DATE: 19 August 1984 SAMPLE: 56 DK box dredg
CRUISE ID: SO 33
LOC: VII
AREA: E

	time (GMT)	LAT (N)	LON (W)	water depth (m)	wire
ON BOTTOM =	1521	15°35.38	169°12.44	1335	145
OFF BOTTOM =	1637	15°36.59	169°12.08	1484	148
mean dredge data (corrected): (bereichiert)		15°35'55"	169°12'03"	1387 (758 fm)	

RECOVERY WEIGHT = total 13 kg crust 3 kg
10 kg basalt + hyaloclasti

CRUST THICKNESS = 1–5 cm Avg = 2.5 cm
2 generations

SUBSTRATE = Basalt + hyaloclastite

COMMENTS:

* microbio sample

* confidential

56 DK

Sample Description

Cruise I.D: 5033

Sample I.D: Sta: 56 DK

Location: "Kelly" Sm R.d

15°35'55" N
169° 12' 03" W
(-)13 87 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:

	1	2
Rock Type:	Basalt (AOB?) Hyaloclastite I	→ do, II
Color:	Moderate reddish-brown (matrix) (10 R 4/6)	Grayish yellow (5Y 8/4), (matrix) Olive gray (5Y 3/2)
Texture:	Pyroclastic	clastic
Matrix:	Basaltic glass shards, ±67 " rock fragments, ±3	→ do — ±50%
Cement:	Zeolites, ±15% Phosphorite ±12% Calcite, ±3%	Phosphorite, calcite, zeolites, } ±50% (intimate mixture?)
Average grain size:	±1mm (range: fine sand - fine gravel)	±2mm
" grain shape:	angular - subrounded	→ (fine sand to medium gravel) angular - subangular
Sorting:	moderately poorly sorted	poorly sorted
porosity:	±80%	±45%
permeability:	±80%	±5%
Alteration:	complete; (oxidation, hydration, zeolitization, smectitization, phosphorization, carbonation)	Complete; (zeolitization, smectitization (nontronite?) hydration, phosphorization, carbonation)
Remarks:	Similar to material from the previous two dredges, perhaps of the same derivation. In some specimens, cement is largely calcite and zeolites; in others, the calcite has been ± replaced with phosphorite and the degree of zeolitization varies from specimen to specimen, serves as substrate for encrustation of ferromanganese (±25 mm thick) deposit (knobby, warty surface); oxidation & zeolitization seem to be the dominant reactions in this alteration rock; curious development of very regular polygonal shapes of many matrix fragments (result of zeolite crystal growth peripheral to fragment?)	→ do, but type of alteration, cementation is different, coloring the matrix fragments differently and creating different composition and color of cement *Very like 57DK2 ≠ → ±10mm thick encrustation of ferromanganese oxide

Some pieces have curious rods (± 2 cm thick) composed of phosphorized (carcinous worm?) (cones?); these [illegible] between hyaloclastite & ferromanganese crust.

*2 (where on the description?) — found!
~~56DK4 is very like S037 36 DS 2~~
~~56DK3 is very like S037 48 DS 11~~

Sample Description

Cruise I.D: S033

Sample I.D: Sta: 56DK

Location: Kali R.L
15° 35'55" N
169° 12'03" W
-) 1387 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:

3

Rock Type: chalk-phosphorite	≠	AOB(?) Hyaloclastite III
color: Very pale orange (10 YR 8/2) [usually stained externally by $Fe(OH)_3$(?) to pale yellowish-orange (10 YR 8/6) to Dark yellowish-orange (10 YR 6/6)]	≠	
Texture: microgranular	≠	pyroclastic
Matrix: Globigerina(?) Globorotalia(?) test remnants and "ghosts" left by phosphorization process, 15-20%	≠	Hyaloclastite fragments, ± 65%
Cement: phosphorite (francolite?) 80-85%	≠	smectite, zeolites } ± 35% (undifferentiated
Average grain size: < 0.010 mm (range: 0.005(?) — ± 1 mm)	≠	0.50 mm (range: 0.10 mm — 5 mm)
" grain shape: round — acicular(?) (probably)	≠	subangular-subrounded
Sorting: well-sorted (prior to phosphorization)	≠	moderately poorly-sorted
Porosity: ± 5%	≠	± 80%
Permeability: ± 1%	≠	± ± 60%
Alteration: extensive - nearly complete (phosphorization of calcite, oxidation of of siderite(?))	≠	complete(?) (oxidation, zeolitization, argillation, hydration, calcification, phosphorization?)
Remarks: fragments and clasts ranging from small pebbles to boulders, dislodged by dredge from outcrop (?), forms cap several mm to ± 1 cm thick ontop of 56 DK 1 & 4 lithologies; frequently composed in part of large (± 5 mm dia), meandering, calcareous (phosphorized) worm tubes(?), the shells of which are concentric in development parallel to X-sections of the tubes, with central tubular channel 1-5 mm dia. Serve as substrate for knobby, botryoidal (grossly) (finely nodose) surficially 1-generation dendritic ferro-manganese crust; this crust delivers some $Fe(OH)_3$(?), by downward diffusion to underlying substrate, altering color and compositions.	→	fragments and clasts ranging from small pebbles to boulders, dislodged by dredge from outcrop (?) (subtotal) probably related to 56 DK 4 and 2, just different types of cementation and alteration involved in lithification and diagenesis; generally much more dense and lithified than 56 DK 4, some of which is so friable as to be fragile (uncemented); margins of grains are well-defined, as with mineral overgrowth (dark — perhaps thin ferro-manganese oxide coating); internally some are highly alt to $Fe(OH)_3$(?) or perhaps goethite (reddish-brown color) in the interiors; exteriors are bleached or altered to nontronite(?) — most are this way all the way through — similar to 56 DK 2; serves as substrate for ferro-manganese oxide deposits (like those) as in the other lithologies of this dredge
* vern like 5037 41 DS 11		* vern like 5037 36 DS 2