PROTOCOL DREDGE

Cruise No. SO 37	Stat. No. Equipm.	Location	Area
27.5	28 DKS	III	I

Date 26.5 1985	Protocol written by : Weber / Flemming

Pinger on wire 300. m from dredge

	Time GMT	Latit. N	Longit. W	Water depth	Wire length	Tension (t)	Remarks
begin operation	00.44	15°38.31	170°23.53	2035	-	-	
begin lowering	0 47	- " -	- " -	- " -	0	0	
+1. bottom contact	1 24	15°38.62	170°23.09	1770	1927	0.7	
Winde STOP, Pinger	1 30	15°38.60	170°23.14	1845	2147		
30 über grund							
Schiff nimmt Fahrt auf	1 32	- " -	- " -	- " -	- " -	2.0	
30 m gefiert	1 52				2177	1.8	
10 m Hieven	1 53	15°38.80	170°22.82	1700	2167	1.8	
	2 03	15°38.89	170°22.71	1657	2167	3.2	
	2 09	15°39.96	170°22.65	1612	- " -	3.5	
	2 12	15°39.03	170°22.60	1599		4.5	
Hänger	2 14	- " -	- " -	1590	2166	6.1	
Dredge frei	2 15	- " -	- " -	- " -	2166	2.0	
10 m Hieven	2 38	15°39.11	170°22.41	1566	2155	3.2	
	2 49	15°39.25	170°22.29	1536	2155	3.8	
20 m Hieven	2 52	- " -	- " -	1530	2135	4.2	
	2 56	15°39.39	170°22.19	1530	2135	5.5	
25 m Hieven	3 13	15°39.43	170°22.12	1555	2110	3.3	
Hänger	3 26	15°39.54	170°21.81	1417	2113	7.4	
Dredge frei	3 30	- " -	- " -	1450	2115	2.4	
	0336	15°39.14	170°23.30	1463	2112	4.5	
begin heaving							
end heaving							
end operation							

+Corrected data 15°38.20 N 170°24.37 W

ship course ~65° calcul. mean water depth.....m

total time of bottom contact 168 .min ship velocity ~1 .kts

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

Result

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

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

Pinger on wire 300m from dredge

	Time (GMT)	Lat N	Long W	Water Depth	Wire Length	Tension
Begin operation	00.44	15°38'31"	170°23'53"	2035	—	—
Begin lowering	00.47	-do-	-do-	-do-	0	0
±1 bottom contact	1:24	15°38'62"	170°23'09"	1770	1927	0.7
End bottom contact	04:12	15°38'98"	170°23'71"	1698	1571	

Sampling (Bottom contact) from ~1800–1400m

Begin heaving	0:412	15°38'98"	170°23'71"	1698	1571
End heaving	0440	15°39'08"	170°23'62"	1490	—

Ship course ~65°

total time of bottom contact 168 min

Ship velocity ~1 kt.

50 kg total dredge wt. Substrate: 400 kg.

total crusts in dredge: 100 kg

100% crust coverage

~75% broken from outcrop (by vol.)

no nodules

texture: Botryoidal / dendritic; 2-3 generations, middle one spongy, thick outrones dense

thickest crust – 4.5 cm
thinnest crust – ±1 mm } avge ~2 cm

<1% encrusting organisms

photos 2

Gen substrates: Andesite?(HGI)
Chalk / Phosphorite
Volcanogenic Breccia

Rock Type:	Hornblende? Andesite?	Andesite(?) volcanogenic Breccia	Phosphorite
Color:	Brownish-gray (5YR4/1)	Greenish-gray (5GY6/1) (matrix) to yellowish-gray (5Y8/1)	Pale yellowish-brown (10YR6/2)
Texture:	Phyric intergranular	Clastic	micro-granular
Phenocrysts: (single pcts, %. Very greatly)	Amphibole (Hornblende?) ± 10% ± 2mm dia.; Pyroxene (Augite?) not clear; Plagioclase, <1%, 2mm dia. avge.	(Framework Grains): Andesite clasts ± 40%, ± 2mm dia.	rare crystals (augite? plagioclase?) andesite fragments, <1%.
		(Cement): Phosphorite ± 50%	→ -do-, 99+%.
		(Average grain size): ± 2mm (range: ≤ 1mm – ± 5mm)	(beyond resolution)
Groundmass:	not determined (beyond resolution with hand lens)	(Average grain shape): angular	-do-
		(Sorting): moderately poorly-sorted	→ -do-
Vesicles:	% ±10% size: ≤ 1mm – ± 1cm shape: elongate oval to oval filling: calcite (or lines with), phillipsite(?)	(Porosity): Low	Very Low
		(Permeability): Extremely low	→ Extremely Low
Alteration:	moderate (oxidation of groundmass mafics, zeolitization, smectitization)	(Alteration): penultimate (zeolitization, smectitization of matrix clasts, phosphorization of cement)	total (phosphorization of original calcareous sediment - chalk(?))
Remarks:	Rounded, cobble-size clasts incorporate of volcanogenic breccia; some were recovered as talus clasts, encrusted in dendritic ferromanganese oxide deposits and sometimes coated first with a layer of phosphorite up to 5mm thick; cobbles display considerable evidence of subaerial water-working prior to incorporation in volcanogenic slope debris breccia or puddingstone (aureolic weathering rinds, rounding, etc.); all pieces display irregularly-shaped gabbroid xenoliths: hornblende gabbro - looks as if they were picked up by fast-flowing magma flowing through a chamber in which crystal settling (differentiation) was taking place, lava displays strong flow-orientation of vesicles, but not so much so of phenocrysts.	Single, free sample not found in dredge: description of adhering material on side of sample 28 DS 1e; possibly serves as "cement" for larger clasts in another volcanogenic breccia	single fragment, probably piece of capping phosphorite of an outcrop volcanogenic breccia (contains various rare pieces from other lithologies), and is itself capped by ~3mm thick, less indurated, phosphorized chalk, in turn capped by dendritic ferromanganese oxide encrustation

Rock Type:	Andesite(?)/Trachyte(?) volcanogenic Breccia	Phosphorized chalk	→ - do -
olor:	Very pale orange (10YR8/2) (cement)	Very pale yellowish-orange (10YR 8/6)	very pale yellowish-orange (10YR 8/6)
exture:	Clastic	granular	→ - do -
ramework rains:	Andesite(?) clasts ±20% ±1cm; Trachyte(?) clasts ±10% ±1cm	foraminiferal tests, 99±%	→ - do -
ement:	phosphorized foram chalk, ±70%	apatite(?), (not determined)	→ - do -
verage grainsize:	~2mm	≤0.25 mm	→ - do -
(range:	≤0.25 mm — 1cm)	(not determined)	→ - do -
verage grainshape:	round (cement) (intraclasts are angular)	do - round	→ - do -
orting:	extremely poor	Well-Sorted	→ - do -
orosity:	Moderately high	Extremely High	→ - do -
ermeability:	Very low	Extremely High	→ - do -
lteration:	Extensive (phosphorization of foram chalk cement, oxidation, smectitization, zeolitization of matrix clasts)	- do -	→ - do -
emarks:	single talus clast (flat, subrounded) serving as nucleus for foro-manganese encrustation (dendritic, 3 generations, bottom & top dense, middle one very porous and $Fe(OH)_3$(?)-rich, ±3cm thick on upper surface); the matrix clasts appear to have been deposited under conditions of rapid quick transport in foram. ooze, later experiencing phosphatic diagenesis.	Very abundant (most?) constituent lithology of dredge 28; probably forms the capping deposit on other outcrop material; found also as talus; quite thick deposit - exact thickness unknown, but in tens of cm's; extensively burrowed and bored by clams or worms; is cavernous and spongiform; the tubular conduits are highly coated with $Fe(OH)_3$(?) and $Mn(O,OH)$(?). the main lithology is highly porous and permeable and spongiform on a microscopic scale, as the foraminiferal tests originally forming the chalk have been dissolved leaving a system of interconnecting pores. the deposit serves as substrate for encrusting, dendritic foro-manganese oxide (whence comes the Fe & Mn-oxide deposits in the tubes.	- do - very much different from 28 DS 5; is massive, not burrowed, not cavernous, but quite undisturbed or spinose w/ Fe, Mn. oxides, occurred as a large boulder in volcanogenic breccia; faint traces of foro manganese dendrites or micro nodules; much faint bedding planes(?), otherwise appears massive, unstratified - do - (exactly)

MNSS 1 rg.

6-10-85