Sample Description

Cruise I.D: SO 33

Sample I.D: Sta: 1 DK

Location: Cross Sm 1
153° 22' 5" W (-) 4112
18° 41' 40" N

Size: _____ Weight: _____

Mn crust thickness:

Total: min: _____ max: _____ ave: _____

Inner crust: min: _____ max: _____ ave: _____

Outer crust: min: _____ max: _____ ave: _____

Surface texture: _____

Internal structure: _____

layered: _____
laminated: _____
massive: _____
porous: _____
dendritic: _____
other: _____

Mineralogy (XRD): _____

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: _____

Description: _____

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

SO33 1DK1	SO33 1DK2
Rock Type: Basalt (AOB?), massive	Basalt ~~hyaloclastite~~/Breccia
Color: Moderate yellowish-brown 10YR 5/4	Grayish-brown (5YR 3/2) to moderate yellowish-brown (10YR 5/4)
Groundmass: Glass — 40%? crystals (feldspar/olivine?) — 60%? smectites? zeolites? goethite? (related to glass)	glass smectite zeolites? goethite?
Phenocrysts: Plagioclase ±1%, ±1 mm; Olivine ±2% ±1 mm	Not observed
Texture: subaphyric, hyalopilitic — micaceous; subtrachytic	Aphanitic hyalopilitic to subtrachytic
Vesicles: varies from 0 — ±25%, ±1 mm — ±10 mm round to cylindrical elongate	not observed
Clasts: not observed	angular to subangular fragments ranging from ±1 mm — ±2 cm dia

Basalt, massive (1DK1)

Remarks: Very highly altered groundmass (glass only?) most phenocrysts appear fresh, if skeletal, particularly plagioclase most of the alteration appears to be smectitization and oxidation; the vesicles, when present generally empty, a few drusy linings of yellowish cubic-aspect zeolites? display flow orientation strongly in some samples; samples rare mostly sub rounded pebbles and cobbles set in matrix of brown hyaloclastite(?) ooze which bears a thin crust of δ-MnO_2 (?) coated brown phosphorite (?) [This is actually description of basaltic component of 1DK2]

Basalt Hyaloclastite: angular to subangular fragments of highly altered basalt set in cement composed of small rock fragments, smectite; zeolites?; very irregular upper surface coated with δ-MnO_2 (?) layer ±1 cm thick; no vesicles observed; no phosphorite deposits

(1DK2)

Sample Description

Cruise I.D: S033

Sample I.D: Sta: 1 DK

Location: Cross Cut
158°22'54" W
19° 41'40" N
(-) 4112 m.

Size: _____ Weight: _____

Mn crust thickness:

Total: min: ____ max: ____ ave: ____

Inner crust: min: ____ max: ____ ave: ____

Outer crust: min: ____ max: ____ ave: ____

Surface texture: _____

Internal structure: _____

layered: _____
laminated: _____
massive: _____
porous: _____
dendritic: _____
other: _____

Mineralogy (XRD): _____

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: _____

Description: _____

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

	SO33 1DK3	SO33 1DK4	SO33 1DK5
Rock Type:	"Red clay"	- do, - ooze	Trachyte Breccia
Color:	Pale orange-brown (5YR 6/2)	yellowish-brown (10YR 5/2)	Pale yellowish olive (10Y 7/2) pale brown (5YR 5/2) to grayish-brown (5YR 3/2)
Texture:	Clastic	- do -	- do - (Subtrachytic - trachyte fragments)
Matrix:	Manganese crust fragments - ± 5% ≠		
	Mn-micronodules - ± 5%	± 5%	
	Foraminiferal tests - ± 15%	- do -	
	Basaltic glass fragments - ± 5%	± 5%	
	Basaltic rock fragments - ± 5%	± 5%	
	Total: ± 35%	± 30%	
Cement:	Smectite/zeolites(?) - ± 65% ≠	± 70%	Trachyte fragments 80-90%; feldspar (sanidine?) ± 9[illegible]; Biotite(?) ± 5%; Fayalite(?) ± 2%; Zeolites (phillipsite?) 10-20%
Avge grain size:	~ 20 μ	- do -	± 1 cm (fine gravel - small pebble size)
Avge grain shape:	angular - round (forams)	- do -	angular - subangular
Sorting:	moderately poorly sorted	moderately sorted	moderately poorly sorted
Porosity:	70± %	80-90%	< 5%
Permeability:	- do -	- do -	< 3%
Alteration:	moderate to intense (oxidation, hydration (basalt phases) smectitization zeolitization, phosphorization(?) (carbonate component)	- do -	intense to complete (smectitization [nontronite], oxidation, hydration, zeolitization [phillipsite?])
Remarks:	fine, pasty, consolidated ooze with large sand-to-gravel-size component, both biogenic and volcanogenic; forms a very large part of the substrate recovered in the dredge; contains Mn-micronodules and regular-size ones (up to 1 cm dia.) and Mn-crust fragments; impression is that this material represents red clay ooze that has consolidated by marine diagenetic process (probably once had a large ash component now completely altered to smectite, zeolite etc.; generally covered by ± 1 cm-thick layer of knobby, warty δ-MnO_2 crust - no phosphorite layer observed - continuous crust - displaying evidence of current scouring and polishing from place to place on upper surface; clay gave (+) test for (PO_4) - phosphorization of calcareous component?	- do -, not consolidated; ≠; - do -; ≠	pebble-to-cobble-size subrounded to subangular clasts composed of gravel-to-pebble-size clasts of trachyte cemented rather tightly (some have ± 10% open spaces ± 3 mm avge dia.) with well-crystallized, colorless, transparent acicular zeolite aggregate; impression is that trachyte fragments rolled short distance from eruption site, becoming submarine rubble slope-covering; subsequent submarine hydrothermal activity altered the fragments and finally cemented them tightly together into a breccia.; texture of the trachyte is quite directed with tiny black, shiny flakes of biotite and rusty, equidimensional silt-size grains interspersed between feldspar laths.