SO37 41 DS | Station Data | [illegible]-30-85

Pingeron wire 300 m from dredge

	Time (GMT)	Lat. N	Lon. W	Water Depth	Wire Length	Tension
Begin Operation:	00:58	15°39'03"	169°05'76"	~~2558~~	—	—
Begin Lowering:	00:59	15° -do-	-do-	-do-	—	—
+/ Bottom Contact:	01:55	15° 38'46"	169°06'26"	2567	2902	2.7
Begin Heaving:	02:21	15° 38'22"	169°06'668"	2086	2940	3.3
End heaving:	03:40	15° 38'97"	169°07'42"	2271	0	—
End operation:	03:43	15° 38'60"	169° 06' 50' (over, incorrect)			

Ship course 210°

total dredge wt - 80 kg
total crust recovery - 2 kg.
total substrates - 78 kg
100% ferromanganese coverage, all talus
1 generation of crust, dendritic growth

maximum thickness - 1.5 cm } ± 1 mm avge
minimum " - 0.8 mm

encrusting micro organisms; rare (tubular forams

no photos taken

			… 41 DS 3
Rock Type:	Hawaiite(?) Scoriaceous	→ -do-; glassy	→ -do-; Volcanic Breccia
Color:	Medium dark gray (N4)	→ -do-	≠> Brownish-black (5YR 2/1) (mesostasis?) to Dusky yellow (5Y 6/4) (inclusions)
Texture:	Intersertal(?)	≠> Hyalopilitic(?)-variolitic(?) (pl/px-Glomerophyric)	≠> Volcaniclastic
Phenocrysts:	Augite(?) ±5%, ±2mm (Na-Augite?-greenish glassy)	→ -do-, ±15%, ±1mm dia.; Plagioclase, ±5%, ±1mm dia.	→ -do-, ±5%, ±1 mm dia.; → -do-, ±5%, ±1 mm dia. (Inclusions—variolitic hawaiite intraclasts(?), ±60%, ±3 mm dia.)
Groundmass:	Plagioclase, Pyroxene, glass(?), Opaques(?) (not determined)	→ -do-; (undetermined)	→ glass, ±30%
Vesicles:	±20%; round–irregular, ≤1mm dia.—6mm dia.; filled, or lined w/zeolite, chlorophaeite, ±75% of total vesicles	→ -do- (Some may be varioles)	≠ -no vesicles-
Alteration:	fairly fresh (smectitization of groundmass glass?)	≠> extensive (smectitization, oxidation, zeolitization of glass, microlitic glass)	-do-, but penultimate–total
Remarks:	our sample is a large, irregularly shaped pebble-size talus clast with adhering hawaiite(?) hyaloclastite (contains same px as the basalt clast) and a ±1mm-thick dendritic, botryoidal ferromanganese crust—may be derived from same magma batch as samples 41 DS 2, 3, & 4	→ -do-, has glassy zones and displays distinct flow structure; some vesicles are 2-3 cm in dia & vug-like, resembling those found in pillow lavas; also, there appear to be some partially-palagonitized glassy rinds here and there externally, probably a pillow lava; crust: -do- but much better developed (±6mm-thick)	our sample is a subrounded pebble-size talus clast almost completely encrusted with ferromanganese oxide crust as described in 41DS 1; appears to be hawaiitic glass which has included volcanic debris, either from the same flow or from previous eruptions; most everything is converted to nontronite(?)

* All these appear to be related, at least compositionally if not texturally and habitually.

ock Type: Hawaiite(?) trap(?) → Alkali Olivine Basalt → -do- Hyaloclastite

olor: Olive gray (5Y 5/1) ≠ Medium dark gray (N4) ≠ Moderate Brown (5YR 4/4) (larger hyaloclasts) to Grayish Orange (10YR 7/4) (smaller hyaloclasts)

T...ure: Intergranular → -do- ≠ Pyroclastic

henocrysts: Pyroxene (Augite?) ±1%, ±2 mm dia.; Olivine <1%, ±1 mm dia. (Iddingsite) → -do- but → ±10%, ±2 mm dia.; → ±15%, ±3 mm dia. ≠ (Framework Grains): AOB Hyaloclasts ±45%, ±5 mm dia.; Open space, ±45%, ±5 mm dia.

≠ (Cement): Phillipsite(?), smectite, ±10%

roundmass: Plagioclase, Pyroxene, Opaques(?) (Not determined) → -do-

≠ Average grain size: ±5 mm dia (range: ±1 mm — ±20 mm)

≠ (Average grain shape): angular

≠ (Sorting): poor (better by individual bed)

esicles: -absent- (dense) → -do-

≠ (Porosity): Extremely high

≠ (Permeability): Extremely high

lteration: petty (Oxidation, (groundmass only), Smectitization?) → -do-, iddingsitization of olivines ≠ (Alteration): Total (Oxidation, Smectitization, zeolitization(?))

...ks: Our sample is a subrounded, cobble-size talus clast probably once completely enclosed with dense dendritic (internal), finely botryoidal-to-redissolved (external), ±2 mm thick ferromanganese crust. Rock is very dense and without flow structure (indicating intrusion as dike or sill?); curious are patches of sky-blue glassy material (≤0.75 mm) filling cavities at one point (alteration of CuS phases?)

→ Our samples are both very dense, texturally-undirected cobble-size talus clasts with very angular aspect (41DS5a displays an ±ortho-gonal shape and 41DS5b displays a rhombic shape) ≠ (up to 3 mm) → -do- Phenocrysts of olivine are completely replaced w/iddingsite and chlorophaeite generally occurring as single pets (though not cumulate); CPX (normal augite?) is glassy and brown quite different from that which occurs in the hawaiites

≠ Our sample is a discoid rounded cobble which has been subjected to considerable abrasion (dredging operation). Once had a patinate dendritic encrustation of ferromanganese oxide covering the entire sample — now restricted to surface pits and pores of the open-textured rock. The hyaloclastite appears to be very crudely-bedded with a planar zone ±1 cm-thick in the center composed of fine gravel-size hyaloclasts as opposed to the outer planar margins which are composed largely of coarse gravel-size hyaloclasts: these are typical AOB material composed mostly of rusty-brown palagonite cellulite in which the cells have been filled with smectite & phillipsite

* See 41DS 1...3

Rock Type:	AOB Hyaloclastite →	—do— (composite w/ 41DS)	≠ Hawaiite(?) Volcanogenic Brecc[ia]
Color:	Grayish orange (10YR 7/4) (main mass of matrix) to Light brown (5YR 5/6) (large hyaloclasts)	Moderate brown (5YR 3/4) (matrix) to medium dark gray (N4) (cement) to white (N9)	—do—
Texture:	Pyroclastic →	—do—	→ clastic
Framework Grains:	AOB Hyaloclasts, ±60%, ±1 mm, small, orange; ", ±10%, ±5 mm dia, large, brown	—do—, but ±2 mm dia.; —do—, but ±10 mm dia.	≠ Hawaiite(?) (prob. 41DS4 material) volcaniclasts (very augite-rich [greenish]), ±50%, ±3 …; Open Space, ±10%, ±5 mm; Hawaiite Hyaloclasts, ±5%, ±few dia
Cement:	Phillipsite(?), ±30% →	—do—	≠ coccolith(?) chalk, ±35% (green… variable)
Average grain size:	±2 mm →	—do—, but ±3 mm dia.	≠ extremely variable
range:	≤1 mm – ±10 mm) →	(range: ≤1 mm – ±10 mm)	≠ (range: ≤0.20 mm – ±3 cm
Average grain shape:	Subangular →	—do—	≠ angular
Sorting:	bimodal: {orange matrix: moderate; brown matrix: poor}	≠ very poor	→ extremely poor
Porosity:	very high →	—do—	→ —do—
Permeability:	high →	—do—	→ —do—
Alteration:	Total (Smectitization, Oxidation, Zeolitization)	—do— → stronger	≠ penultimate (Oxidation of small mafics, basalt smectitization, zeolitization, incipient phosphatization of chalk cement) (augite(?) look still fresh)
Remarks:	Our sample is a sub-discoid, rounded cobble, similar to 41DS6 (in fact, it appears that 6 grades into 7 as the coarsest light brown material on the bottom of the cobble grades into the open-textured material with Mn(O,OH)?) stains); it may be that these bedded hyaloclastites weather (submarine?) preferentially along less competent beds, yielding flat cobbles of denser, better-cemented material. Sample bears, on upper surface, an encrustation of ferromanganese oxide [illegible]	this material is quite similar to 41 DS 7, and may be the same, but it seems far less bedded, much more oxidized, and is in contact with phosphorized, very porous chalk and volcanogenic breccia (41 DS & respectively) which are quite different from 41 DS 6 which 41 DS 7 is in contact with; covered the same kind of ferromanganese oxide crust as the previous lithologies described from this dredge.	≠ Our sample is an angular, lateroid, cobble-size clast, probably broken from outcrop (no manganese oxide coating). Most of the volcaniclasts are glassy and palagonitized, otherwise resembles, very strongly, 41 DS 4 Hawaiite(?); most of the volcaniclasts are angular but some are even subrounded, indicating possibly mixing of materials from different levels of reworking.

Lock Type: Hawaiite? Volcanogenic Breccia → AOB Volcanogenic Breccia → — do —

lo —: Greenish-gray (5GY6/1) → Light brown (5YR5/6) (Grains) to Very Pale orange (10YR8/2) (cement) → Pale orange-pink (5YR9/4) to Pale brown (5YR5/2) (cement) to Moderate-yellowish-brown (10YR5 (Grains)

Texture: Clastic → — do — → — do —

Framework Grains: Hawaiite(?) Volcaniclastic debris, ± 80%(?) → AOB Volcaniclastic debris ± 50%, extreme grain size range → — do —, but only ± 10%.

ement: Smectite(?), ± 20%(? → coccolith(?) chalk, ± 30%(?) Smectite(?), ± 20%(?) Phillipsite?, ± 10%(?) → Phosphorite (dense, porcellano

erage grainsize: extreme range

range: ≤ 0.10 mm — ± 6 cm) → do, but upper range limit probably ≈ 2 cm, and grain size is bimodal (coarse fraction contains a fine AOB sand component) → — do — (undetermined)

erage grain shape: Subangular (many are subrounded) → — do — → — do — (undetermined) → Subrounded (?)

orting: extremely poor → — do — → — do —

orosity: very high → do, extremely high → low

rmeability: high → very high → Very low

ration: Slight-to-Moderate (smectitization zeolitization(?) oxidation of framework grain components) → extensive (oxidation, smectitization, zeolitization of framework material) → Penultimate

— do — for framework components ± for cement (phosphorized ± Comp

marks: Our sample is an angular, cobble-size clast apparently broken from outcrop (no surface deposits except on assumed) upper surface, which bears a ± 1 cm-thick encrustation of Fe-rich, dendritic (internal), partially re-dissolved botryoidal (external), one-generation ferromanganese crust); the substrate material is chaotic, with no hint of bedding and probably represents deposition from a high-energy environment (such as a submarine debris flow) with rapid, transport and no re-working (subrounded material may indicate mixing with previously-reworked material prior to final deposition

Our sample is an angular, large-pebble-size clast probably broken from outcrop — do — (no surface deposits at all!). Framework grain material appears to be mostly palagonitized glassy AOB (Ol, px-phyric), probably related to ± DSS. curious is the observance that numerous olivine phenocrysts are fresh, with only a rind of smectite, in spite of the highly altered, oxidized state of the groundmass and the observance of a large (± 30%) matrix component of AOB fine sand.

Our samples are (probably) Clasts, ± completely covered with Fe-rich ferromanganese crust ranging from ± 1 mm — 3 cm thick (thicke on [presumed] upper surfaces; coarsely and densely dendritic (internal) and re-dissolved botryo (external); the substrate material is dense, porcellaneous phospho bearing subrounded, very altere volcaniclastic debris in very in homogeneous distribution some specimens observed in the framework material appear to be old ferromanganese nodules with curiously, laminar structure.

ample No: 3037 4DS 15 (Composite of 4DS 8)

ck Type: Phosphorized foraminiferal chalk

l.: Very light gray, (yellowish) (N8)

xture: granular, spongy

atrix: empty foram tests ± 95%.
(darkened often by ingrown dendritic Mn(OH)?)

ment: apatite (?), ± 5%.

erage grain size: 0.50 mm

erage grain shape: round

ting: well-sorted

rosity: extremely high
(rock is cellular)

meability: high.

teration: Penultimate (?)
(Phosphorization of
carbonate foram tests)

marks: Sole sample seen is a subrounded pebble talus clast adhering (in composite lithology) to 4DS 8, cemented by dendritic ferromanganese crust