S037 47 DS Station Data 5-30-8[illegible]

pinger on wire 300m from dredge

	Time (GMT)	Lat. N	Lon W	Water Depth	Wire Length	Tension
Operation:	21:42	15°37'31"	169°14'76"	1603	—	—
Begin Lowering:	21:45	15°37'57"	169°14'71"	1648	—	—
+1 bottom contact:	22:33	15°37.68"	169°14'34"	1552	1638	2.4
Off bottom	23:42	15°37'69"	169°13'32"	1399	1510	2.1
Begin Heaving	23:25	15°37'65"	169°13'42"	1398	1884	2.5
End Heaving	0000	15°39'77"	169°15'00"	1479	—	—
End Operation	0015	15°37'863"	169°12'859"	1515	—	—
		15°37'59" N	169°14'5[illegible]"			

Ship course 070 → 090

~450 kg total
no nodules

~60 kg. crusts
~380 kg. substrate
100% crust coverage

± 80% talus
One nodule
Surface topography: botryoidal (subdued)
<1% encrusting organisms (tubular forams)
Internal struct: 3 generations: innermost-very dense dendritic ±25mm
middle-porous Fe-rich dendritic ±15mm
Outer dense, laminar ±7 mm; no phosphorite hiatus; subtle boundaries

Thickest crust: ±5cm
Thinnest crust: ±3 mm } avge ≈3 cm

Photos?

Substrates: AOB
" Hyaloclastite
" Volcanogenic breccia
chalk/Phosphorite

ample No:	S03+4+DS1	S03+4+DS2	S03+4+DS3
ck Type:	Hawaiite(?)	Hawaiite(?) Volcanogenic Breccia	Hawaiite(?) Volcanogenic Psephite Breccia
olor:	Light olive gray (5Y3/1)	Brownish-gray (5YR4/1) (grains) to White (N9) cement	Pale Brown (5YR5/2)
xture:	Intergranular, flow-oriented	-do-, subscoriaceous, clastic	-do-
nocrysts:	-absent-	-do-	-do-
		(Cement): phosphorized chalk, ±10%	zeolites, ±10%
roundmass:	Plagioclase, Pyroxene, Olivine (Iddingsite?), Opaques } not determined	(Framework grains) -do-	Framework grains: Hawaiite(?) clasts, ±90%, ±1cm dia; do but ±55%, ±2mm dia; open space, ±35%, 1mm dia
		(Average grain size): ±1cm	2mm dia
		(range: ≤1mm – ±2cm)	(≤1mm dia – ±5mm)
esicles:	%: ±25%	%: ±50%	>50%
	Size: ±5mm avge dia.	size: ≤1mm	-do-
	(range: ≤0.50mm – ±12mm)	(not determined	-do-
	shape: oval to fusiform	round	-do-
	filling: empty or lined w/ smectite/zeolite	-do-	-do-
		(Average grain shape): angular	-do-
		(Sorting): very poor	poor
lteration:	moderate-extensive (iddingsitization of olivines, zeolitization(?) smectitization(?) of feldspars)	-do-, extensive to intense	-do-
		(Porosity): moderately high	very high
		(Permeability): very low	very high
emarks:	our samples are pebble-size fragments of subangular pebble-to-cobble-size talus clasts which were completely enclosed in ±2mm-thick, dense dendritic (internally) abraded botryoidal (externally) ferro-manganese encrustation. the substrate is an altered alkali basalt of andesite in which crystal components and internal structures display a high degree of flow orientation. the flow appears to have been viscous and subaerially erupted; one of our samples, apparently related to this lava, is scoriaceous and the vesicles are nearly completely filled with dense phosphorite (47DS1)	-do-	-do-
		This material resembles hyaloclastite (matrix) but is far less oxidized and argillized;	even finer-grained and grain size is fairly uniform as is the distribution, but appears to be unbedded
		-do-	-do-
mpletely gillized!			

Sample No.	803747DS4	803747DS5	803747DS6
Rock Type:	Hawaiite(?) Volcanogenic Breccia	AoB Hyaloclastite	AoB Hyaloclastite/Volcanogenic Breccia
Col:	Olive gray (5Y 4/1) (matrix) to Pinkish-gray (5YR 8/1) (cement)	Light brown (5YR 5/6) (grains) to Very pale yellowish-orange (10YR 8/6) (cement)	Pale Greenish-yellow (10YR 8/2) to Light brown (5YR 5/6)
Texture:	Clastic	Pyroclastic	-do-
Framework grains:	Hawaiite clasts, ± 75%, ± 4 (47DS1?)	AoB Hyaloclasts, ± 80%, ± 12 mm dia	-do-; ± 75%, ± 2 mm dia a & AoB clasts, ± 3%, ± 1 mm dia & AoB(?) scoria lapilli, ± 2%, ± 3
Cement:	dense phosphorite, ± 25% (resembles 44DS9)	-do-; but porous & ± 20%	Smectite (nontronite?)/Phillipsite(?), ± 20%
Average grain size:	± 4 cm (range: ± 1 mm — ± 7 cm)	± 12 mm dia (range: ≤ 1 mm — ± 3 cm)	± 3 mm dia avge (range ≤ 0.50 mm — ± 2 cm)
Average grain shape:	subrounded	subangular	angular
Sorting:	extremely poor	-do-	very poor
Porosity:	low	very high	extremely high
Permeability:	very low	high	very high
Alteration:	moderate - total (basalt clasts display smectitization of some ferromagnesian components) | phosphorization of original chalk cement)	-do-, add oxidation, zeolitization	Total (Smectitization [nontronite?], zeolitization, oxidation)
Remarks:	Our sample is a small cobble-size fragment of a large cobble-size, subrounded talus clast completely enclosed in ferromanganese oxide encrustation such as described in other samples from this dredge (± 5 mm thick); the substratum resembles 47DS2, but is composed of (apparently) pebble-size clasts of 47DS1 flow interior rather than the lapilli(?) of 47DS2; cement of this sample is different also, being more like that of 44DS9, that is, dense with marmatose internal structure.	Our samples are angular fragments of pebble-size, broken from a larger ferromanganese-encrusted talus(?) clast (encrustation is like others recovered in this dredge, ± 2 mm thick); the substratum material is also similar to AoB hyaloclastite from other areas dredged by us on Keli Ridge	-do-, but cobble-size clast, w/ ± 1 mm-thick ferromanganese encrustation; displays faint, cyclical, crudely graded bedding; displays curious argillat "bleaching" (nontronite?) with larger cl usually goethite brown in the center, as in mat from numerous other Ke Ridge dredges

Sample No:	503+47DS7	503+47DS8	503+47DS9
Rock Type:	AoB Hyaloclastite	-do-	do
[illegible]:	Pale greenish yellow (10Y 8/2)	-do- with a heavy blend of light brown (5YR 6/6) and lighter	Light greenish-yellow (10Y 7/2)
Texture:	Pyroclastic	-do-	-do-
Framework grains:	AoB Hyaloclasts ±60%, ±4mm; Open Space, ±±20%, ±2mm	-do-, but ±65%, ±4mm dia; ±5%, ±3mm dia	-do-, but ≤60%, ≤1mm dia.
Cement:	Nontronite?/Phillipsite(?) ±20%	-do-, but ±30%	-do-, but ≥40%
Average grain size:	±4mm (range: ≤0.50mm — 15mm)	-do- (range: ≤1mm — 10mm)	≤1mm dia. (range: undetermined)
Average grain shape:	angular	-do-	subrounded (by hydrative argillation swelling)
Sorting:	very poor	poor	moderate(?)
Porosity:	very high	-do-	moderately high
Permeability:	high	moderately high	moderately low
Alteration:	Total (Smectitization [nontronite?], Zeolitization [Phillipsite?], Oxidation)	-do-, even more so	-do-, subtract oxidation
Remarks:	Our sample is a fragment of an oblate, subangular cobble-size talus clast which was completely enclosed in ferromanganese oxide encrustation similar to that described on other samples from 47DS, but up to 5mm thick; the substratum material is very similar to 47DS6, but is not all bedded, is much more open-textured, and lacks rock fragments and scoria lapilli; probably of same origin, but from a different part of the original deposit from the eruption	latiform; -do- but appears to be older(?) much more consolidated (infilled with nontronite?/Phillipsite?); much more condensed	-do-, but pebble-size; -do-; completely unlike any material described from the dredge so far; is distinctly bedded dense (bedding is often dissimilar) extensively argillized, and, in some beds, penetr[illegible] to a small extent with mn(O,OH): dendrites

ock Type: Hawaiite(?) Hyaloclastite Volcanogenic Breccia	→ -do-	⇒ Phosphorite / AOB Hyaloclastite Breccia
ol: Between Grayish-orange (10YR 7/4) and Pale greenish-yellow (10Y 8/2) (varicolored)	-do-, but → very pale orange (10YR 8/2) (coloring in stratiform, not chaotic, as in 47DS10)	→ very pale orange (10YR 8/2) but very pale olive (10Y 7/2) ⇒ quite chaotic!
exture: Clastic	→ -do-(?)	→ -do-, distinctly clastic
ramework grains: Hawaiite(?) clasts, ± 60%, ± 3mm	→ -do-, but arranged in strata, ± 50%	⇒ Phosphorite clasts, ± 55%, ± 1
" Hyaloclasts, ± 20%, ± 3mm	→ -do-, but	⇒ AOB Hyaloclastite clasts, ± 30%, ± 2cm
ment: Nontronite(?), ± 20%	→ -do-, but ± 5% & add ± 45% phosphorite	⇒ ± 10% dendritic Mn(O, OH)(?) ± 5% dark orange phosphorite
erage grainsize: ± 3mm	→ -do-	⇒ ± 1.5cm
range: ≤ 1mm – ± 10mm)	⇒ (range: ≤ 1mm – ± 5mm)	⇒ (range: ± 5mm – 3cm)
erage grain shape: Angular	→ -do-	⇒ subangular
rting: very poor	→ -do-	→ -do-
rosity: moderately high	→ -do-	⇒ high
ability: moderately low	→ -do-	→ -do-
teration: Penultimate (Smectitization, Zeolitization(?), Oxidation)	→ -do-, add phosphorization of chalk laminae	→ -do-
marks: Our sample is a lenso large pebble-size talus clast completely enclosed in ferro-manganese oxide encrustation of the same type described occurring on other 47DS samples; the substratum material very much resembles rock in 47DS1, 2, & 3, but extremely altered hydrothermally (more argillative than oxidative, as in some of the AOB hyaloclastites from this dredgesite)	→ -do-, but the crust is ± 1cm thick, & the entire sample is a cobble-size talus clast	→ -do- / -do-
the sample displays no bedding and may represent direct deposit from eruption (fragments very angular and joined by very small amount of hydrothermal cement)	→ -do-, but less intense argillation ⇒ Sample appears to be bedded, a composite of thin beds(?) or laminae of phosphorite, hawaiite, hawaiite(?) volcanogenic breccia and hawaiite(?) hyaloclastite (individual beds are ~3–5mm thick	⇒ This curious breccia appears to be made up of fragments of vari types of phosphorite an bedded, argillated AOB hyaloclastite (47DS9 to be specific) all cemented sparsely, but tightly with a curious v hard translucent dark orange phosphorite and Mn(O, OH?) (dendritic)

Sample No:	503+47DS13	503+47DS14	503+47DS15
(variously)	(composite with 47DS6 & 47DS)		
Type:	AOB Volcanogenic Breccia	-do-	Phosphorized Chalk
lor:	Dark brownish-gray (5YR 3/1) (grains) to Very Pale Orange (10YR 9/2) (cement)	-do-, also Dark yellowish-brown (10YR 3/2) (grains) to Very pale yellowish-brown (10YR 7/2) (cement)	very pale orange (10YR 8/2)
xture:	Clastic	-do-	granular/spongiform
grains:	AOB Clasts, ±30%, ±5mm	AOB(?) clasts, ±50%; AOB(?) hyaloclasts, ±12%; Angite(?) crystal fragments, ±3%, ≤1mm dia	foraminiferal tests, ±97%; Hawaiite(?) hyaloclasts, ±3%, ≤2mm dia
ment:	Phosphorized Chalk, ±70%	do, dense phosphorite, ±35%	do, porous phosphorite (not determined)
erage grainsize:	± 5mm dia	-do-, extremely variable	≤ 1mm (not determined)
range:	≤1mm – ±10mm)	(≤1mm – 2cm)	
erage grain shape:	subangular	-do-	round
rting:	poor	extremely poor	well-sorted
rosity:	high	moderately low	moderate – high
rmeability:	Moderate	very low	moderately low – very low
teration:	extensive – penultimate (phosphorization of original chalk cement, oxidation, smectitization, zeolitization of AOB matrix)	-do-	-do-, total
marks:	Our samples are pebble-to-cobble-size subangular talus clasts which are (usually) composites of several bedded lithologies; they were found completely enclosed in ferro manganese oxide encrustation such as that described on other samples from this dredge site; the substratum material usually occurs as a bed ±3cm thick sandwiched between 47DS6 and 47DS, or ferromanganese crust; it very much resembles other deposits from Keli Ridge such as 44DS8 and may be	Our sample is a single fragment of a large, rounded pebble-size talus clast which once bore a thick, dense, at least partly laminar ferromanganese oxide encrustation (removed before we could sample); the substratum very much resembles lithology 44DS9 which is such a strikingly unique deposit that this material described here is probably derived from it	Our samples are fragments of pebble-to-cobble-size talus clasts enclosed in dense ferromanganese oxide encrustation some of which is laminar in structure (internal) near the substratum, otherwise resembles other ferromanganese deposits described from this dredge site; the substratum varies in compactness and porosity from place to place and from sample to sample but otherwise appears to be more or less from the same deposit; resemble the cement from 47DS13 and often the lithology of 46DS3.