PROTOCOL DREDGE

Cruise No. SO 37	Stat. No. Equipm. 17 DKS	Location III	Area I
Date 25.5 1985	Protocol written by : POTENTOS / SCHWAB		

Pinger on wire 300 m from dredge

	Time GMT	Latit. N	Longit. W	Water depth	Wire length	Tension (t)	Remarks
begin operation	1627	15°40.63	170°21.72	1619	0	—	
begin lowering	1630	15°40.62	170°21.73	1621	0	—	
+1. bottom contact	1707	15°40.76'	170°21.73	1628	1652	1.8	
	1757	15°40.73'	170°22.14	1466	1889	4.1	
	1818	15°40.61	170°22.50'	1278	1889	4.9	
	1832	15°40.58	170°22.66	1170	1860	5.3	
HANG UP →	1847	15°40.66'	170°22.78	1119	1519	8.4	
CHANGE CRS TO WINDWARD	1854	15°40.69	170°22.69'	1187	1467	7.2	
OFF BOTTOM	1900	15°40.71	170°22.74	1180	1304	2.7	
begin heaving	1830	15°40.58	170°22.64	1168	1889	2.6	
end heaving	1930	15°40.83	170°22.56	1244	—	—	
end operation	1933	"	"	"	—	—	

+Corrected data 15°40.98' N 170° 21,53 W

ship course 245..... calcul. mean water depth.....m

total time of bottom contact 113 min ship velocity.....kts

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

Result

160 kg Total 150 kg Substrate

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

SO37 17DS Station Data

Station Data

Pinger on wire 300 m from dredge

	Time GMT	Lat N	Lon W	Water Depth	Wire Length	Tension
Begin Operation	1627	15°40'63"	170°21'72"	1619	0	—
Begin Lowering	1630	15°40'62"	170°21'73"	1621	0	—
+1 bottom contact	1707	15°40'76"	170°21'73"	1628	1652	1.8
"hungap"	1847	15°40'66"	170°22'78"	1119	1519	8.9
freed, off bottom	1900	15°40'71"	170°22'74"	1180	1304	2.7
Begin heaving	1830	15°40'58"	170°22'64"	1168	1889	2.6
End heaving	1930	15°40'53"	170°22'56"	1244	—	—
End operation	1933	—	—	—	—	—

Ship Course 245

Total time of bottom contact 113 min

> 95 % encrusted rock

% broken fr. outcrop ~ 50 %

% nodules - 0

Textures: dominantly botryoidal (very thin ones smooth)

Thickest crust ~ 5 cm

Thinnest crust - patina

} avge 0.6 - 0.7 cm

internal struct: older - more massive
younger - more dendritic, porous

~ 10 % have obvious encrusting forams. "biological disc"

2 photos of dredge

general substrates Hyaloclastite
Trachyte
Volcanogenic Breccia
Andesite

160 kg total recovery
10 kg crust
150 kg substrate

1 2 3

Rock Type: Trachyte → Trachyte

Colour: Brownish-gray (5YR 4/1) | Light grayish-yellow (5Y 9/4) to pale greenish-yellow (10Y 8/2)

Texture: Intergranular → -do- trachytic texture inobvious or lacking

Phenocrysts: Sanidine(?) ± 30%, ± 3mm; Hornblende(?), ± 10%, ± 1mm; Augite(?) ± 10%, ± 1mm ≠ (absent?) ~ 10% black spots (clusters of black units - may be tobarkite dendrites or completely altered mafics [amphibole?])

Groundmass: (beyond resolution) ± 50% ≠ Sanidine(?)

Vesicles: absent (density) → -do-

Alteration: partial, inhomogeneous (smectitization of nepheline(?), oxidation of groundmass mafics, ≠ zeolitization(?)) ≠ fairly advanced - complete (smectitization [montmorillonite] zeolitization)

Remarks: angular boulder-size, and smaller, clasts set in volcanogenic breccia and free talus, encrusted, nodule-fashion, in knobby, warty, dendritic ferromanganese crust of varying thickness. Curious dense structure of phonolite(?); phenocrysts only somewhat flow-oriented - similar to terrestrial intrusive (trap) material.

Boulder-size, angular clasts set in volcanogenic breccia, serving as substrate for manganese crust of varying thickness (botryoidal, [illegible] topography, dendritic internal structure, one-to-two generations). Typical of trachytes recovered so far, generally lacking typical trachytic texture, displaying the spotted, "paisanitic" texture seen elsewhere

≠ Andesite(?) Hyaloclastite/Volcanogenic Breccia

Light greenish-gray (5G 7/1)) ≠ pyroclastic

(Framework Grains): Andesite hyaloclasts ± 65%, ± 2 cm; Augite/hornblende crystals ± 5%, ± 3mm; Phillipsite crystals ± 15%, ± 1mm; Andesite(?) clasts ± 5%, ± 10 cm

(Cement): phillipsite(?) ± 10%;

(Avge grain size): ± 4mm

Avge grain shape: sub rounded

(Sorting): poorly-sorted

(Porosity): Extremely high

(Permeability): High

(Alteration): almost complete (smectitization, zeolitization of hyaloclasts, oxidation of andesite clasts)

(Remarks) Pebble-to-cobble size clasts included in volcanogenic breccia and also as loose talus completely encrusted in ferromanganese crust

-do-

very open-textured and loosely cemented with phillipsite(?) which also encrusts open spaces between matrix components

	4	5	6
...ock Type:	Andesite(?) Hyaloclastite Volcanogenic Breccia	Andesite(?) Hyaloclastite / Phonolite(?) Breccia Trachyte	Trachyte V.F.
	→ -do-	→	-do-
...lor: (cement) Very pale orange (10YR 8/2)	→ -do-		≠ Moderate brown (5YR 4/4)
Framework Grains: Light Greenish gray (5G 7/1)	→ -do-, and pale brown (5YR 5/2)		≠ Pale greenish-yellow (10Y 8/2)
...exture: clastic	→ -do-	→	-do-
...mework Grains: 17DS3 clasts, ±30%, ~1cm dia	→ -do-, ±35%, ±2cm dia		≠ 17DS2 clasts, ±90%
17DS2 clasts, ~5%, ~1cm dia	→ -do-, ±5%, ±5mm dia 17DK1 clasts, ±10%		
...ent: phosphorized foram chalk ±65%	→ do, ±50%		≠ dense phosphorite, ±10%
...rage grain size: ±1cm	→ -do-	→	-do-
(range: ≤0.10mm (cement) — ±3cm (matrix))	→ -do-	→	-do-
...rage grain shape: subangular (varies greatly)	≠ angular		≠ Subangular (many are subrounded)
...rting: extremely poorly sorted	→ -do-	→	-do-
...rosity: High	→ -do-		≠ Moderately high
...meability: Moderately low	→ -do-		≠ Moderately low
...teration: penultimate	→ do	←	→ penultimate (Smectitization [nontronite] Zeolitization of matrix components, phosphorization of foram chalk cement)
	← -do-	←	
...marks: Outcrop and loose talus clasts ranging from pebble through boulder size; deposits vary in thickness, but are often in contact with each other several units represented in one large pebble-size clast. boundaries of units often marked by thin ferromanganese crusts (particularly between 17DK4&5 with 17DS6); all as massive unit or separately as loosened talus pieces, serve as substrate for prominently botryoidal (surface topography), dendritic (internal structure) ferromanganese crust of varying thickness	→ -do-	→	-do-, may represent the order of the deposits, as is the most firmly cemented and altered.

	7	8
	(like 9DK4)	
Rock Type:	Trachyte Volcanogenic Breccia	→ - do -
Color:	White (N9) to very pale yellowish-orange	≠ variegated: Dark yellowish-orange (10YR 6/6 & 7/6) to moderate yellow (5Y 7/6) to Pale greenish yellow (10Y 8/2) to black (N1)
Texture:	Clastic	→ - do -
Framework grains:	Trachyte clasts ~90%	→ - do -, but ~80%; ~25% are penetrated by todorokite(?) dendrites to the point, in some cases, of being black - striking contrast to the white cement and yellow, remaining matrix.
Cement:	Phosphorite (dense, hard) ~10% (Pale yellowish-brown (10YR 6/2)) (thin, lacing network around trachyte clasts)	≠ White (N9), porous, softer phosphorite
Average grain size:	~1.5 cm (range: ≤1mm - ≥4 cm)	≠ ~5 mm → (range: ≤1mm - 2 cm)
Average grain shape:	angular	→ - do -
Sorting:	extremely poor	≠ poorly-sorted
Porosity:	Extremely High	≠ High
Permeability:	Extremely High	≠ Low
Alteration:	total (carbonation, smectitization, zeolitization, penetration, deposition of todorokite(?) & matrix material; phosphorization, deposition of $Fe(OH)_3$(?) in original foram chalk cement)	- do -, but heavier on smectitization, less carbonation
Remarks:	Strikingly similar to trachyte V.B. from dredge 9 (9DK4): a few unaltered Sanidine phenocrysts are apparent in some of the trachyte clasts here; serves as substrate, both on outcrop and talus pieces for encrustation of ferromanganese oxide (prominently botryoidal topography w/ finely botryoidal super topography, dendritic lateral structure, often displaying several generations → porous and very $Fe(OH)_3$(?)-rich)	≠ Similar to 17 DS 7, but on a finer scale; much more altered to nontronite; curious, selected penetration of some pieces by remobilized $Mn(OOH)$(?), cement much softer, iron-poor apatite. - do -