PROTOCOL DREDGE 42

Cruise No. SO 37	Stat. No. Equipm. 29 DKS	Location 3	Area I
Date 27.5 1985	Protocol written by : Commeau / Heinz		

Pinger on wire 300 m from dredge cl Hein

	Time GMT	Latit. N	Longit. W	Water depth	Wire length	Tension (t)	Remarks
begin operation	05.22	15°39.04	170°23.70	1535	-	-	
begin lowering	05.25	-"-	-"-	-"-	-	0.2	
1. bottom contact	0618	15°39.24	170°23.43	1186	1840	2.0	
Ship Moving forward	0557	15°39.21	170°23.72	1549	1496	1.2	
	0623	15°39.24	170°23.38	1148	1860	2.6	
	0626	15°39.24	170°23.37	1138	1860	2.8	
	0628	15°39.24	170°23.36	1134	1859	4.7	
begin heaving	0629	15°39.24	170°23.36	1134	1859	5.0	
	0637	15°39.21	170°23.47	1145	1806	5.5	
	0639	15°39.21	170°23.49	1144	1789	6.8	
	0648	15°39.20	170°23.51	1121	1718	2.6	
Sampling from	0650	15°39.20	170°23.51	1131	1704	3.1	
~ 1400 - 1200 m	0658	15°39.19	170°23.52	1134	1647	3.8	
	0700	15°39.19	170°23.52	1125	1630	4.3	
	0701	15°39.19	170°23.52	1125	1609	5.8	
	0702	15°39.19	170°23.52	1125	1594	6.8	
	0704	15°39.19	170°23.52	1125	1555	6.0	
	0709	15°39.19	170°23.50	1122	1416	7.2	
	0713	15°39.19	170°23.48	1124	1359	8.1	
	0714	15°39.19	170°23.47	1125	1330	3.2	
	0715	15°39.19	170°23.47	1128	1297	4.7	
	0718	15°39.19	170°23.46	1121	1230	2.1	
End Bottom Contact	0719	15°39.18	170°23.45	1122	1180	1.8	
begin heaving	0634	15°39.23	170°23.42	1137	1849	4.7	
end heaving	07.44	15°39.21	170°23.33	1157	-	-	
end operation	07.51	-"-	-"-	-"-	-	-	

*Corrected data 15° 39.46' 170° 23.11

ship course ...080°... calcul. mean water depth ~1300 m

total time of bottom contact 61 min ship velocity ~1.5 kts

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

Result

80 ....kg Total

....kg Nodules

50 ....kg Substrate

....kg Sediment

Pinger on wire 300m from dredge

	Time (GMT)	Lat. N	Lon. W	Water Depth	Wire length	Tension
Begin operation	05:22	15°39'07"	170°23'70"	1535	—	—
Begin Lowering	05:25	-do-	-do-	-do-	—	0.2
+1 bottom contact	06:10	15°39'24"	170°23'43"	1186	1840	2.0
End bottom contact	07:19	15°39'18"	170°23'45"	1122	1180	1.8
Begin Heaving	0634	15°39'23"	170°23'42"	1137	1849	4.7
End Heaving	07:44	15°33'21"	170°23'33"	1157	—	—
End operation	07:57	-do-	-do-	-do-	-do-	

Ship course 080°T

total time of bottom contact 61 min.

Sampling from ~ 1400 – 1200 m

Calc. mean water depth 1300 m

Ship veloc. ~ 1.5 kts

Bottom topography: Slope

kg total 50 kg substrates

30 kg crusts

no nodules

~95% broken from outcrop

features:

Thickest crust – ~4 cm
Thinnest crust – ~2 mm } avge ~2 cm

2–3 generations; older 2 are dense, laminar; lowest one (~1 cm thick) separat. by thin, discontinuous phosphorite band; upper (~5 mm thick) separated from upper (youngest) by thin, inobvious Fe-oxide layer, upper is dense; dendritic, surface topography is subdued to prominent botryoidal

Encrusting organisms <1%

Photos 2

substrates: hyaloclastite
chalk/phosphorite
volcanogenic breccia

Rock Type: Andesite(?) ≠ Andesite(?)/AoB/Trachyte Volcanogenic Breccia → -do-

Color: Pale yellowish-brown (10YR 6/2) ≠ White (N9) (cement) to moderate Brown (5YR 3/4) (matrix)

Texture: Intergranular ≠ Clastic

Phenocrysts: Plagioclase(?), ±15%
(single pxts) Pyroxene (Augite(?)), ±15%(?)
Amphibole (Hornblende?) (not determined)
≠ (Framework Grains): Andesite(?) clasts: ±15%; AoB clasts, ±15%; Trachyte clasts, ±10%,

Groundmass: very fine-grained (not determined) (beyond resolution with handlens)

(Cement): Coccolith chalk, ~60%

(Average grainsize): ±3 mm (range: ±1mm – ±1cm)

(Average grainshape): Subround

(Sorting): poorly-sorted

(Porosity): Very high

(Permeability): High

Vesicles: %: ±30%
size: ≤1mm – ±5mm (~1mm avge dia.)
shape: very irregular (spongiform)
filling: lined w/ zeolites(?)

Alteration: highly altered (oxidation of groundmass mafics, zeolitization(?) of plagioclase(?) phenocrysts, smectitization)

Alteration: superficial (excluding already-altered matrix components) compaction, recrystallization of coccolith(?) chalk cement

Remarks: boulder-size clasts in dredge material (Volcanogenic breccia; also free talus pieces); has almost the appearance of an ignimbrite (includes cinders & lapilli, clasts of AoB, displays almost frothy texture); plagioclase(?) phenocrysts are short, stubby, stout (almost equidimensional); coated thinly w/ dendritic feromanganese crust.

Similar to material from other areas on Black Friday Ridge; volcaniclasts display considerable evidence of water-working (i.e. beach-type environment) before final deposition in coccolith(?) ooze; cement like that of 29 DS3 adheres to side of one piece – may represent contact between 29 DS2 & 3

-do-

differs only in recrystallization of coccolith(?) chalk cement/solution cavities formed by reaction of cement (lined w/ Scalenohedron calcite); ~80% of rock cement is recrystallized

Rock Type Phosphorite breccia

Colour: Very pale yellowish-brown (10YR 7/2) to Medium yellowish-brown 10YR

Texture: microgranular

Framework grains: foraminifer ghosts ± 40%.
trachyte clasts ± 10%
pellets ± 40%.

Cement: dense phosphorite ± 10%.

Average grainsize: ± 0,25 mm
(range: ± 0.10 mm — 5 mm)

Average grainshape: subround

Sorting: moderately sorted

Porosity: very low

Permeability: Extremely low

Diagenesis: total (phosphorization of foramtests & pellets, smectitization, zeolitization of trachyte volcaniclasts)

Remarks: very irregular, loose talus clasts, derived from foraminiferal chalk; material retains irregular topography and internal structure derived from worm or clam borings (tubes, cleaned pebbles coated with a coating of $Mn(O,OH)_2$ and $Fe(OH)_3$ underneath. spherical to ooid bodies in phosphorite are probably remains of forams and fecal pellets.

ock Type:	Trachyte/Andesite Volcanogenic Breccia	≠ Phosphorite w/ Volcaniclast	≠ Andesite/trachyte Volcanogenic Sandstone
[illegible]	Pale greenish yellow (matrix)	≠ Pale brown	≠ olive green (brown)
	pale brown cement	≠ granular/clastic	≠ clastic
...ture:	Clastic		
...amework ...rains:	Trachyte clasts ± 50% Andesite(?) clasts ± 15% Hyaloclastite frags ± 10% Phosphorite clasts ± 4% Crystals (Augite/Hb) 1%	≠ Volcanogenic ss clasts, ± 10%, ± 60 mm dia. (29 DS)	→ -do- Andesite clasts ± 95%, ± 2 mm Trachyte clasts ± 5%, ± 2 mm crystals < 1%, ± 1 mm dia
...ment:	phosphorite ~ 20%	phosphorized foraminiferal chalk ± 90%	≠ zeolites, Mn(O,OH)(?) ± 20%
...rage grain size:	~4 mm	≠ ± 1 mm	≠ ± 2 mm
	(range: ≤ 1 mm – 1 cm)	≠ (range: ≤ 0.20 mm – ± 10 mm)	(range: ≤ 0.5 mm – 4 mm)
...rage grain shape:	subangular	≠ round	≠ Subangular
...orting:	poorly sorted	≠ matrix: cement = poorly sorted cement: cement = well-sorted matrix: matrix = moderately sorted	poorly-sorted
...orosity:	Moderately high	≠ Very high	→ Very high
...bility:	low	≠ Moderately high	≠ High
...lteration:	nearly total (smectitization, zeolitization of igneous clasts, phosphorization of cement)	→ -do-	≠ highly altered (smectitization, zeolitization)
...emarks:	Occurs (rare in dredge material) as subangular, rough, flat clasts (talus) (cobble size) completely enclosed in ferromanganese crust (pancake nodule) & generations, alternating dense and porous – all on dendritic – 1–2 cm thick subdued botryoidal surface topography.)	talus material (probably outcrop as well) in angular large cobbles completely encrusted in ferromanganese of varying thickness (2 generations, no phosphate interlayer, dendritic, internally and containing pebble-size volcaniclastic material; phosphorized chalk is very mottled & disturbed, also bearing volcaniclastic pebbles penetrated variously by todorokite(?) dendrites; degree of phosphorization probably quite variable through rock.	Occurs as pebble-size (angular) clastic inclusions in 29 DS – shapes of pebbles are quite variable; because of the disturbed nature of the phosphorite cement, possibly represents material disturbed and set in motion prior to diagenesis and phosphorization (induration)
	We were not able to sample this material	* We were not able to sample this material	* -do-