DATE: 11 August 1984 SAMPLE:
CRUISE ID: SO 33 31DK box dredge
LOC: IV
AREA: C

	time (GMT)	LAT (N)	LON (W)	water depth (m)	wire
ON BOTTOM =	1256	6°16.8527	162°52.6657	13776	170
OFF BOTTOM =	1338	6°16.7332	162°52.6410	1378	144

time on bottom = 42 min

RECOVERY WEIGHT = total ~~300~~ kg crust <1 kg

CRUST THICKNESS = Veneer
1 generation

SUBSTRATE = bright red-brown glassy oxidized material. Unusual color
(Palagonite) (Blasenlava?)

COMMENTS:

* 1 microbio sample
* 1 bio sample

Sample No.: [illegible]	[illegible]
Rock Type: Basalt (AOB?) I	Basalt (AOB?) II
Color: Brownish-gray (5YR 5/1) (Medium purplish)	Dark gray (N 3)
Texture: Subaphyric – phyric, hyalopilitic – intersertal	– do –
Phenocrysts: Olivine <1 – ±5% (generally single phenocrysts) euhedral	– do –
Groundmass: Olivine – Plagioclase – Pyroxene? – Glass – } not determined	– do –
Vesicles: Size: extremely variable (<<1 mm – 8+ mm)	<1 mm
Shape: irregular	round
%: extremely variable (<1% – 50+%)	<<1%
Filling: empty – (usually) partial filling (lining) with calcite, zeolites, smectite?)	smectite
Alteration: extensive (Oxidation [hematite], smectitization, zeolitization, hydration) Olivine pxts completely altered to iddingsite	Interstitial glass? looks fairly fresh
	– do –
Remarks: Olivine basalt of diverse vesiculation and phenocryst density and distribution, but probably related to one flow unit, probably coupled subaerially and related to Basaltic Vent breccia II as the rocks bear many similarities, exposed surfaces bear thin (±1 mm) Mn-Oxide coatings, compute in protected areas, highly polished by water currents (?) on exposed surfaces.	Olivine basalt of considerably fresher aspect than Basalt I and much more dense, though appearance of groundmass and phenocrysts is much similar; probably a younger, less volatile-rich flow unit; exposed surfaces coated with thin (±1 mm) nodose Mn-oxide crust.

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Rock Type:	Basalt (AOB?) III	Basalt (AOB?) IV
Color:	Medium dark gray (N4)	Brownish-gray (5YR 3/1)
Texture:	Subaphyric - intersertal	- do - perhaps hyalopilitic
Phenocrysts:	Olivine - <1%, ±1 mm (single, euhedral)	≠ ±5%, ±1 mm dia single euhedra
Groundmass:	Plagioclase ?, Olivine ?, Clinopyroxene ?, Glass ?, Opaques ? } not determined	perhaps much more glass in matrix
Vesicles:	%: ±5%, Size: ±1 mm, Shape: irregular, filling: calcite (50-75% amygdules)	— absent —
Alteration:	moderate - extensive	extensive
	Olivine, both phenocrysts & groundmass are completely iddingsitized; interstitial glass altered to smectite? much evidence for penetration by fluids along fractures (smectitization)	- do - appears to be much more glass - totally altered to brown smectite - in the matrix
Remarks:	Olivine basalt of similar aspect to Basalt II, but apparently more altered - may be the same flow unit; exposed surfaces coated first with thin $Mn(OH)_3$ coating, then thin Mn-Oxide coating which has been polished by watercurrents?; apparently pebble-cobble-size components of a volcanogenic breccia, traces of which adhere to surfaces of the clasts	- do - even more altered; *probably the same unit as 31DK2

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Rock Type: Olivine Basalt (AOB(?)) pillow la

Color: Medium brownish gray (5YR 5/1) to yellowish-brown (10YR 5/2)

Texture: Phyric hyalopilitic (?- intersertal

Phenocrysts: Olivine, ±10%, ±2 mm dia (single, euhedral)

Groundmass: Glass, Olivine, Plagioclase, Clinopyroxene?, Opaques? } not determined

Vesicles: absent

Alteration: Extensive (smectitization, oxidation, hydration, zeolitization(?)) Olivine pxts & groundmass totally altered to pale green chlorophaeite; groundmass glass totally altered to smectite, etc.

Remarks. loose pebbles not related to other olivine basalt in the dredge or to the volcanogenic breccia; apparently fragments of a pillow lava, some pieces bearing a ±5 mm-thick palagonite rind; appears to have undergone pre-eruptive, non-oxidizing hydration (olivine, glass) and post eruptive oxidative alteration (palagonitization, oxidation of groundmass glass)

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AOB(?)

Volcanogenic breccia

yellowish-gray (5Y 7/2)

Clastic

(Matrix) predominantly AOB(?) rock fragments, ±45%

(Cement) Calcite (calcareous ooze ???), Smectite, Zeolite(?) } ±55%

(Avge grain size) ±3 mm (fine gravel)

(Sorting) poor

(Grain shapes) subangular + subrounded

(porosity) ±25%

(permeability) ±20%

(Alteration) Smectitization zeolitization?

Remarks: rock made of detritus derived from weathering and comminution of basaltic rocks and (perhaps) ash; looks like all rock fragments – perhaps devitrified glass shards as well – not apparent; grains range in size from silt size to pebble or cobble size and show evidence of considerable (subaerial) reworking before final deposition; thin coating <1 of nodose Mn-oxide on exposed surfaces

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Rock Type: Basaltic Vent Breccia I | Basaltic Vent Breccia II

Color: Moderate reddish-brown (10R 4/2) to Grayish-Red (5R 4/2) to Dark Grayish-red (5R 3/2) | **Color:** Grayish-red (5R 4/2) to dark grayish-red (5R 3/2)

Texture: Volcaniclastic, subaphyric → more phyric (not much)
subholohyaline, scoriaceous ↔ - do -

Phenocrysts: Olivine, <<1%, ±1mm ↔ ±1%, ±2 mm dia

Groundmass: Glass ±99% ↔ - do -

Vesicles: (extremely variable with distribution of flow lines) (also in size, shape) (<<1mm — ±5mm dia) ↔ - do -

Alteration: complete - nearly complete (Oxidation, smectitization, hydration) ↔ - do -

Remarks: Looks like a vent agglomerate breccia in which early hyaloclastic material piled up around a vent or vents, was incorporated in a later "Aa"-like flow of semi-liquid to semi-solid consistency; perhaps the rusty brown color of the scoriaceous cementing glass can be explained by subsequent low-temperature hydrothermal alteration — especially since the rusty color is not completely homogeneous (in some areas it is light brown); much of the incorporated breccia pieces and blocks are also highly scoriaceous and are oxidized to grayish-red indicating oxidation at higher temperature — perhaps before being erupted — These blocks and pieces frequently bear large iddingsitized olivine phenocrysts; large clasts of the breccia display definite flow structure; the incorporated breccia pieces and blocks often display greenish nontronite (?) & calcite deposits in vuggy areas.

↔ Similar to sample at left, but lacking reddish-brown glass "cement"; in this case, far more clastic material is present and is more loosely bound together (more of an "Aa"-like flow, perhaps); both these breccias were probably erupted subaerially, possibly later altered by hydrothermal fluids subsequent to final deposition.

subaerially erupted probably

exposed surfaces coated with +1 (±1mm) layer of very shiny black cuspate MnO_2 deposit