

APPENDIX 1 - WATER COLUMN AND SEDIMENTARY ENVIRONMENT

1.6 Gravity Core: Analysis Requirements

NAMIBIAN MARINE PHOSPHATE

CORE ANALYSIS REQUIREMENTS

METHOD STATEMENT

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1 GRAVITY CORE ANALYSIS

1.1 PRE-ANALYSIS CHECKS

Throughout the different phases of analyses and the preparation for these, detailed log sheets should be kept.

The first task will be to determine whether or not all the listed cores (Table 1-1) are present in the freezer, and how many sections each one has been divided into.

Table 1-1: Log sheet for gravity core collection, for NMP trial

Sample #	Date /Time	Depth	Penet.	Sections	General Comments	
	26/03/2013					
2735	12:30	215	0.75	1	90 mm pipe Enviro : 3 m swell / no wind	no clay
2735	12:30	215	1.55	2	2 attempts	no clay
2736	12:55	215	0.73	1	90 mm pipe Enviro : 5 kts wind : 2 attempts	no clay
2737	13:53	215	2.11	2	90 mm pipe Enviro : 3,5 m swell / 5 kts wind	clay
2738	14:13	216	0.91	1	90 mm pipe Enviro : 3,5 m swell / 8 kts wind	no clay
2738	14:13	216	2.39	2	2 attempts	no clay
2739	14:48	215	2.74	3	90 mm pipe Enviro : 3,5 m swell / 8 kts wind	no clay
2740	15:03	216	2.18	2	90 mm pipe Enviro : 3,5 m swell / 8 kts wind: (Duplicate)	no clay
2741	15:20	215	2.19	2	90 mm pipe Enviro : 3,5 m swell / 8 kts wind	no clay
2742	15:54	215	2.4	2	90 mm pipe Enviro : 3,5 m swell / 10 kts wind	no clay
2743	16:27	215	2.4	2	90 mm pipe Enviro : 3,5 m swell / 15 kts wind	no clay
2744	17:05	215	1.1	1	90 mm pipe Enviro : 3,5 m swell / 18 kts wind	no clay
2745	17:22	215	2.4	2	90 mm pipe Enviro : 3,5 m swell / 18 kts wind	no clay
2746	17:45	216	2.35	2	90 mm pipe Enviro : 3,5 m swell / 18 kts wind : (Duplicate)	no clay

1.2 IDENTIFYING CORE SECTIONS

Next all sections of each of the cores will need to be placed into the correct order (according to depth).

The full length (i.e. all sections) of the two duplicated cores (2740 and 2746) can then be handed over to Mr P. Morant, CSIR Stellenbosch, and he will provide the detailed instructions for their analysis.

1.3 COLLECTING SUB-SAMPLES AT VARIOUS DEPTHS

The full length (all sections) of the remaining 10 cores must then be divided into sub-samples at various depths along each core. In the case of cores 2735 and 2738, where two attempts at obtaining the cores were made, the first attempt will not be analysed. This means that sections 2735 (T1) and 2738 (T1) will remain whole and won't be analysed.

Dividing the remaining sections into sub-samples will be done by first heating the outer core casing and then attempting to push out the core sample using a rod. As the sample extrudes from the opposite end of the core casing, the required sections will be broken off from the main core. All sub-samples need to be purged with liquid nitrogen to restrict oxygenation and placed as quickly as possible into pre-labelled transparent, sealable plastic bags and appropriately stored for analysis. If it proves difficult to extrude the sediment cores for sub-sectioning the alternative of cutting the entire core (including the outer casing) into 'biscuits' can be followed. Cutting should be with a pipe-cutter which should not penetrate into the sediment sample. For this, it may be helpful to mark the exterior core casing with the following sub-sectioning depth intervals, as they will continue across different length sections of the various cores:

For all cores, sub-samples from the following lengths will need to be collected:

1. 0 - 10 cm
2. 20 – 30 cm
3. 50 – 60 cm
4. 100 – 110 cm
5. 200- 210 cm, or if shorter than 200 cm, the bottom 10 cm of the core.

1.4 DESCRIBING SUB-SAMPLES

Each packaged sub-sample will then need to be photographed and a description of the sample must be recorded on the appropriate log sheet. Ensure a detailed label (Sub-sample ID) as well as an object (for scale) are both visible in all of these photographs. Notes on the classification of the sediment should also be made at this time, the broad texture gradings are: mud, sand, or gravel. The presence of shells/shell fragments should be noted; it is expected that the samples will comprise mainly muddy sand and shell fragments with the latter in the gravel size range. Any bioturbation (biological activity as indicated by, eg, worm tubes) present in the sub-samples should too be noted.

1.5 SEPARATING FOR FULL/PARTIAL ANALYSES

The sub-samples from all the cores will then need to be separated into those that require full analysis and those that require only partial analysis:

- Full Analysis is required for all sub-samples from cores: 2735, 2739, 2745
- Partial Analysis is required for all sub-samples from cores: 2736, 2737, 2738, 2741, 2742, 2743, 2744.

1.6 FULL ANALYSIS

Sub-samples will need to be prepared for analysis in the appropriate manner after which the following analyses will be carried out:

- Heavy metals including Cd, Hg, Al, As, Ba, Cr, Cu, Co, Fe, Mn, Ni, Pb, V, Zn)
- Acid volatile sulphide (AVS) and simultaneously extracted metals test (SEM)
- Total organic matter
- Total organic carbon
- Total N
- Particle size analysis (including the sub 63 µm fraction)
- Redox state

1.7 PARTIAL ANALYSIS

Sub-samples will need to be prepared for analysis in the appropriate manner after which the following analyses will be carried out:

- Acid volatile sulphide (AVS)
- Total organic matter
- Total organic carbon
- Total N
- Particle size analysis (including the sub 63 µm fraction)
- Redox state.