PROTOCOL DREDGE 11 29

Cruise No. SO 37	Stat. No. Equipm. 19 DS	Location III	Area I
Date 25.5.1985	Protocol written by : Sattler, Flemming		

Pinger on wire 300 m from dredge (chain bag)

	Time GMT	Latit. N	Longit. W	Water depth	Wire length	Tension (t)	Remarks
begin operation	23 47	15°39.78	170°23.69	1770	–	–	
begin lowering	23 48	-"-	-"-	-"-	–	–	
+1. bottom contact	00 20	15°39.80	170°23.60	1815	1880		
ganz wenig Fahrt aufgenommen	0 22	-"-	-"-	-"-	-"-		
Winde STOP	0 23	15°39.82	170°23.59	1812	2079	2.0	
Winde 20 m fieren	0 26	15°39.84	170°23.58	1823	2099	2.0	
Fahrt volle Kraft	0 29	-"-	-"-	1831	2099	2.0	
10 m fieren	0 30	-"-	-"-	1835	2109	2.0	
langsam hieven	0 33	15°39.88	170°23.46	1822	2109	2.0	
Winde STOP	0 35	-"-	-"-	-"-	2084	2.0	
20 m fieren	0 36	-"-	-"-	1834	2102	2.0	
20 m fieren	0 46	15°39.97	170°23.31	1812	2122	2.0	
20° nach Stb auf 80°	0 56	15°40.03	170°23.11	1763	2122	2.0	
20 m fieren	0 58	-"-	-"-	1772	2142	2.0	
20 m fieren	1 01	-"-	-"-	1746	2162	2.0	
	1 03	15°40.05	170°22.95	1734	2162	2.6	
20 m fieren	1 05	-"-	-"-	1715	2182	2.8	
	1 11	15°40.06	170°22.81	1690	2182	3.0	
	1 20	15°40.07	170°22.73	1680	2182	3.5	
	1 33	15°40.08	170°22.49	1605	2182	4.4	
	1 49	15°40.11	170°22.20	1542	2182	3.6	
Fahrt volle Kraft, langsam hieven	2 00	15°40.17	170°22.03	1483	2182	3.6	
begin heaving							
end heaving							
end operation							

+Corrected data 15°40.26' N 170°24.80' W

ship course ...80°..... calcul. mean water depth.....m

total time of bottom contact.....min ship velocity.....kts

bottom topography ..... length of dredge section .....m

Result

....kg Total ....kg Substrate

....kg Nodules ....kg Sediment

Pinger on wire 300 metres from dredge

	Time (GMT)	Lat N	Lon W	Water Depth	Wire Length	Tension
"in Operation	23:47	15°39'78"	170°23'69"	1776	—	—
Begin Lowering	23:49	—do—	—do—	—do—		
+/ bottom contact	00:20	15°39'80"	170°23'60"	1815	1880	
End Bottom Contact	03:10	15°41'26"	170°23'74"	1460	1450	2.0
Begin heaving	03:11	15°41.26	170°23'74"	1450	1400	—
End heaving	03:41	15°40'96"	170°23'65	1349	—	—

Ship course 80°

200kg total recovery; 65 kg crusts; 135 kg substrates

~0% talus (thick crust mainly on one side)

<1% nodules (including 1 pancake nodule)

max thickness ~8 cm
min. thickness ~3 mm
} avge ~2.5 cm

dominantly botryoidal (few % smooth)

2 generations (very thick old & thin younger) (some have 3)

20% have obvious encrusting fossils

2 photos

Substrates: hyaloclastite (Andesite)
Chalk / Phosphorite
Volcanogenic breccia
Andesite?

Rock Type:	Hornblende(?) Andesite(?) (Same as 18 DS1?)	Andesite(?) hyaloclastite / Breccia (Same as 17DS3?)	Andesite(?) Volcanogenic Breccia
Color:	Medium very similar brownish-gray (5YR5/1) Phyric	Light greenish-gray (5GY7/1)	Dark yellowish-brown (10YR4/2) mat + very pale orange (10YR8/2)
Texture:	Intergranular (directed)	pyroclastic	clastic
Phenocrysts:	Pyroxene (Augite?), ±10%, ±1 mm dia; Amphibole(?) (Hornblende(?)), ±5%, 1 mm dia; Plagioclase(?), ±5%, ≤1 mm dia	(Framework Grains): Andesite Hyaloclasts ~75%, ~2 mm dia; Aug.(?), Ubl.(?) crystals ±5%, ~2 mm dia; open space, ±5%; Andesite(?) clasts ±5%	Andesite(?) clasts ±30%, ≤1 mm; Trachyte(?) clasts ±5%, ±5 mm dia; Basalt(?) clasts ±5%, ±5 mm dia; phosphorite clasts ±5%, ±4 mm dia; Augite/Hornblende(?) crystals ±10%, ±1 mm
Groundmass:	(beyond resolution with handlens)	(cement): phillipsite(?), ±10%	dense phosphorite, ±45%
		(Average grain size) ±3 mm (range ≤1 mm – 1 cm)	±1 cm (range is enormous!) (range ≤1 mm – Boulder size)
Vesicles:	% ±40%	(Average grain shape) angular	Sub angular (but extremely variable - many subrounded, many angular)
	Size: ≤ 0.5 mm – 1 cm; ±1 mm (range)	(Sorting): moderately poorly sorted	Extremely poorly-sorted
	Shape: round (small) to elongate lensoid (large)	(Porosity): High	Low
	Filling: zeolites (phillipsite?) (~95% are amygdules)	(Permeability): moderately high	Very Low
Alteration:	moderate (Oxidation of mafics in groundmass, zeolitization?, smectitization?)	(Alteration): highly altered (zeolitization, smectitization of of hyaloclasts)	-do- (cement is totally altered to phosphorite, many matrix components appear to be smectitized, zeolitized, oxidized and/or less)
Comments:	Very similar in most ways to Andesite(?) dredged in 18DS – probably same magma batch; found included as clasts (generally pebble-to-cobble-size) in Volcanogenic breccia.	-do-, to 17DS3, probably from same origin, perhaps from same unit; similar in all ways except for amount of open space and development of phillipsite euhedra therein.	Very dense (as these substrates go), indurated, well-cemented breccia; has the greatest variety of component rock species and degrees of weathering of any rock type in the dredge; predominantly made up of andesite (19 DS1) fragments of vastly different sizes (other components older than the andesite(?)); many clasts are subrounded (subaerially exposed to water-working (wave-action?)) for some time before incorporation into slope-draping debris apron. Occurs both as outcrop and as loose talus, both covered, encrusted with thick 2 generation (older dense, laminated, younger porous, Fe-rich, dendritic), prominently botryoidal (surface topography) ferromanganese crust.

Rock Type:	Andesitic? Volcanogenic Breccia	→ -do-	→ -do-
Color:	Greenish-gray (5GY 6/1) (matrix) do	→ -do-	≠ pale brown (5YR 5/2), some greenish gray (matrix)
	very pale yellowish-orange (10YR 9/6) (cement)	→ -do-	→ -do-
Texture:	Clastic	→ -do-	→ -do-
Framework Grain:	Andesite clasts, ± 40%, ± 1.5 cm avg.	→ ± 20%.	→ -do- ± 25%, ± 2 cm avg. dia., but most are pale brown
	ferromanganese crust clasts, ± 5%, ± 1 cm avg.	-do-, but: 0%.	-do-, but ± 2%. manganese crusts ± 5 mm dia.
	phosphorite clasts, ± 40%, ± 1 mm avg.	→ < 5%.	→ < 1%.
	open space, ± 5%, ± 2 mm avg.	→ < 5%.	→ 0%.
Cement:	Phosphorized chalk, ± 10%	→ -do-, but 75%	→ -do-
Average grain size:	± 0.5 cm (range ± 1 mm – 2 cm)	± 4 mm (range: ≤ 1 mm – 2 cm	± 1.5 cm (matrix) ≠ ± 0.2 mm (cement)
Average grain shape:	subangular	≠ Subrounded	≠ subangular (many are angular)
Sorting:	very poor	→ -do-	→ extremely poor
Porosity:	Extremely High	→ -do-	→ Very High
Permeability:	Very high.	≠ Moderately High	≠ Very High
Alteration:	penultimate (smectitization, phosphorization, zeolitization of matrix, phosphorization of cement)	-do-, also oxidation of matrix ferromagnesians in andesite(?)	-do-, but somewhat less so
Remarks:	occurs as very loosely-cemented, very altered outcrop also as manganese encrusted loose talus (encrustation is like that of previous sample), all material is densely coated, or penetrated by remobilized Mn- & Fe-oxyhydroxides	-do- but much greater Cement : Grain ratio, much more tightly cemented; usually occurs as outcrop material. Components appear to have been weathered subaerially (rounded as by wave action on beach); less penetrated by remobilized Mn & Fe Oxyhydroxides; no ferromanganese crust interlayers	-do-, but clasts often much larger, were becoming nucleii for formation of ferromanganese nodules: each has ± 2 mm-thick dendritic encrustation.

Rock Type: Chalk / Phosphorite

Color: very pale yellowish-orange (10YR 9/6)

Texture: granular

Matrix: foraminiferal tests, ± 95%,
ferromanganese micronodules, dendrites ± 5%

Cement: dissolved, recrystallized calcite, apatite %. not determined

Average grain size: ≤ 0.20 mm
(range: ≤ 0.10 mm — 1.0 mm)

Average grain shape: round

Sorting: well-sorted

Porosity: Extremely high

Permeability: High

Alteration: advanced (phosphorization of calcite foram tests

Remarks: forms capping deposit several cm thick on top of other substrate rock types; appears massive, unstratified; very porous, sometimes, but not abundantly, cavernous due to worm/crawling burrows; colored by remobilized Fe & Mn oxide deposits; generally an outcrop rock, not a talus rock; serves as substrate for MnO_2 deposits of varying thickness, dendritic internally, smooth, subdued dendritic surface topography.