-N, plotted respectively; Graphic mean, Standard deviation, Skewness and Kurtosis against the chronologic height in stratigraphy. The graph in the lower right corner shows the tails (minimum and maximum) values of the distribution curve.



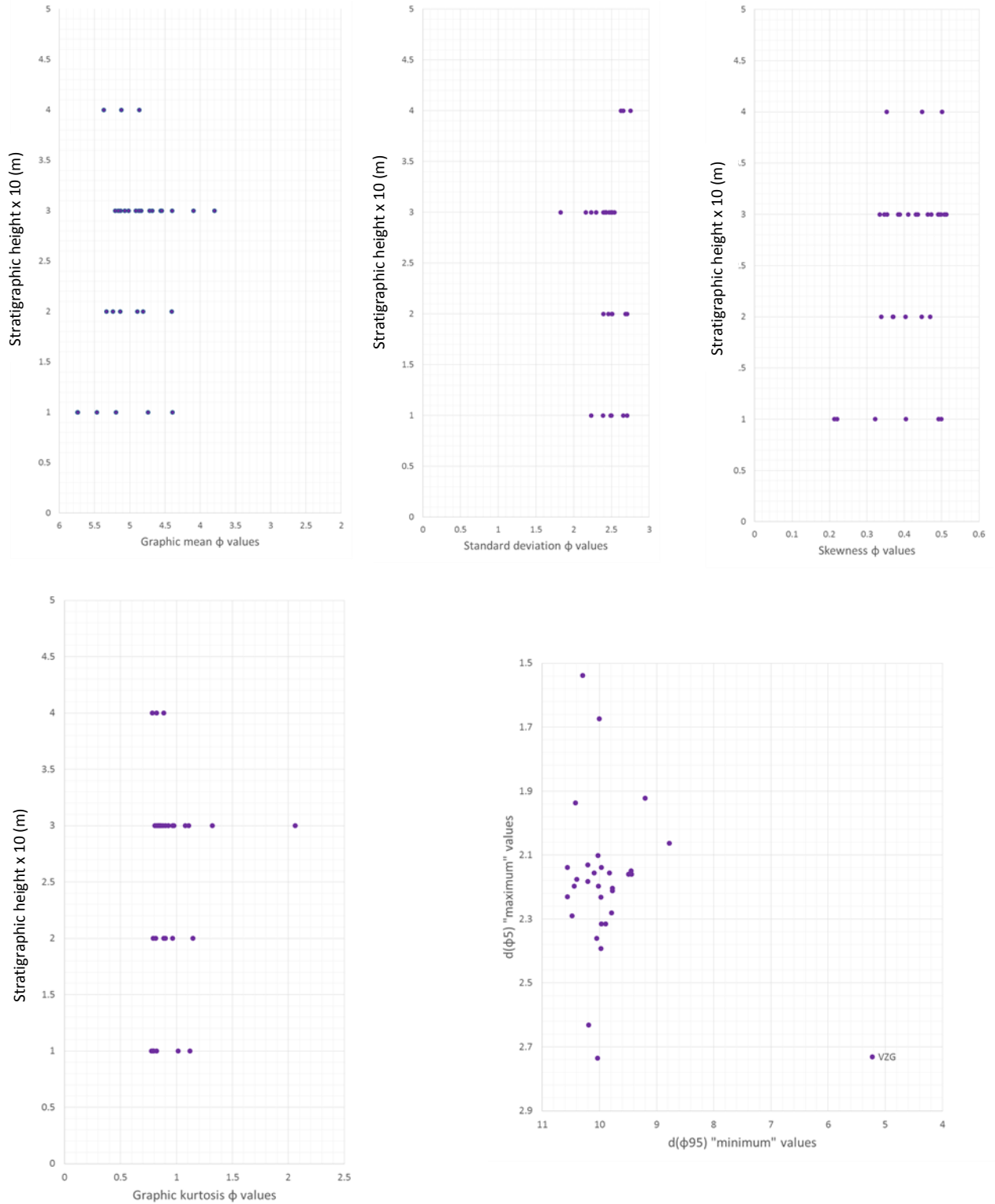


**APPENDIX 4.3** Results of the calculated grain-size  $\phi$  values for section **M-NW**, plotted respectively; Graphic mean, Standard deviation, Skewness and Kurtosis against the chronologic height in stratigraphy. The graph in the lower right corner shows the tails (minimum and maximum) values of the distribution curve.



**APPENDIX 4.4** Results of the calculated grain-size  $\phi$  values for section **M-SW**, plotted respectively; Graphic mean, Standard deviation, Skewness and Kurtosis against the chronologic height in stratigraphy. The graph in the lower right corner shows the tails (minimum and maximum) values of the distribution curve.





**APPENDIX 4.5** Results of the calculated grain-size  $\phi$  values for section M-SE, plotted respectively; Graphic mean, Standard deviation, Skewness and Kurtosis against the chronologic height in stratigraphy. The graph in the lower right corner shows the tails (minimum and maximum) values of the distribution curve.

<b>Sample</b>	<b>Thinsection 7 – HAT 1.3</b>
<b>Sphericity</b>	Low to high
<b>Angularity</b>	Angular to sub-rounded
<b>Sedimentary features</b>	Bioclastic structures and remains – matrix to grain supported
<b>Picture</b>	Thinsection 7 – 7.3
<b>Porosity</b>	Very low
<b>Matrix</b>	± 20% - Wacke (Tucker, 2001)
<b>Content</b>	30% quartz 5 – 10% calcite 1% glauconite 2% muscovite 30% lithic fragments
<b>Rock type</b>	(lithic wacke)

<b>Sample</b>	<b>Thinsection 3 – HAT 61</b>
<b>Sphericity</b>	Medium
<b>Angularity</b>	Sub-rounded to rounded
<b>Sedimentary features</b>	Laminated (not oriented) apparent soft sediment deformation influenced lamination – matrix supported fabric – contains tiny shell remains and bioclasts – some grains contain fluid inclusions
<b>Picture</b>	Thinsection 3 – 3.1
<b>Porosity</b>	< 1%
<b>Matrix</b>	10 – 20% - shades of brown, very fine grains and calcite in matrix - Arenite / Wacke (Tucker, 2001)
<b>Content</b>	25% quartz 2% <b>plagioclase</b> 1% beryl – 1 or 2% opaque minerals 5% <b>hornblende</b> 30 – 40 % very fine grained clasts
<b>Rock type</b>	(lithic arenite/wacke)

<b>Sample</b>	<b>Thinsection 18 – HBT 65</b>
<b>Sphericity</b>	Medium to high
<b>Angularity</b>	Sub-rounded
<b>Sedimentary features</b>	Laminated, grain supported – concentration of iron concretions in the bottom of the thinsection
<b>Picture</b>	-
<b>Porosity</b>	5%
<b>Matrix</b>	± 30% - Wacke (Tucker, 2001)
<b>Content</b>	35% quartz 10% <b>plagioclase, perfect triclinic crystal</b> < 5% calcite 2% opaque minerals 3% halite 15% lithic fragments
<b>Rock type</b>	(feldspathic lithic wacke)

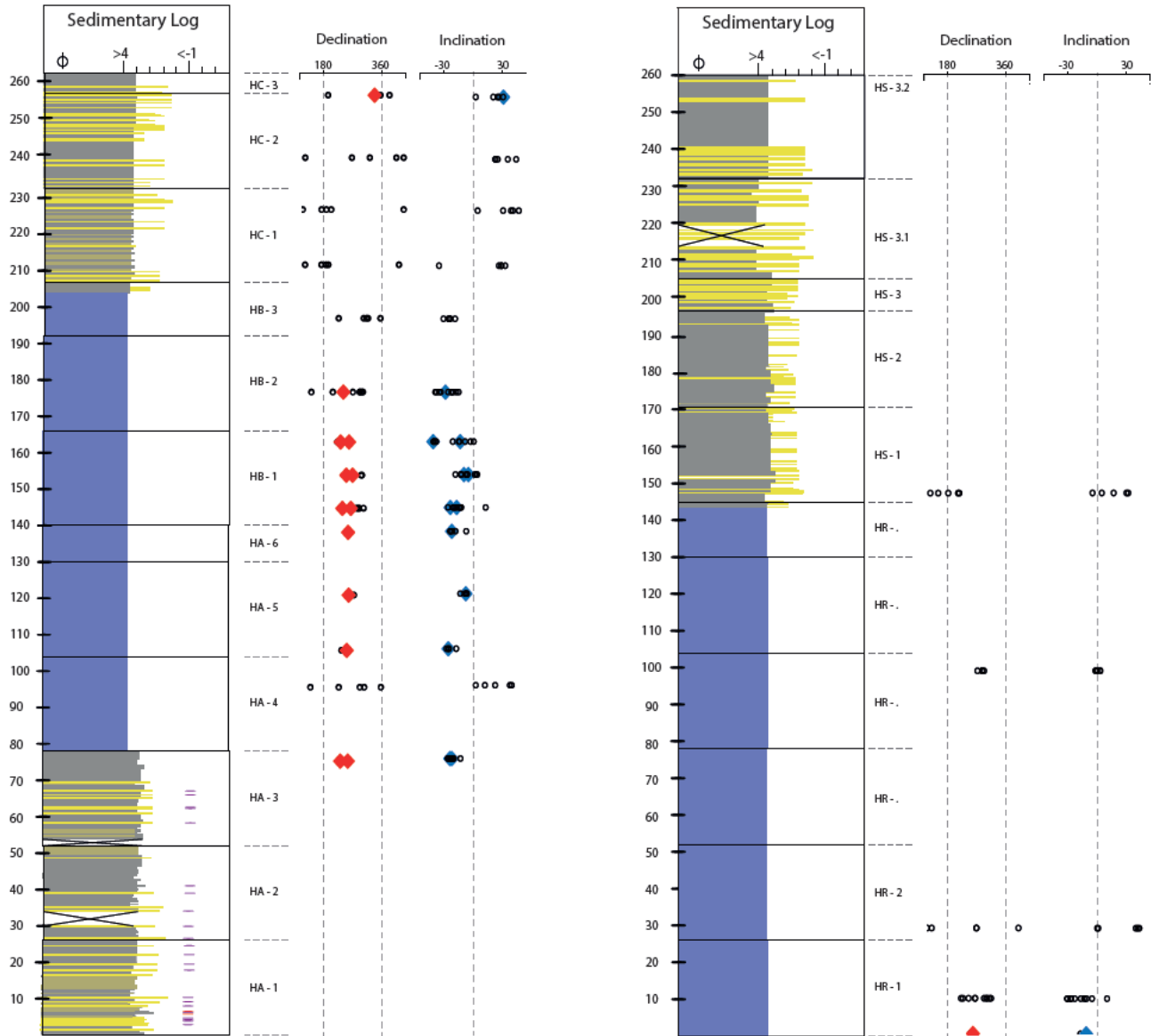
<b>Sample</b>	<b>Thinsection 1 A – HST 131</b>
<b>Sphericity</b>	Medium
<b>Angularity</b>	Sub-angular to sub-rounded
<b>Sedimentary features</b>	Small iron nodules at the bottom – matrix/porosity increase to the top – thin laminations – dominantly matrix supported fabric
<b>Picture</b>	-
<b>Porosity</b>	10 – 35 %
<b>Matrix</b>	± 25% - Wacke (Tucker, 2001)
<b>Content</b>	30% quartz 2% <b>albite</b> 3% <b>plagioclase</b> < 1% biotite/muscovite 5% brownish minerals – moderate to high relief 2% opaque 20% lithic fragments
<b>Rock type</b>	(lithic wacke)

<b>Sample</b>	<b>Thinsection 6 – HST 127</b>
<b>Sphericity</b>	Low to high
<b>Angularity</b>	Sub-angular
<b>Sedimentary features</b>	Matrix grains – grain supported fabric – variety of bioclasts
<b>Picture</b>	Thinsection 6 – 6.5
<b>Porosity</b>	Very low
<b>Matrix</b>	± 15% - Arenite / Wacke (Tucker, 2001)
<b>Content</b>	30% quartz 5 – 10% calcite 1% glauconite 2% muscovite 35% lithic fragments
<b>Rock type</b>	(lithic arenite/wacke)

<b>Sample</b>	<b>Thinsection 4 – HST 145</b>
<b>Sphericity</b>	Medium to high
<b>Angularity</b>	Sub-angular to rounded
<b>Sedimentary features</b>	Grain supported fabric with point contacts
<b>Picture</b>	Thinsection 4 – 4.1
<b>Porosity</b>	< 5%
<b>Matrix</b>	± 15% - Arenite / Wacke (Tucker, 2001)
<b>Content</b>	30% quartz 2% <b>orthoclase</b> 3% muscovite 1% biotite 4% <b>plagioclase</b> 1% opaque minerals – in clusters 25% lithic fragments
<b>Rock type</b>	(feldspathic lithic arenite/wacke)

<b>Sample</b>	<b>Thinsection 14 – HST 145.3</b>
<b>Sphericity</b>	Low to high
<b>Angularity</b>	Sub-rounded
<b>Sedimentary features</b>	More rounded towards the top – bioclasts – lots of darker clasts under normal light Very elongated angular clasts do occur
<b>Picture</b>	Thinsection 14 – 14.1
<b>Porosity</b>	Very low
<b>Matrix</b>	± 5% matrix and grains consisting of matrix - Arenite (Tucker, 2001)
<b>Content</b>	40% quartz 5% halite 5% opaque 1% muscovite/biotite 1% <b>albite</b> 1% calcite 40% lithic fragments
<b>Rock type</b>	(litharenite)

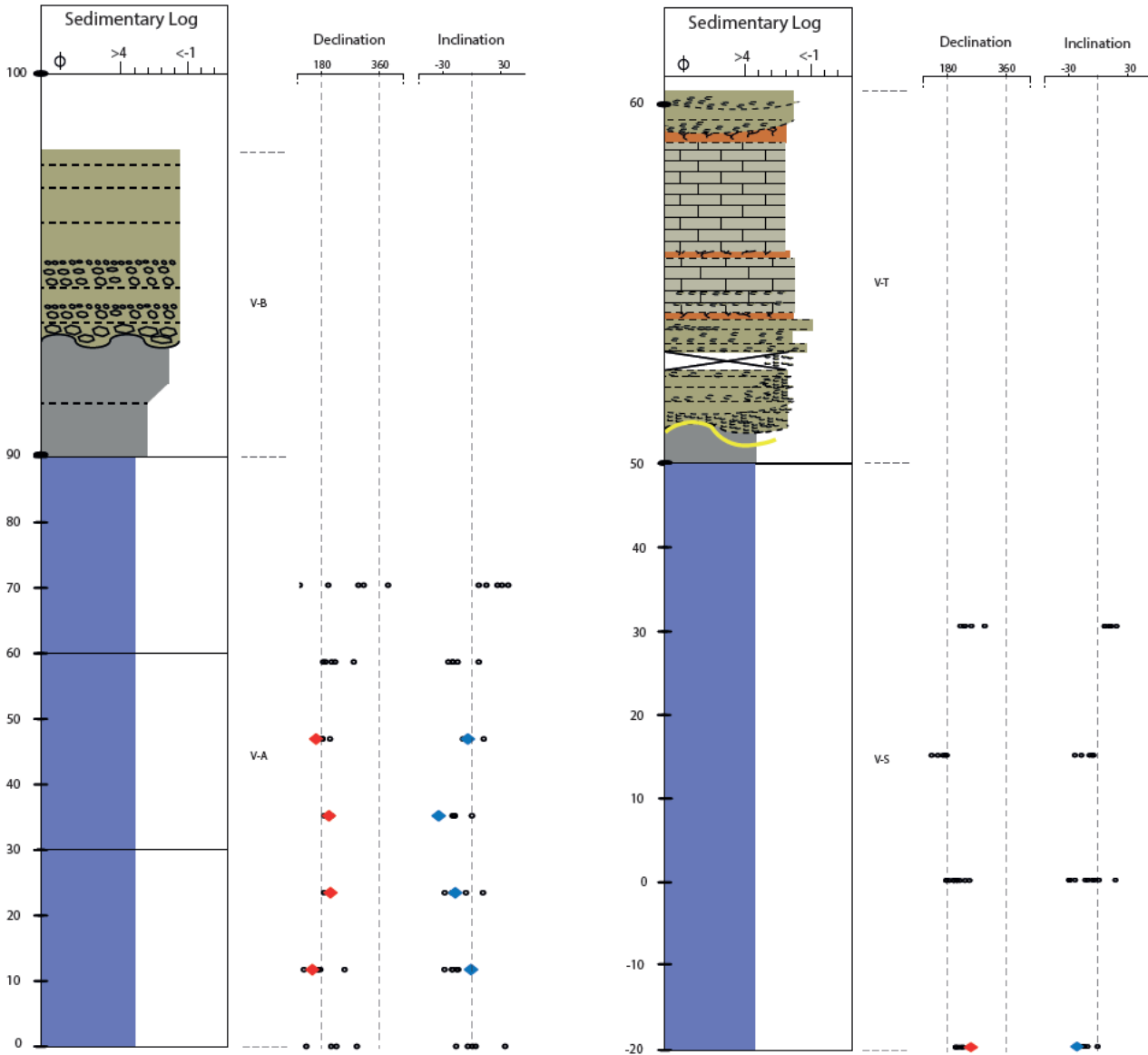
#### APPENDIX 5 Results of the interpreted thin-sections under the microscope.



**Legend**

- Normal Polarity
- Reversed Polarity
- Polarity Unknown
- Proper signal - Declination
- Proper signal - Inclination
- Poor signal

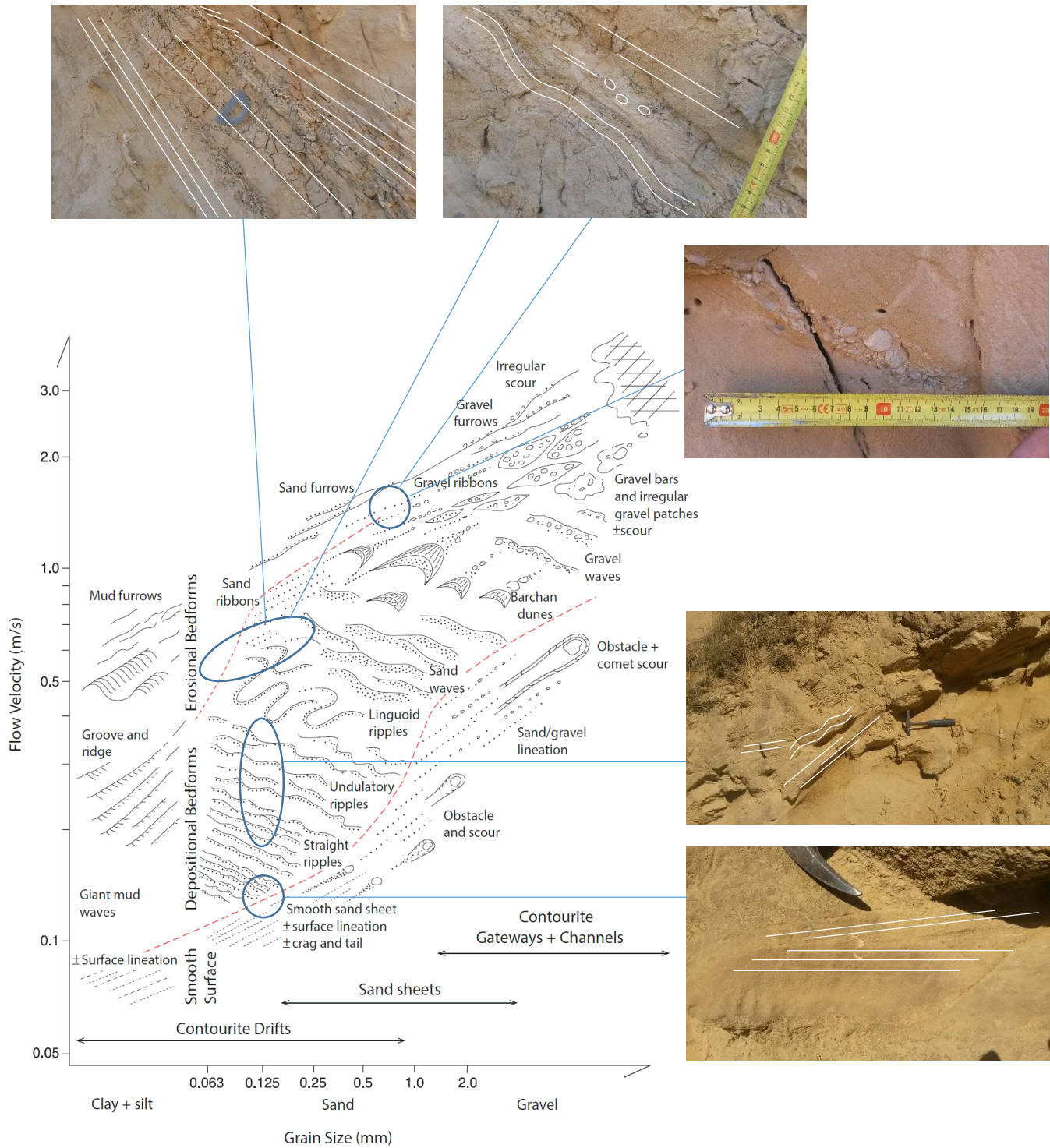
**APPENDIX 6.1** Magnetostratigraphic results concerning the declination and inclination of both Jebel Haricha sections. (Left) results of section JH-S, (right) results of section JH-N.



**Legend**

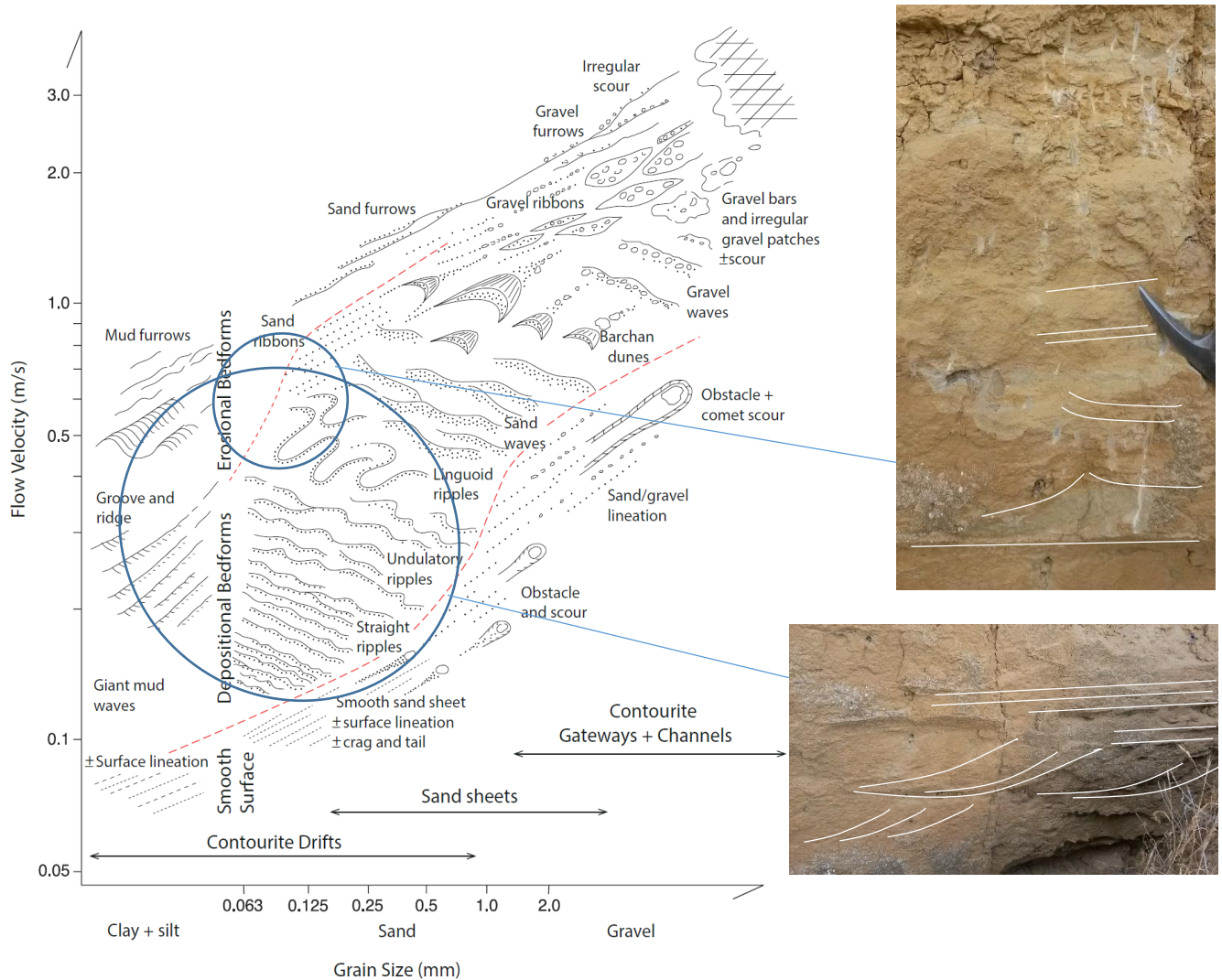
- Normal Polarity
- Reversed Polarity
- Polarity Unknown
- Proper signal - Declination
- Proper signal - Inclination
- Poor signal

**APPENDIX 6.2** Magnetostratigraphic results concerning the declination and inclination of both sampled Mahouma sections. (Left) results of section M-NW, (right) results of section M-SW.



**APPENDIX 7.1** Indication of palae-current velocities related to bottom currents in the Jebel Haricha North section (JH-N) obtained from bedforms and grain sizes. Source of diagram: *Rebesco et al. (2014)*. Bottom current velocities range from 0.1 to approximately 1.5  $\text{ms}^{-1}$ , note however that higher velocities might have occurred. Higher velocities combined with the grain-sizes present however most likely led to the formation of erosional surfaces.





**APPENDIX 7.2** Indication of palaeo-current velocities related to bottom currents in the Mahdouma south-east section (M-SE) obtained from bedforms and grain sizes. Source of diagram: *Rebesco et al. (2014)*. Bottom current velocities range from 0.1 to approximately 1.0  $\text{ms}^{-1}$ , note however that higher velocities might have occurred. Higher velocities combined with the grain-sizes present however most likely led to the formation of erosional surfaces. Erosional surfaces were only noticed as channel-like incisions, major erosional surfaces were not encountered in this section.

**APPENDIX 8** Sedimentary log sheets - for the stratigraphic location of the individual log sheets I refer to Appendix 6.1 (Jebel Haricha composite section) and to Appendix 6.2 (Mahdouma sections).

*Note: logs sheets have been produced starting at the lowermost point of the stratigraphic unit, working our way towards the upper part of the stratigraphy, appendices are shown in the same order.*

JEBEL HARICHA SOUTH – LOG HA 1

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section						Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	φ	Moisture	Color	Grain Size	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.		
												<p>PORE SANDY UNIFORM</p> <p>2 ROLLING MARKS</p>	
		H-AB21										<p>LESS FEATURES IN TOP - SHALL SLACK</p> <p>4-10% IN SPACING UNIFORM</p>	
		W2100-4 H-AT13.1 AG22.1						DRY SW				<p>SACK STUFF GETS LARGER + MORE</p> <p>FIN JANE + COARSE BOTTOM</p> <p>SILTSTONE - GREY AND BELLIED</p> <p>ON LAYERS. AGAIN BUT MORE</p> <p>BLACK ONT STAINI - W/100-3</p> <p>LAMINATED - PICT M</p>	
		H-AB23 AG23						DRY SW				<p>38 → 290 NW</p>	
												<p>LIGHT GREY, QUITE A LOT OF</p> <p>W/100 SURROUNDING</p>	
												<p>APPEARS SAME AS # 2 H</p> <p>DRYER Silt LAYER, LESS O/W/100</p> <p>CORTING</p>	
		H-AB26											
		H-AB28.3											
		H-AG14 H-AG10 AG10										<p>PORE SILENTLY RECALIBR</p> <p>PORE SUCCLASTIC EXHIBIT, ALSO</p> <p>SLIGHTLY COARSE</p> <p>+ APPAR. SOLIDIFIED WITH FIN</p> <p>CORTING BOTTOMS</p> <p>HORIZONTAL</p>	
												<p>PORE LIGHTEN AFTER EXPOSURE</p> <p>NEARLY TO THE BOTTOM</p>	
												<p>VERTICAL EXPURE, QUARTZ + GRAIN FN</p> <p>NOT COARSE INSIDE BUT OUTSIDE</p> <p>COARSE? INSIDE LAYER DARK +</p> <p>PORE CLAY ONT</p>	
		H-AB2.2										<p>ALSO HEAVY GREY AND DARK BERRY</p> <p>DARK BERRY INSIDE CLAY</p> <p>UP TO 1CM O/W/100 OUTSIDE</p>	
												<p>ORANGE MODULES</p> <p>BUT INDICATED TOP POORLY SORTED</p> <p>BLACKTON + SIVALLIS SHELL</p>	
												<p>ROUNDED QUARTZ CONJUNCT, SILENT</p> <p>+ 3% HEAVY SLACK</p>	
												<p>DARK CLAY + SILENT</p> <p>ORANGE + PURPLE SHELL WHITE &amp; W/100</p> <p>(BLACK)</p> <p>WHITE POORLY EXPOSED ↓ H/100</p>	
		H-AB4										<p>ALL SW ACCRETION IN V. SAND</p> <p>SHELL SORTED, BLACK CLAYS BRIGHT</p> <p>SILT ANGULAR, SPHERIC</p>	
												<p>SAME AS BELOW</p> <p>38 → 310 NW</p>	
		W309-01 TAL3 AG1.8 HAB1 AG1										<p>FIN SAND, COARSE COARSE</p> <p>PORE HEAVY MATERIALS TOWARD</p> <p>TOP 2-4-10% SLOWLY MATRIX</p> <p>CLAY BLANK 7% QUARTZ</p>	

JEBEL HARICHA SOUTH – LOG HA 2

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section		Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.		
		H-AB50.4 AG 39.4	50					ALTERATION OF LIGHT GREY SILTS AND CLAYS. 3 PETER CLAY RICH CLAYSTONE UP TO 33.0m	
	M1620	H-AG48.7						LESS PLYWOOD + PYRITE CON	
		H-AB47.7						NOTIFICATION # 2.1m DEEPER INCLINATED TO THE BED.	
		H-AB44.5	45					MORE SANDY LAYER + DISPERSED	
		H-AB43.8						DARK GREY	
	M1521	H-AG41						39° → 200mm MAX GRASSHOPPER MARKS SILT + FEW WELL SORTED PYRITE SAND - LESS BLACK HEAVY BLACK SPOTS STILL ELONGATE SAND WATER NO CHANGE BUT + FINE SAND + PYRITE ITALY SHELL FRAGMENT, LOW CLAY COAT CARB. COATING AROUND GRAIN	4.95cm RADIOLARIA CLAY SAND
		H-AB39.5 AG 37.5	40					SILT + FEW WELL SORTED PYRITE SAND - LESS BLACK HEAVY DARK GREY, MORE CLAY PYRITE RASPBERRY + BIOTITE	
		H-AB37.1						LIGHT GREY LAYERS MIGHT BE GETTING SLIGHTLY COARSER → NOT  HARDER LAYERS	
		H-AB34	35					0.5cm + 1.0cm IN SITU? AS USUAL, COARSER, LIGHTER GREY SAME SIZE, LESS CLAY CONTENT	
					33° → 300m	34° → 290m 35° → 260m		ANGULAR UP → SAND NORMAL BOTTLE AS USUAL BLACK LAYERS COARSE + FINE SAND FL STRONG WITH FINE SAND	
					360°			AGAIN DOUBLY SORTED UP → 30° → 210mm BLACK GRAIN INCREASE	
								POSSIBLY FAULTED AREA, SMALL OFFSETS POSSIBLY CONTAINING SILTSTONE → FOR CLAY + APPARENT USUAL SILT.	
	M1621	H-AG39.9	30					BIOTITE # 4cm DIAMETER	
	M1622	H-AB39 AG 29						2cm BLACK INSIDE 10cm ID OF 1cm CONCENTRATED THROUGH SILICIFICATION GREENISH, LESS SILT MORE CLAY	
		H-AB26						RISING LEWARD COARSEST MORE SANDY SILT DIFFERENT PARTS OF SAME CLAY	78



JEBEL HARICHA SOUTH – LOG HA 3

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section						Structures		Additional Description	Fossil Cont.
			Relief	Compos. Texture	ψ	Mudstone Siltstone Shale Sandstone Limestone Gypsum Evaporite	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.			
	M2509 01 M17.05 1609	H-AB76.7									GREENISH SILTSTONE, ORGANIC COLOUR, SHELL REMAINS + BODIES 5% SEE PHOTOS.	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
		H-AB73.0									HIGH CLAY CONT. > 5% BLACK MARSHALS (MAY BE CALLED TO BODIES); DARK SILTSTONE; MINOR CONTACTING TUBICULATING	
	M12.00										SHELL FRAG. > 5%, > 5 MM DARK GREY SILT, MUDRY CLAY HEAVY SOME GREEN BODIES OR MS. OF BODIES.	8
		H-AG69.4 H-AB69 AG69									COARSELY TANN. > 1MM SHELL REMAINS LIGHT GREY SILTSTONE, SOME HEAVY MINERALS	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
		H-AB65.7									INTERNAL (FS) WELL EXPOSED, SOME MDS MIGHT BE OVERLOOKED	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
		H-AB63.4									40% → 21% NH POSSIBLE MISSED IN CLAY CONT	
											WELL SORTED, MICAS → SPALLS, BLACK SILTSTONE 40 TO 2 CM	
											→ DARK SORTED & WHITE BLACK CONFORMING, CHANGE → WHITE MASSES IN SOME DIRECTIONS 3 CM DARK BROWN OR LIGHT SILTSTONE	
											LIGHT GREY SILTSTONE	
											MORE BLACK MINERALS, GREENISH ORANGE WHITE MINERALS, LAMINATED	
											HOODNALLY SORTED, DARK GREY SILTSTONE	
											> 1% BLACK MARSHALS	
											SHALE + SHELLS → PICT	8
											MICAS + 0.5 MM BLACK SLATS, BASOL? → 40% → 50% SILTSTONE	
	M13.17 249	H-AT61 H-AG61 H-AB60.5 AG60.5									LEAVES WITH FINE DARK SAND, PROLONG CONTACTING, LIGHT MINERALS	
											BLACK HEAVY BODIED MINERALS, LIGHT WHITE SILTSTONE WITH HEAVY MINERALS	
											VERY FINE → SALT, WHITE SANDS, CONTACTING LOW HEAVY MINERALS, CONTACTING SILTY HEAVY MINERALS	
											5% HEAVY MINERALS, SILTY SHELLS, UNBODIED GABERS, BODIES WITH HEAVY MINERALS SILTSTONE 0.5 CM	
	M14.75 M15.00 M16.00	H-AB56.7									SHELL REMAINS UP TO 1.5 MM AND 1 MM BLACK SLATY CLAY, HEAVY GREENISH ORANGE DARKLY SORTED SILT SLIGHTLY MORE HEAVY MINERALS + MICAS	8
		H-AB54.5									DARK GREY DISORDERED LITHOL. HEAVY MINERAL CONTACT AND WHITE QUARTZ WELL SORTED	

JEBEL HARICHA SOUTH – LOG HA 4

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section				Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture		Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.			
		H-AB103.5 -								MARLS	
		H-AB100.5 - AG100.5	100								
		H-AB99.7 -									
		H-AB94.7 -	95								
		H-AB91.5 -	90								
		H-AB88.5 - AG88.5								RUSALVE SHELL SEMI MORTAT 2 CM	
		H-AB85.5 -	85								
		H-AB82.7 -									
		H-AB79.3 - AG79.7									

DECREASING RESOLUTIONS → EVERY 5M













JEBEL HARICHA SOUTH – LOG HC 2




Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section				Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	φ	Min. grain size Max. grain size Grain shape Grain orientation Grain texture	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.		
		HC8(?) HCG 47.7 1-3909 05/06								LOW ANGLE CROSS BEDDING / PARALLEL LAM + BOTHR	
		HC8 44.5 HCG 44.5 HCG 44 TOP + BOT	95					019.5		IRON CONCRETION TOP + BOTTLER 1-2.5 CM, CROSS BEDDED - 60° AT TOP GREY OUTCROP	
		HC8 41.5 1-3910 03/06								WIDE TOWARD DISTANCE CLAY TOP CONCRETE LAYER, FINING UPWARD ORANGE SANDS STILL POORLY SORTED	
		HC8 41.5 1-3910 02	40					081.4		IRON CONCRETION AT BOTTOM (60°) RED BELL LAMINATION / CONCRETE OR CROSS BEDDING? / PARALLEL LAMINATION	
		HC8 38 1-3909 02						015.4		SAME AS BELOW GREENING TOPPED / SALT FRAGILE LAMINATED - CONCRETE FRAGILE TO FINE GRAINED 2.5 CM OR THERE BOTTLER CONTAINS 1 CM SALT - 5 CM KIND AND SOME HARD NO CRASSSED UNITS, PARALLEL NO BOTTLER FLOW DIRECTION MEASURED PERPENDICULAR TO PICTURE 015, DIP 30° - 20° NW	
		HC8 38								ACCRETIONARY OUTCROPS AND FRAS	
		HC8 35 HCG 35	35								
		HC8 32 1-3908 01								IRON OXIDE, BRONZE BOTTOM ADDITIONS WIDE ORANGE SANDS, CARE SORTED STONES	
		HC8 28.5 1-3907 01	30							CONCRETE LAYER, MIDDLE LAYER SLIGHTLY SPACED CONCRETE - PARALLEL, MULTIPLE HOT RANGE TRAILING SOUTH	✓ LACK BOTTLER
		HC8 26.5 1-3906 01	35					010.5		IRON CONCRETE LAYER FRAGILE TO FINE GRAINED - PARALLEL LAMINATION + SPACED IRON OXIDE TOPPED WATER SOAKED ORANGE & CONCRETE MULTIPLE DIRECTIONAL	
										3H TO MUCH PROBABLY!	



JEBEL HARICHA SOUTH – LOG HC 3

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section							Structures			Additional Description	Fossil Cont.	
			Relief	Compos. Texture	$\phi$	Micro-structures				Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.			
						Mud-cracks	Rooting	Stress cracks	Block faces						Crash cracks
			65												
			60												
		HC8 535	55												
														TOP IRON WITH FEW PARALLEL ERODED SURFACES OF THE STRUCTURES	
		HC8 505												TOP IRON CONCRETIONS - BIG LUS - LOWEST PART CONTAIN LARGE NIP	

JEBEL HARICHA NORTH – LOG R 1

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section				Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	ⓐ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓑ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓒ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓓ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓔ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓕ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small> ⓖ <small>More than 4</small> <small>4</small> <small>3</small> <small>2</small> <small>1</small>	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.			
		HRB 28.5	25							HRB 28.5 + HRG 29.5	
		HRB 20.5 HRG 19.5	20							VERY DARK GREY MARL	☞ SAME AS BEFORE 1 CM 
		HRB 17.5									
		HRG 14.5	15								
		HRG 10 HRG 10	10							BLEISH GREY MARL WITH SMALL SHELLS + CLSTN	8
W3009 -02		HRB 6.5								LIGHTER GREY, MICELLITONE CLAY MATRIX + FEW SHELL REMNANTS	8
		HRB 3.7	5							DARK GREY BLEISH MARLY SLT SOME SHELL REMAINS + BIVALVE SAME AS BELOW	8 
W3007 -01*		HRB 01 HRG 01								BROWNISH GREY AND DARK BLUE MARLY SLTSTONE WITH LARGE FOSSILS, HIGH CONCENTRATION	8 8 

BY 20507 - S 64159

JEBEL HARICHA NORTH – LOG R 2

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section			Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	①	Transport Direct	Sedimentary/Diagenetic Structures	Bio-turb.		
									R 150m 5-8 in S-section	
									HRB 99 102 107.5 = 104.5	
									136 141 145.5 149.5	
		HRB 35.5								
		HRB 31.5								
		HRB 23.5 HRB 29.5								
		HRB 24.5								


JOB: JEBEL HARICHA



JEBEL HARICHA NORTH - LOG S 1

Stratigraphic Units	Photographs	Coretop Data & Samples	Columnar Section						Structures			Additional Description	Fossil Cont.		
			Relief	Compos. Texture	Φ	Min. Stone	St. Stone	St. Stone	St. Stone	St. Stone	St. Stone			St. Stone	Transport Direct.
W0220-04/06		HSB-25	25											IRON CONCRET + 7% LF VERY FINE GRAINS, APPARENT BOTTOM FAIRLY PARALLEL LAMINATED TOP FINELY SPOTTED, BLACK GRAINS 2% 3-5% 10" COH DUCT LARGE HORIZONTAL TUBE 10CM DIAM INDICATED CASE CEMENTATION - BOTTOM 10CM LOTS OF SMALL MUSCOVITE	
		<del>HSB-22</del>													
		HSB-22												15CM TOP + BOTTOM, WHITEBLS 2 MORE INDICATED, MORE COAR CEMENTED GREY SLTSTONE, CLUMBED AND SHELL REMAIN 0.5CM MAX  GREY SLTST, AS USUAL NOT INDICATED	8 8
		HSB-19 HSG-19	20												
		HSB-18,5 HSG-18,5												SANDS HAVE NOT CHANGED MUCH LACK OF CEMENTS HAVE FLASHLIGHT HARD	
		HSB-16												4% BLACK CLASTS AND SHELL REMAINS SMALLER, SMALLER LIGHT GREY SLTSTONE	8
		HSB-13	15											TOP 15CM CONCRETIONS COMPOSITE? 3 LAYERS, BOTTOM THIN COARSEST? 4.5-3.0 MM  + THIN 0.5 CM SAND	
		HSB-10	10											LAMINATED CRYSTALLINE 5 CM BOTTOM + IRON  SILT TOPS + SILT LAYER ON TOP SPECKLE COALS OF IRON RICH AND BLACK CLAST SEE PICT	
W0230-03		HSB-7	05											IRON CONCRETIONS OUT TO 5 CM HORIZONTAL LATE BOTTOM SILT LAY COARSE, SPREADS WELL SORTED, MANY CHIR COAL, NO BLACK CLASTS  8% BLACK CLASTS + FISH FISH 4MM POSSIBLY LAMINATED, HARDLY VISIBLE DUE TO LOW REPRESENTATION	
W0190-02		MRM-1 HSM-5	5											FINE + SILT RICH GRAINS ENRICHED? 15% TAN BLACK GRAINS COMPOSITE SILT LAYER HARD + VF SAND BOTTOM BROWN SORTED, LARGE GRAIN	
		HSB-4												COMPOSITE, BOTTOM 15CM SILT + IRON RICH FEAT INDICATED  GREY SILT SILTY TOPS COARSE, FINE GRAINS SILT BIOTURBS, DEFINITE BOUND COARSE + MUD AND SANDS RICH COMPOSITE, 3 LAYERS + TOP SILT	TO FINE
		HSB-1												BIOTURBS, VERTICAL 0.5 CM 2% BLACK CLASTS, GREY SILT UP TO 0.5CM SMALL BOUND POSSIBLY HORIZONTAL  POSSIBLY BIOTURB. TOP SLIGHTLY COARSE + TOP POSSIBLY HORIZONTAL CHANGE UP TO FINEST PARTS - 2 TO 3 CM	8
W0210-01		HSG-0 (MUD)												34.28597, -5.64270	

JEBEL HARICHA NORTH – LOG S 2

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section						Structures			Additional Description	Fossil Cont.		
			Relief	Compos. Texture	$\rho$	Min. void space	Blockiness	Dark spots	Dark voids	Coarse pores	Recessed pores			Transport Direct.	Sedimentary/Diagenetic Structures
		HS6+HSB 50,5													
		HSB 48											COMPOSITE COMPOSITE - MORE GRAINE + PARALLEL BOTTOM		
		HSB 45											MORE GRAINE, NO STRICT LENSES		
		HSB 41											BROWNISH COMPOSITE WITHOUT GRAINE		
		HS6 39,1 HS6 39 HS6 38,2											K 2 IRON CONCRETIONS - LAMIN + MORE GRAINE		
		HSB 38,5													
		HSB 35,5											MORE MATURE LESS GRAINE, MORE BROWN LOW ANGLE PARALLEL + PARALLEL		
													DIAPYCNIC SURFACE PARALLEL + TROUGH SURFACE		
													10CM SURFACE		
													UNIFORM SANDING WITH PRESENT CHANNELS		
		HS6 37,5								045			ROUGH CONCRETIONS?		
		HS6+HSB 37,7								024			MIDDLE - PARALLEL TO LAMIN. L. COMPOSITE BOTTOM IRON + CONCRET.		
		FAULT											HORIZONTAL TUBE 1CM		
		HS6+HSB 31,1											DARK OPENING STILL MONOCRYSTALLINE WITH 30% OF 1 CM WHOLE GRAINE, + FLAG NET INITIAL, BLACK GRAINE		0.8
		HSB 28,5								050			IRON CONCRETIONS AT TOP 50% → 32% IRON-ENRICHED STRICT CHANNELS		
													2 X IRON CONCRETION COMPOSITE, LAMINATED BOTTOM ON HIGHLY DEVELOPED BLACK GRAINE 1%		

JEBEL HARICHA NORTH – LOG S 3

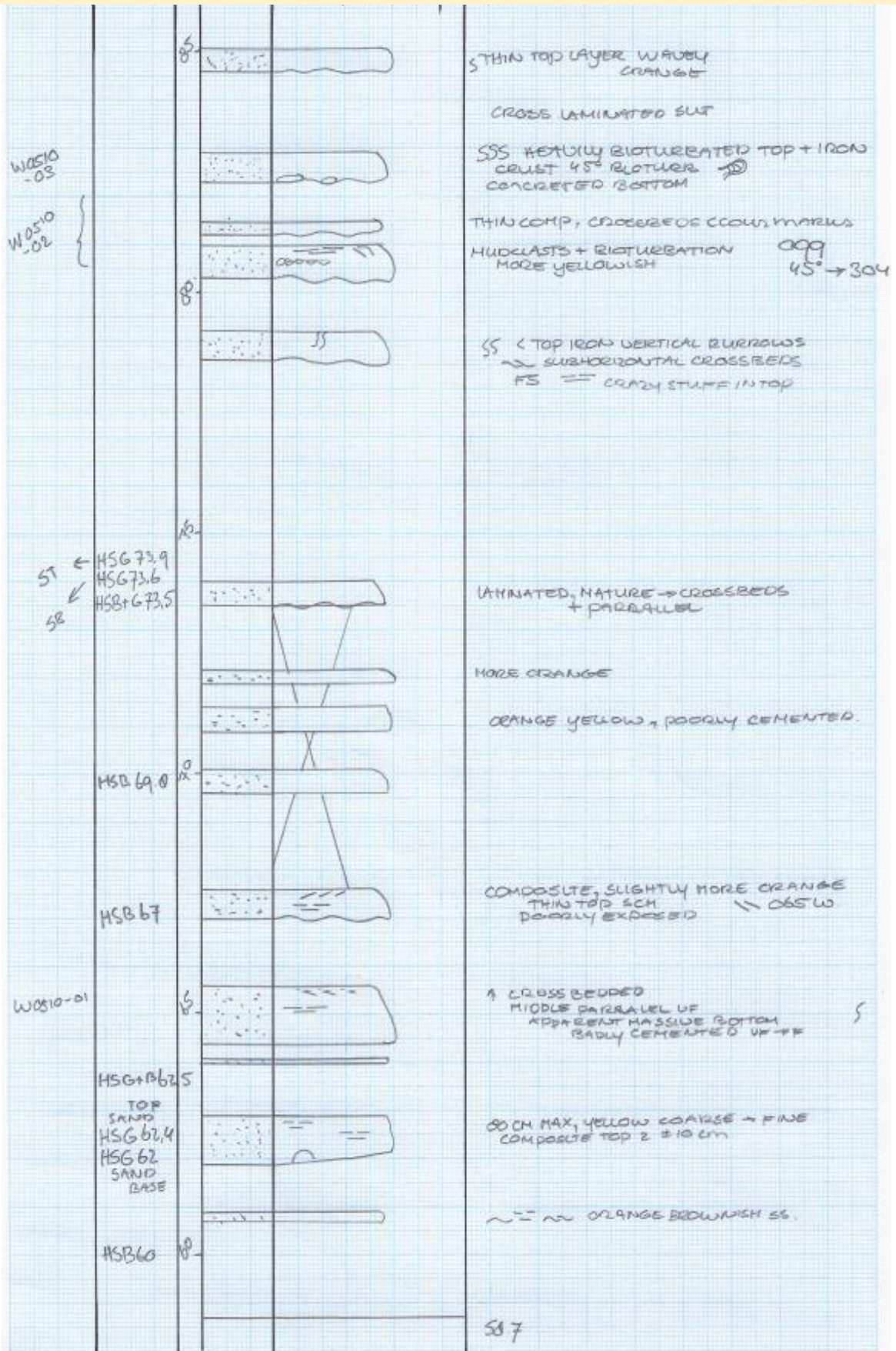
Stratigraphic Units	Photographs	Cutcrop Data & Samples	Columnar Section				Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	Φ	Min. stroke 2-4 Wide stroke 4-8 Fine stroke 8-12 Coarse stroke 12-16 Bound stroke	Transport Direct.	Sedimentary/Diagenetic Structures	Bio-turb.		
		HSG 73,9 HSG 73,6 HSB + HSB 73,5	75								
		HSB 69,8	70								
		HSB 67									
			65								
		HSG + HSB 63,5									
		HSG 62,4 HSG 62		Sand top Sandy base							
		HSB 60	60								
		HSB 57									
			55								
		HSB 53,5									
		HSB 53,1 HSB 50,8 HSB + HSG 50,5									

										MIDDLE SHORTWEIGHTED TEXTURE, DIMENSIONAL HUNDREDS
										TINY SLUTTING IN SOME PL.
										VERY COMPLEX
										MASSIVE TO TAKE MULTIPLE SAMPLES 25cm DIAMETER CAREFULLY INDICATED CONCISE BUT ORANGE BOTTOMS ASSEMBLY TOP INDICATIVE STRUCTURES
										BOTTOM BENTONITE, MUDCLAST MAX 1CM COMPOSITE SOFT LAYER SANDY, SLIGHTLY REDDISH/BROWN
										ORANGE, SANDSTONE - STILL VERY SANDY

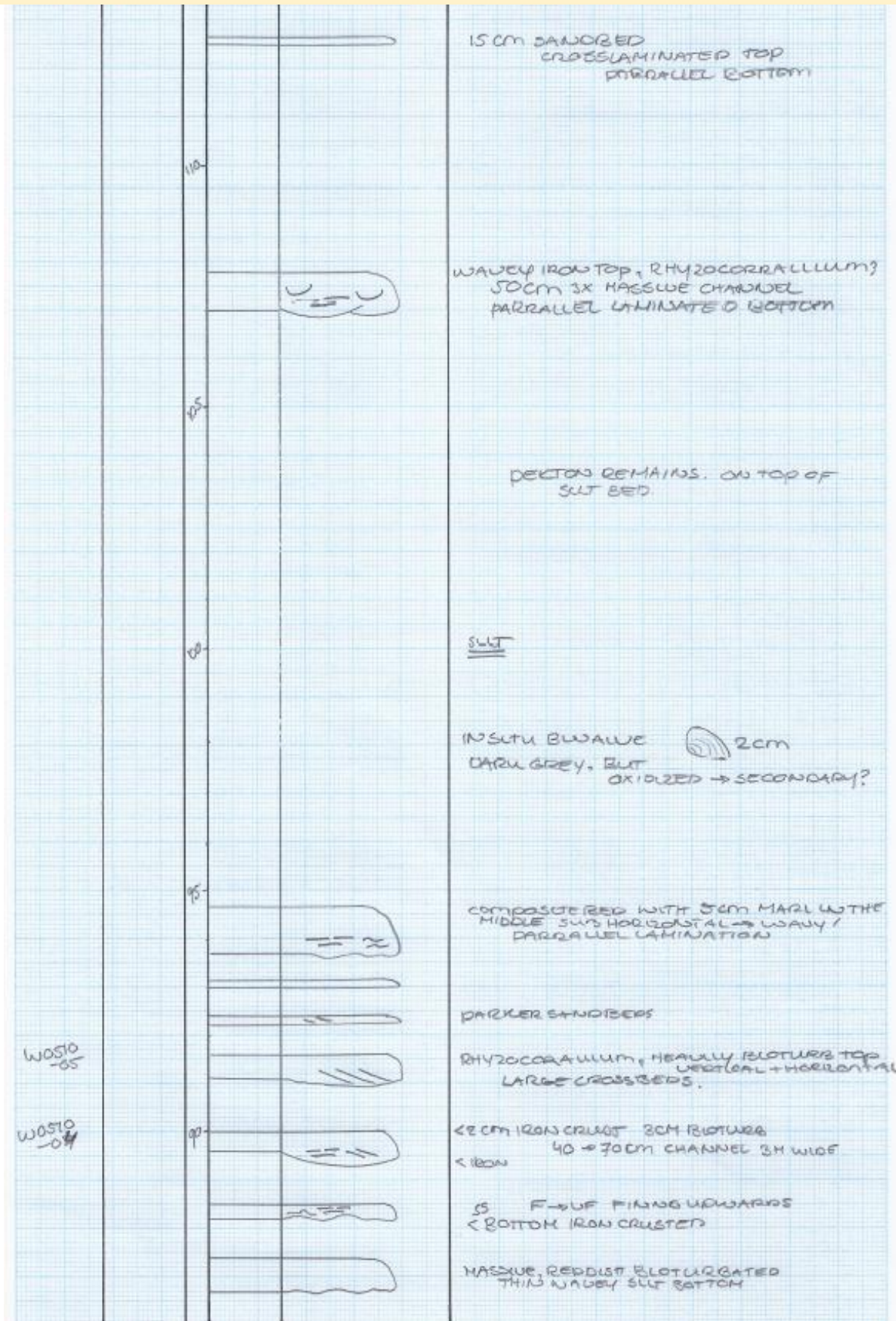


JEBEL HARICHA NORTH – LOG S 3.1

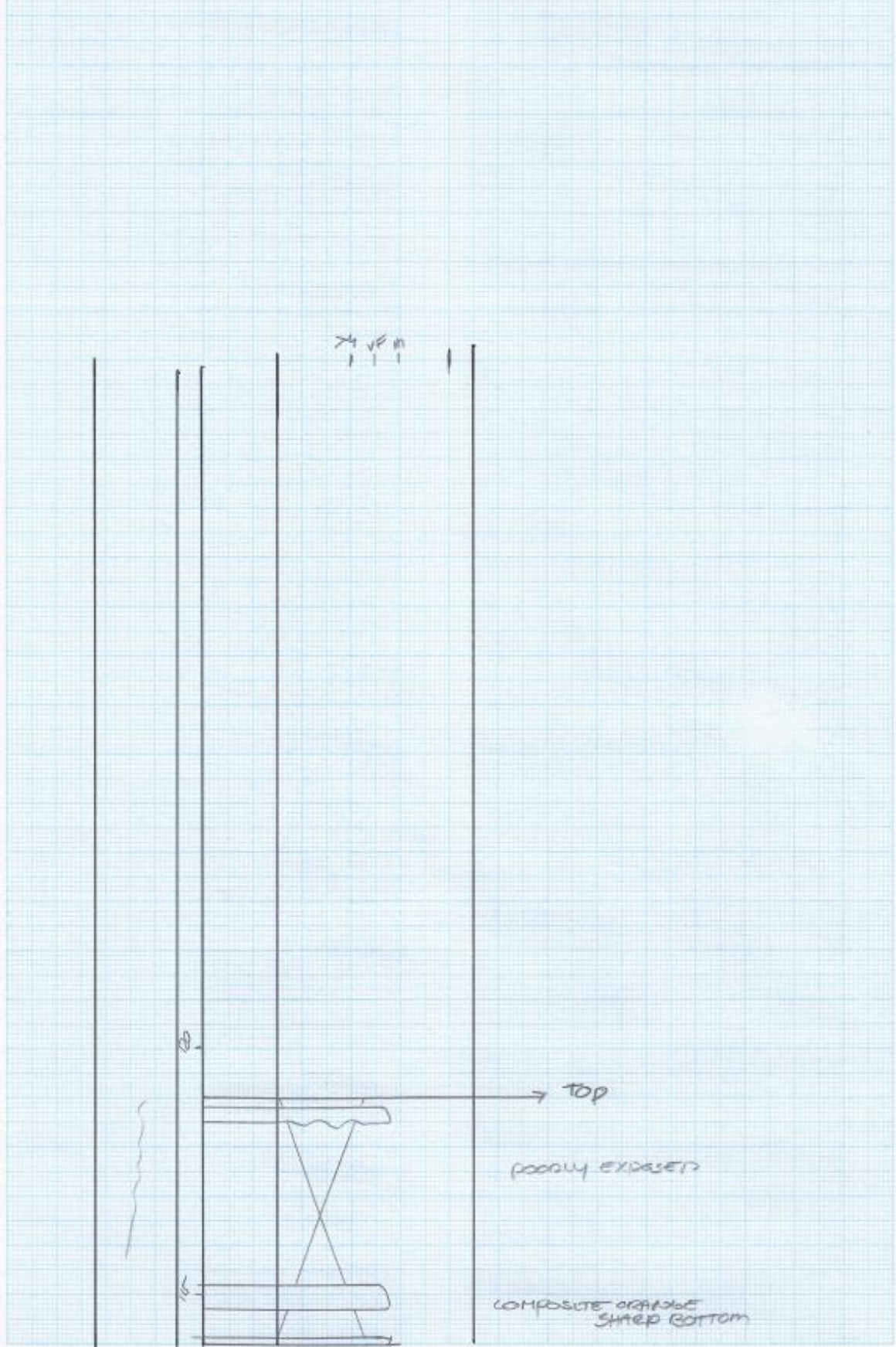




JEBEL HARICHA NORTH – LOG S 3.2



JEBEL HARICHA NORTH – LOG S 3.3















MAHDOUMA NORTH WEST – LOG VB

Stratigraphic Units	Photographs	Outcrop Data & Samples	Columnar Section				Structures			Additional Description	Fossil Cont.
			Relief	Compos. Texture	Φ	100% Limestone 90% Limestone 80% Limestone 70% Limestone 60% Limestone 50% Limestone 40% Limestone 30% Limestone 20% Limestone 10% Limestone 0% Limestone	Transport Dirct.	Sedimentary Diagenetic Structures	Bio-turb.		
			0								
		VBC 7.1	8	lime							
		VBC 6.9	7	cond?							
			6	lime							
			5	lime							
			4	lime							
		VBC 7.9	3	lime							
			2								
			1	lime							
			0								

more carbonate in comparison with layer below  
 (stone shire tubes)  
 no large clast lots of quartz grains biturbation tube forams corals with very small bioclasts - tubes

crossbedding fine upwards

less carbonate?  
 becomes better sorted but coarse clasts

bit decrease in diameter fine and an increase in tubes to 5%  
 small tubes and fine - no matrix clasts consist of sandstones and encrusts bottom marked by nodules up to 2cm  
 organic rich layers  
 upper 20cm may contain forams  
 crossbedding to the north  
 possible 7000' 10'

to the S  
 Siltstone become interbedded by pebbles, tubes and crossbedding  
 See VN  
 detail 17+8000'

15+270 W?  
 fine  
 Bedded columnar with fine trunks, both horizontal crossbedding up to 1.5m possibly in other direction but can not be measured possible biturbation tubes with grey fill

grey coloured with orange bands on 1.2 to 1.6 m and not all good bedding possible crossbedding to SW in 1.2 to 1.6 m forams, muschick up to 2.3 m

cluster 25



