DATE: 11 August 1984 SAMPLE: 30 DK box dredge
CRUISE ID: SO 33
LOC: IV
AREA: C

	time (GMT)	LAT (N)	LON (W)	water depth (m)	wire o
ON BOTTOM =	0930	6°16.4220	162°53.1702	2217	2926
OFF BOTTOM =	1053	6°16.9367	162°52.9532	1388	1387

RECOVERY WEIGHT = Total 50 kg Crusts <1 kg

CRUST THICKNESS = 0 - .5 cm
Avg = veneer
1 generation

SUBSTRATE = Breccia, basalt, trachyte

COMMENTS:

* 1 bio sample
* smear slides made of sediment

30 DK

Sample No: [illegible]

1

Color: Olive Black (5Y 2/1)

Rock Type: Olivine Basalt (AOB?)

Texture: Phyric; subtrachytic, intersertal - intergranular?

Phenocrysts: Olivine ±7%, ±3 mm dia (mostly single euhedra, some glomerocrysts)

Groundmass: Plagioclase - Clinopyroxene, Olivine, glass ?, opaques — not determined (average size ±0.25 mm)

Vesicles: absent (dense)

Alteration: superficial - moderate (smectitization, iddingsitization, hydration, carbonation, oxidation) most of the olivine pxts are altered to pale green chlorophaeite and calcite; a large number are iddingsitized as well, often concommitent with chlorophaeite; a few are still largely unaltered (or merely oxidized) olivine; interstitial glass?! may be altered partly to smectite.

Remarks: bears a strong resemblance to AOB II in DK 33 - perhaps from same flow, different locus; occurrence here is as ± cobble size angular fragments from an extremely poorly-sorted volcanogenic breccia; traces of which still adhere to surfaces of fragments. (perhaps a dike rock ?)

2

Dark Gray (N 3)

Olivine - Plagioclase Basalt

Micro Phyric; subtrachytic intersertal - intergranular

Olivine, ±5 %, ±1 mm

Plagioclase, ±5, ±0.50 mm (acicular) (single euhedra)

— do — avge grain size ±0.10 mm

extremely variable in size, shape, distribution; generally fractured irregular, directed with the flow of the basalt, usually lined with zeolites, smectites

moderate - extensive (smectitization, zeolitization, oxidation, hydration, iddingsitization) all olivine is converted to iddingsite or (more rarely) chlorophaeite; oxidation extensive along fractures, and as weathering inward ±5 mm from exposed surfaces

Large boulder of flow basalt recovered in dredge, served as substrate for deposition of thin (±1 mm) deposit of Mn-oxide on exposed surfaces; $FeOH_3$ [illegible] substrate from foromanganese deposit ±5 mm

Rock Type:	Olivine Basalt (AOB?) (pillow lava)	3 → – do – → – do ? –
Color:	(fresh break) olive gray (5Y 4/1)	medium Grayish-brown (5YR 4/2)
Texture:	Phyric, varcolitic	→ intersertal
Phenocrysts:	Olivine, ±5%, ±1mm dia. (single euhedra)	→ Olivine, ±5%, wide range of crystal size, ±3 mm dia. (large glomerocrysts, small single euhedra)
Groundmass:	glass, Olivine } (not determined)	Plagioclase, Olivine, Clinopyroxene, glass, Opaques } not determined
Vesicles:	absent	→ (iddingsitized olivine fits together out on exposed surfaces to resemble vesicles)
Alteration:	extensive (smectitization, palagonitization, oxidation, hydration, isolitization(?)) Olivine crystals are converted completely to smectite, glass is partially palagonitized, though oddly, much fresh glass remains, groundmass glass probably totally devitrified	moderate – extensive (iddingsitization, oxidation) all olivine phenocrysts are completely iddingsitized
Remarks:	large, rounded pebble-size clasts (pillow fragments) with chilled margins up to 1 cm thick; oddly, in one specimen, zone of palagonitization is in the center of the chilled margin and is not continuous; thin Mn-Oxide crusts (<1mm) on sides ⊥ to chilled glassy margins of the pillow fragments.	large cobble-sized subrounded clasts (free, uncemented in breccia); maybe a pillow lava fragment, but grain size is remarkably uniform (dike-rock?) thin, spotty ice coating of Mn-oxide on exposed surfaces

4

	Sample 5	Sample 6
Rock Type	Olivine Basalt (~~tholeiite~~?)	→ -do-, but probably AOB
Color:	Medium gray (N 6) (brown tinge)	→ -do-, but no brownish tinge
Texture:	Phyric intergranular	→ -do-, but perhaps intersertal
Phenocrysts:	Olivine ± 15 %, ± 3 mm (avge) (Glomerocrysts & single euhedra)	→ ± 25 % (olivine); Plagioclase ± 20 % 0.5 mm dia (short, stubby euhedra?)
Groundmass:	Plagioclase, clinopyroxene, olivine, glass (?), opaques (not deformed)	→ -do-; (more?) olivine; (more?) glass
Vesicles:	%: ± 10 %. Shape: irregular. Size: ± 5 mm dia. filling: ± empty (some smectite [illegible]) (loss of smectite/iddingsite after olivine in surface weathering give appearance of more vesicles [illegible])	≠ -dense-
Alteration:	Moderate (smectitization, iddingsitization, oxidation, hydration, zeolite [illegible]). Olivine (& its [illegible]) completely altered to mustard yellow smectite and iddingsite (combination, [illegible])	moderate/extensive (smectitization, iddingsitization, oxidation, hydration); → -do- but more iddingsite
Remarks:	Subrounded, cobble-sized clasts (free? - from being cemented in a breccia?) appear to have been erupted subaerially and reworked by water currents (wave action?) also subaerially; no Mn-Oxide deposits on exterior; no cross-cutting veins of mineralization.	subangular - subrounded, [illegible]-sized, -do-; [illegible] extreme variation in phenocryst size and distribution (dike rock?); does not have Mn-Oxide coating → -do-

	7	8
Rock Type:	Basalt, massive (Tholeiitic)	→ -do-
Color:	Dark brownish-gray (5YR 3/1)	Dark gray (N 3)
Texture:	Aphyric, intergranular + intersertal?	Subaphyric
Phenocrysts	- extremely rare Olivine	Olivine, ±1%, ± 1mm dia Augite(?) << 1%, ± 1mm dia (glomerophyric to single euhedra)
Groundmass:	Plagioclase Clinopyroxene Olivine glass(?) Opaques } not determined	→ -do-
Vesicles:	absent (dense)	→ -do-
Alteration:	moderate (infiltration by fluids along fractures has produced oxidation, hydration, smectitization, zeolitization?; rare olivine pxts altered to yellow-green chlorophaeite	superficial-moderate (Iddingsitization of olivine) perhaps smectitization of glass)
Remarks:	large cobble-size angular-subangular clasts displaying weathered surfaces (exposed); texture at grains is very uniform (dike rock?); abundant black augite(?) crystals slightly larger than average grain size of the components visible with hand lens; exposed surfaces coated with thin (<1 mm thick) layer of Mn oxide; no residual volcanogenic breccia cement on exterior.	≠ → -do- ≠ -do-

Curious sheet-jointing of rock; develops rhomboid clasts

	9	10
Rock Type:	Basalt, massive (Tholeiitic)	→ -do-
Color:	Medium dark gray (N4)	Dark gray (N3)
Structures:	Subaphyric, intergranular-intersertal (microphyric)	Phyric, intergranular-intersertal (glomerocrysts & single euhedra)
Phenocrysts:	Olivine ±1%, ±0.75 mm (single euhedra)	Olivine ±25%, ±1 mm dia. Augite(?) ±5%, ±1 mm dia
Groundmass:	Plagioclase, clinopyroxene, olivine, glass(?), opaques (not determined)	→ -do-
Vesicles:	%:<1%. Size: extremely variable: <1 mm – ±2 mm; shape: irregular; filling: empty	absent (dense)
Alteration:	Superficial – moderate (all the olivine is iddingsitized and smectitized (more the latter) glass(?) may be smectitized. superficial oxidation and hydration	moderate – extensive → -do-
Remarks:	Cobble-size subangular clasts apparently free from volcanogenic breccia residue on exposed surfaces;	→ -do-
	as in samples 6–8, extremely uniform grain size, but quite unequal distribution of (rare) phenocrysts and vesicles (~~like rock~~?);	→ -do-
	fracture faces bear deposits of fibrokite(?) and yellowish smectite,	→ bear thin coating of smectite, goethite(?) & calc
	exposed exterior surfaces coated thinly (<1 mm) with Mn-Oxide	→ -do-

	11	12
Rock Type:	Basalt, scoriaceous (AOP)	→ -do-
Color:	Dark brownish-gray (5YR 3/1)	Brownish-gray, (5YR 4/1)
Texture:	Aphyric; aphanitic, microlitic	subaphyric, intergranular / intergranular
Phenocrysts:	± absent (rare olivine glomerocrysts)	olivine, 5%, 0.75 mm dia
Groundmass:	glass (devitrified), plagioclase(?), olivine, clinopyroxene(?), opaques(?) (not determined)	→ -do ?-
Vesicles:	%: ± 40%	→ -do-,
	shape: oval to irregular, coalescing	round
	size: ± 1 mm	± 2 mm
	filling: lined with bluish-white zeolite? powder	lined with pale green zeolite? powder
Alteration:	extensive - complete (all olivine is iddingsitized or oxidized to goethite/hematite(?); groundmass glass(?) is devitrified probably to iron oxides, smectite and zeolites.	→ -do-
Remarks:	pebble-to-cobble-size subrounded to rounded aggregates of unsized lapilli (smaller pebbles apparently joined together [illegible] cement); vesicle content, distribution, size vary slightly from piece to piece, as do presence/absence of phenocrysts; very light coating (dusting) of Mn-Oxide on some exposed surfaces; no volcanogenic breccia residue adhering to exterior	→ -do- ≠ phenocrysts of olivine (iddingsite) more abundant, grainsize of groundmass larger; more oxidized than 5YR 11; no Mn-Oxide coatings, no volcanogenic breccia residue on exterior

	13	14
Rock Type:	Basalt, massive (AOB?)	Basaltic (?) Hyaloclastite vent agglomerate
Color:	Light yellowish-brown (10YR 6/4)	Medium olive gray (5Y 4/2)
Texture:	Phyric, intersertal?	Pyroclastic
Phenocrysts:	Olivine ±15%, ±1 mm dia. (single euhedra & glomerocrysts)	Olivine, rare: (single euhedra)
Groundmass:	Plagioclase? Olivine? Clinopyroxene? Glass? Opaques? (not determined)	Glass
Vesicles:	absent	absent – rare localized in incorporated lapilli of other rocks
Alteration:	probably complete (smectitization, zeolitization?, oxidation, hydration)	intense (smectitization, zeolitization?) (complete?)
Remarks:	pebble to cobble-size subrounded clasts set in medium olive-gray (5Y 4/2) highly altered vent agglomerate? hyaloclastite; appears to have been altered by hydrothermal activity (bleached, smectitized). greatly resembles DK10, but much more intensely altered – (dike rock?) No Mn-Oxide coating, but covered with covered with spots of incipient Mn-Oxide growth cover exposed surfaces of the rock	massive slabs torn loose by dredging from outcrop and loose, subangular cobble to boulder size clasts of vent agglomerate? Has the appearance of an ignimbrite – perhaps is the basaltic equivalent. contains numerous lapilli and rock fragments of diverse origin, often forming a volcanogenic breccia; exposed surfaces (to seawater) are coated with thin (±1 mm) layer of nodose Mn-Oxide.

15	16
Rock Type: Volcanogenic Breccia	→ - do -
Color: Pale greenish-yellow (10Y 8/2)	yellowish-gray (5Y7/2)
Texture: Clastic	→ - do -
Matrix: basaltic rock, glass fragments ±20%; planktonic calcareous fossils(?) (not deter.)	→ ± 35 %
Cement: calcareous (foraminiferal?) ooze ±80%; Zeolites(?), Smectite(?), Calcite, apatite? (not determined)	→ - do - much more foraminiferal content (10-15 %); → not determined
Avge grain size: extremely variable (± 5mm?) (fine sand to cobble size)	± 1 mm (fine sand - coarse gravel)
Sorting: extremely poor	→ poor, but much better than DK15
Grain shape: angular to subround	angular to round (fossils) (mostly)
porosity: ± 25 %	± 45 %
permeability: ± 15 %	± 25 %
Alteration: phosphorization(?) (postdeposition?), zeolitization ?, smectitization ?	→ - do -
Remarks: massive slabs (broken by dredge from outcrop) to loose cobble and boulder-size clasts; vast variability in sorting, grain size, and shape indicate high energy environment of deposition, rapid deposition and cementation (induration); rounded fragments indicate reworking of part of the components in water currents (wave action?) prior to final deposition with other components; surfaces exposed to seawater environment bear thin (± 1 mm) coating of Mn-oxide.	pebble to cobble size, subangular to subround could belong with DK15 and simply be a better size-sorted bed; better preservation of fossils contained in rock and poorer induration could indicate more recent deposition than DK15; exposed surfaces, like DK14, bear thin coating of Mn-oxide.

~~SS33 30DK 17~~