PROTOCOL DREDGE

Cruise No. SO 37	Stat. No. Equipm. 39 DRS	Location IV	Area III
Date 29/05 1985	Protocol written by : Herzig / Hein		

Pinger on wire 300 m from dredge JD 149

	Time GMT	Latit. N	Longit. W	Water depth	Wire length	Tension (t)	Remarks
begin operation	1546	15°38.507	169°5.950'	0	0	0.8	put out 2500m + con rope that con 2900 m (wird mdrum + ma needed 350 so changed to 4 DS Location whe only 2800m of wire is needed for 2200 - ma spent 2 hr. Trying to make th new coord. W/ 2000m of wire ou 1 cruit from 3400m To 2000 m To 2600 m To 2250 finally Stop Ship
begin lowering	1548	"	"	0	0	0.8	
+1. bottom contact	1755	15°37.525	169°6.467	2130	2150	2.5	
	1819	15°37.232	169°6.842	2019	2500	4.1	
	1820	"	"	2020	"	4.3	
	1825	15°37.198	169°6.945	2000	2500	3.2	
	1827	15°37.150	169°6.992	1994	2500	3.6	
	"	"	"	1966	2500	6.3	
	1829	15°37.124	169°7.042	1967	2500	3.2	
	1830	"	"	1963	2500	3.2	
	1831	15°37.096	169°7.082	1944	2500	4.2	
	1832	15°37.054	169°7102	1940	2500	3.4	
	"	"	"	"	"	5.1	
	1834	15°37.063	169°7.146	1921	2500	6.0	
	1837	15°37.039	169°7.205	1903	2500	3.4	
	1838	"	"	"	"	3.4	
	1839	15°37.020	169°7.247	1894	2499	4.8	
	"	"	"	"	"	3.6	
Hang-up! free	1841	15°37.040	169°7.294	1885	2501	8.4	
	1921	15°37'36	169°07'27	2050	2320	2.3	
begin heaving	1932	15°37'74	169°07'00	2190	2130	—	
end heaving	2015	15°37.85	169°06.47'	3060	—	—	
end operation	2018	15°37.85	169°06.48'	3058	—	—	

+Corrected data 15°37.791'N 169°6.901'W

ship course ....190..... calcul. mean water depth.....m

total time of bottom contact ..90..min ship velocity ..1.0..kts

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

Result

25..kg Total

..0..kg Nodules

25..kg Substrate

..0..kg Sediment

SO 37 39 DS Station Data 5-29-85

Pinger on wire 300m from Dredge

	Time (GMT)	Lat N	Lon W	Water Depth	Wire Length	Tension
Begin Operation	15:46	15° 38' 507"	169° 5' 950"	0	0	0.8
Begin Lowering	15:48	— do —	— do —	0	0	0.8
+1 Bottom Contact	17:56	15° 37' 525"	169° 6' 467"	2130	2150	2.5
Begin Heaving	19:32	15° 37' 74"	169° 07' 00"	2190	2130	—
End Heaving	20:10	15° 37' 85"	169° 06' 47"	—	—	—
End Operation	20:18	15° 37' 95"	169° 06' 48"	—	—	—

Ship Course 190 total time of bottom Contact 90 ship Velocity 1.0 Kts

50 kg total Dredge
0 kg Nodules

<1 kg. crust

-- kg Substrate
Org. Sediment

±50% Crust coverage (patina)
One generation, dendritic, botryoidal
Maximum crust thickness: 2.5 cm (on talus)
minimum crust thickness: patina
} avge: patina

photos 2
Organisms: 1 siliceous sponge fragment
Substrates: AOB Hyaloclastite
AOB
AOB Volcanic Breccia
Chalk
Phosphorite

Rock Type:	Alkali Olivine Basalt	AOB Volcanogenic Breccia	AOB Hyaloclastite
Color:	Dark yellowish-brown (10YR 4/2)	-do-, to yellowish-brown (10YR 4/4)	Grayish-orange (10YR 7/4) (matrix) to very pale orange (10YR 8/2)
Texture:	Intergranular	Clastic	-do-
Phenocrysts: (microphenocrysts) (tan glomerophyric)	(Iddingsite) Olivine, ± 2%, ± 0.75 mm; Plagioclase, < 1%, ± 0.5 mm; Pyroxene, < 1%, ± 0.5 mm	(Framework Grains): AOB Volcaniclasts because of graded (?) bedding, Matrix: cement ratio varies enormously	AOB Hyaloclasts; -do-
Groundmass:	Olivine, Plagioclase, Pyroxene, Opaques (undetermined)	(Cement): Foram chalk/phosphorite; Mn(O,OH); Calcite; Phillipsite? (Cement components not homogeneous, either)	-do-; -do-; -do-; -do- (variation by bed)
Vesicles:	- absent? -		
		(Average grain size): enormous variation! (range: ≤0.25 mm — ≥ 30 mm)	-do- (range: ≤0.25 mm — ±15 mm)
Alteration:	very extensive Oxidation, iddingsitization of groundmass & pxt mafics, smectitization, zeolitization of feldspars?)	(Average grain shape): subangular	-do-
		(Sorting): (varies by bed) but generally bad	
		(Porosity): high (cement)	very high
		(Permeability): high (cement)	-do-
		(Alteration): -do-, phosphorization of cement(?)	-do-
Remarks:	large constituent of most brecciate lithologies in 39DS; sample described here is a small, subangular cobble displaying zones of more intense oxidation (subaerial weathering?); iddingsite phenocrysts are often skeletonized and resemble vesicles; our sample appears to be a fresh talus clast with a more-or-less completely enclosing patina of dendritic (internal) cuspate (external) ferromanganese oxide	(Remarks): Our samples are all subrounded large pebble-to-large cobble-size talus clasts similarly encrusted w/ ferromanganese oxide as in 39DS1; additionally one specimen has a thick (±13 mm) one-generation, dense dendritic (internally) botryoidal with cuspate-supertopography (externally) with a large Fe(OH)3(?) component which is interstitial to the dendrites internally; displays a coarse, indistinct bedding.	Our samples are all subrounded-to-angular tabular talus clasts bearing ferromanganese oxide encrustations similar to those described from 39DS1 2; here again, bedding is graded but in some instances decided graded, with extreme variability in grainsize and grain: cement ratio; one sample with a cement: grain ratio of a 4:6 is capped(?) by bright white indurated foram/coccolith(?) chalk (39DS6)
		-do-	
		probably derived from subaerial weathering of basalt flows, subsequently deposited on terraces(?) and infiltrated by foram chalk(?)	

The rocks of 39 DS are striking because of the bedding (often graded) they display →

Rock Type: AOB Hyaloclastite	AOB Volcanogenic Breccia	⇒ Phosphorized chalk
Color: light brown (5YR 4/4) to pale pale grayish-orange to grayish-yellow (5Y 8/4) (10YR 7/4)	⇒ Dusky yellowish-brown (10YR 2/2) (matrix) to Very pale orange (10YR 9/2) to yellowish-gray (5Y 6/2) (cement)	
Texture: pyroclastic	⇒ clastic	
Framework Grains: AOB hyaloclasts ±45% (varies w/ bedding) open space, up to 10%, ±1mm dia	⇒ AOB volcaniclasts, ±50%, ±1cm	
Cement: phillipsite(?), ±45%	⇒ phosphorized foram/coccolith(?) chalk ±50%	
Average grain size: (enormous variation)	⇒ ±1cm	
(range: ≪ 0.01 mm – ±3 mm)	⇒ (range: ±3mm – 12mm)	
Average grain shape: angular	⇒ subangular	
Sorting: poor	⇒ Very poor	
Porosity: Very high	⇒ very low	
Permeability: moderately high	⇒ very low	
Alteration: Total (Smectititzation, Oxidation, Zeolitization)	⇒ Penultimate (Smectitization, oxidation of matrix components, phosphorization of cement)	
Remarks: our sample came from a great tabular boulder-size slab dislodged from submarine outcrop; displays striking coarse graded bedding; the uppermost (finest) beds completely altered to yellow hontronite(?) (hydrothermal activity exposure?), thin (<1mm thick) patina of dendritic ferromanganese oxide partially mantles the sample (very patchy?); may have been a subaerial ashfall subsequently submerged by subsidence	⇒ our sample is the "nucleus" of a ferromanganese "nodule" an angular pebble-size clast enveloped in dendritic (internal) botryoidal-with caspate super-topography (external) $Fe(OH)_3$(?)-rich ferromanganese encrustation. Very much resembles 37DS3, in fact, may be the same unit; differs in the diversity of material represented (several kinds of phosphorized chalk cement(?) occur over short (1-2 cm) range; the basalt grain material is similar to 37DS1	forms capping material on 39DS3

(also phillipsite? cement)