DATE: 25 August 1984 SAMPLE: 71 DK
CRUISE ID: SO33
LOC: VIII
AREA: F

	time (GMT)	LAT (N)	LON (W)	water depth (m)	wire ou
ON BOTTOM =	0150	20° 13.410	170° 36.077	2220	2887
(uncorrected) OFF BOTTOM =	0302	20° 13.493	170° 38.44	1740	
mean dredge data (corrected):		20° 13'25"	170° 36'00"	1997 (1092 fm)	

RECOVERY WEIGHT = ~ 200 kg (total) 20 kg (crust)

CRUST THICKNESS = Veneer to 3 cm Avg 1.5 cm
2 generations
sooty looking crusts

SUBSTRATE = phosphorite/trachyte breccia
foram. ooze

COMMENTS:
Sample of ooze in bottle
<63μ is 99.7% $CaCO_3$, 0.3% insoluble residue
* 2 microbio samples

71DK

71 DK

Gesamtmenge: 80 kg
davon 10 kg Kruste

- basaltische Breccie in phosphatisch, carbonatisch verfestigte Sediment

71 DK 1 80 x 30 cm Stück - große mehrere cm große basaltische Klasten, unterschiedlich alteriert, 0,5-0,8 Mn-Kruste, Oberfläche grobknotig

71 DK 2 30 x 10 cm s.o., bis 1 cm Mn-Kruste, 1 Stück

71 DK 3 isolierte Mn-Krusten ~ 2 cm mächtig

71 DK 4 basaltische Breccie, grünlich, stark alteriert

71 DK 5 ~ 0,4 cm Mn-Kruste auf carbonatischem Phosphorit

Sample Description

Cruise I.D: SO 33

Sample I.D: Sta: 71 DK

Location: Mid-Pac M. (Area F)
20° 13' 25" N
170° 36' 00" W
(~) 1548 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:

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Rock Type: Basalt (Alkalic?)

Color: Pale olive (10Y 6/2) to brownish-gray (5YR 4/1)

Texture: Microphyric, subtrachytic

Phenocrysts: Plagioclase
Pyroxene (?)

Groundmass: Plagioclase, Pyroxene?, Glass?, Opaques? } (not determined)

Vesicles: % (varies greatly within samples) nearly dense to up to 30%.
Shape: irregular elongate
Size: ± 1mm
filling: often filled with calcite or lined with phillipsite? needles

Alteration: Extensive!
(Zeolitization, hydration, smectitization, oxidation) → extensive; (Zeolitization, phosphorization, re-crystallization of calcite?

Remarks: pebble to boulder-size, generally rounded clasts set in cements of varying types, forming volcanogenic conglomerates; though dark in less altered pieces, apparently all alkalic basalt, probably of same origin (major constituents appear to be flat thin hexagonal plates to four-sided needles of plagioclase and shiny black four-to-six-sided needles of pyroxene; serves as substrate (as volcanogenic breccia) for ferro manganese deposit described

related to other basalts of Alcat

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Volcanogenic Breccia I
Light brownish gray (5YR 6/1)

Clastic
(matrix): ~~Trachyte~~ Basalt (?) fragments, ± 50%.
(cement): "sandstone" made of;
(pelecypod?) shell fragments, ± 10%.
manganese micronodules, ± 1%.
~~Trachyte~~ Basalt (?) fragments, ± 5%.
calcite ?, ± 1%.
phillipsite ?, ± 2%.
phosphorite (?), ± 1%.
(open space), ± 30%.
(Average grain size:) ± 1 mm
(" grain shape:) subrounded
(sorting:) extremely poorly-sorted
(porosity:) open-textured
(permeability:) 80+%

pebble-to-boulder size clasts composed of volcanogenic conglomerate; the included ~~trachyte~~ basalt clasts, generally well subrounded, are in varying states of alteration – some by hydrothermal and some by subaerial (?) weathering; roundness of the matrix constituents and surface weathering suggest a period of subaerial exposure and re-working by water currents prior to submergence. Serves as substrate for deposition of thin (up to ± 2 cm thick) encrustations of warty ferro-manganese-oxide; fractures in ~~trachyte~~ basalt (?) matrix material lined with todorakite dendrites.

Sample Description

Cruise I.D: 5037

Sample I.D: Sta: 71 DK

Location: MidpacMtns (Area F)
20°13'25"N
170°36'00"W
(~) 1548 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	4
Rock Type:	Volcanogenic Conglomerate II	Chalk
Color:	(matrix) greenish-gray (5GY 6/1) (usually cement) very pale orange (10YR 8/2)	very light gray (N 8) to very pale orange (10YR 8/2)
Texture:	clastic	granular
Matrix:	~~Trachyte~~ basalt(?) clasts ± 70%	foraminiferal tests (not determined)
Cement:	phosphorized chalk ± 30%	calcite, phosphorite (francolite?)
Average grainsize:	(extremely variable) (range: sand to large cobble-size)	~~(not~~ determined)
" grain shape:	subrounded	(not determined)
Sorting:	extremely poorly sorted	moderately well-sorted(?)
porosity:	± 60%	80+%
permeability:	± 40%	-do-
Alteration:	(cement) extensive; (phosphorization, zeolitization(?))	incipient; (phosphorization(?) of chalk - very spotty; recrystallization of calcite in foraminiferal te
Remarks:	Similar in form to 71 DK2, cement differing; infiltration by $Fe(OH)_3$(?)-bearing solutions variously colors the phosphorite cement, soft, porous, but harder than 71 DK4; serves as substrate for thin (<1mm) to thick (±15 mm), compact (fine nodose supertopography) encrustation of ferromanganese oxide; more indurated dense phosphorite (pale yellowish brown (10YR 6/2) to medium brownish-gray (5YR 5/1) also present as thin bands or layers	Subangular pebble-to-cobble-size clasts probably already dislodged from outcrop before collection by dredge (general encrustation with ferromanganese deposit - knobby, warty, ± mm thick); incipient phosphorization(?) of the chalk discontinuous, spotty (pale orange areas), not indurated; intensely penetrated by worm(?) burrows, tubes (serves as channels for manganese oxide deposition

Probably the same as 71 DK2, but coming from directly beneath ferromanganese crust hence no [illegible] coloring, greater induration

Sample No. SO33 71 DK5

Type: foraminiferal ooze

Color: Very light brownish-gray (5YR 7/1)

Sample Description

Cruise I.D: S033

Sample I.D: Sta: 7 / DK

Location: M. d Pac Mtns (Area F)
20° 13' 25" N
170° 36' 00" W
(-) 1548 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:

2 mm track interval 3
1000 points counted

Rock Type: Basalt, (pyroxene alkalic?) Latite

Color: Dark gray (N3) (bluish)

Texture: Microphyric, subtrachytic (quite directed) Intersertal

Phenocrysts: glomerophyric together and as single phenocrysts
- Plagioclase (oligoclase); ±10%, ±1mm
- Pyroxene (Augite, Bastite); ±15%, ±1mm
- Amphibole(?) Imenite, Sanidine, Magnetite; <5%, ±1mm

Groundmass: Fayalite (iddingsite) 6%
- Plagioclase? (oligoclase)
- Pyroxene (?) (augite)
- Amphibole (?)
- Glass (Glass)
- Opaques? (Magnetite, Sanidine, Apatite)

(~~not determined~~) 11%

Vesicles: absent, 1%

Alteration: moderate, (argillation [smectite] oxidation, hydration)

Remarks: angular cobble-to boulder-size clasts perhaps dislodged from a primary outcrop (no adhering cement on the clasts); displays strong flow structure, directed texture; is the freshest rock recovered in the dredge, but displays aureolic alteration patterns strongest around clast peripheries; strongly resembles other basalt from Area F (pc/px/am pxt assemblages), pyroxenes, pc are long, acicular, like hornblende in schist. Serves as substrate for ±1mm-thick, dendritic (internal struct), 1 generation ferromanganese crust with finely nodose surface topography.

Counts:

San-	266	27%
glss-	1[illegible]8	11%
Olig-	[illegible]	27%
Fayn-	60	6%
Mgt-	72	7%
Aug-	198	20%
Apat-	10	1%
Ilm-	4	<1%
		99%

probably same melt, may be different flow units

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Basalt → -do-

Yellowish olive gray (5 GY 7/1) to olive gray (5Y 5/1) (altered rim)

Phyric, intergranular(?)

-do- pc = ±3%, ±2mm dia. / px = ±3%, ±1mm dia. } most frequently glomerophyric

→ -do- (?)

→ -do-

moderately extensive argillation [smectite], oxid hydration.

Remarks: pebble-to-cobble-size intraclasts set in Volcanogenic Conglomerate #I (71DK[illegible]) more crystalline than other basalts from this seamount, but probably derived from same magma chamber (pc/px/am assemblage, plagioclase & pyroxene are short & stubby, (unlike 71DK6), most often glomerophyric with each other (subophitic intergrowth of pp partially-enclosing pc), rarely amphibole dense, no flow structure evident (unlike 71DK6); evidence of subaerial exposure from rounding of clasts and weathering aureoles peripheral to clasts; serves as substrate for ±1mm-thick ferromanganese crust (dendritic internally, finely nodose extern[illegible]) curiously weathered (or hydrothermally altered) externally to pale yellowish-green (10 GY 7/2) - mistaken for nontronitized trachyte in hand specimen

Sample Description

Cruise I.D: SO33

Sample I.D: Sta: 71DK

Location: (Mid Pac Mtns Area F
20° 13.25' N
170° 36.00' W
(-) 1548 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:

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Rock Type: Basalt, (Px-Alkalic?) → -do-

Color: pale greenish-yellow (10Y 8/2) to pale yellowish-green (10GY 7/2) (externally) to yellowish-gray (5Y 7/2) to medium dark gray (N4) internally

Colors vary strikingly in concentric aureoles fr[illegible] outermost very altered to innermost (core) least altered: Light brown (5YR 6/0), pale greenish-yellow (10Y 8/2), yellowish-gray (5Y 7[illegible] pale yellowish-brown (10YR 6/2), olive black (5Y [illegible]

Texture: Microphyric, intergranular (?) (most pheno crysts are single) Strong flow structure & flow banding ≠ → -do-, phyric

Phenocrysts: Plagioclase - ±5%, ±1mm dia
Pyroxene - ±5%, "
Amphibole(?) - <1%, "
→ -do-; PC, ± 2%; Px, ± 2%; am, ± 1%

Groundmass: plagioclase, Pyroxene, glass (?), Opaques, amphibole? (not determined) → -do-

Vesicles: %: varies from ±3 - ±10% (abundance varies from band to band)
Shape: irregular, elongated in direction of flow
Size: ± 0.75 mm
Filling: usually lined with calcite(?) or zeolites(?)
→ -do-, ±3% only; calcite, smectite

Remarks: pebble-to-small cobble-size angular-to-subangular clasts loose and set in volcanogenic breccia #I (71DK 2), pieces ≠ are usually altered to pale greenish or yellowish color - mistaken for trachyte; strong flow structure and flow banding ≠ with acicular crystal phases and vesicles oriented with direction of flow; probably derived from the same magma batch as other basalts from this dredge as mineral phases and textures are very similar; serves as substrate for thin veneer of black, finely botryoidal ferromanganese oxide
→ -do-; but set in Volcanogenic Breccia #2; not the same; -do-; but up to 1cm thick and quite dense

Alteration: extensive to complete (argillation [smectite], hydration, zeolitization) → -do-
trace [illegible] varies from band to band;

Sample Description

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(-) 1548 m

Size: _____ Weight: _____

Mn crust thickness:

Total: min: _____ max: _____ ave: _____

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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:

Rock Type: Phosphorite

Color: Grayish-orange 10YR 7/4

Texture: finely granular, (dense, interlocking grains)

Matrix: foraminiferal tests, almost completely lost by conversion to apatite, condensation by diagn

Cement: Phosphorite (francolite?), virtually indistinguishable from matrix.

Average grain size: probably < 0.005 mm

" " shape: probably short acicular

Sorting: probably of uniform grain size at the subMicroscopic level

Porosity: < 1%.

permeability: none

Alteration: Complete (phosphorization of original $CaCO_3$ Chalk, oxidation of Siderite?) component of ~~for~~ foraminiferal tests

Remarks: rather, flat pebble-size clasts found loose in dredge; coloring is mottled, occasional "ghosts" of foraminiferal tests visible; surface topography is marred by narrow dia. bore holes (worm?, clam?)