DATE: 15-16 August 1984 SAMPLE: 49 DK box dredge
CRUISE ID: SO 33
LOC: VI
AREA: D

| | time (GMT) | LAT (N) | LON (W) | water depth (m) | wire on |
|---|---|---|---|---|---|
| ON BOTTOM = | 0007 | 9°12.012 | 164°55.733 | ~1400 | 1499 |
| OFF BOTTOM = | 0129 | | | | 1335 |
| mean dredge data | | 9° 12' 01" | 164° 55' 73" | 1350 (738 fm) | |

RECOVERY WEIGHT = total 17 kg
crust
5 kg
10 kg basalt
2 kg breccia

CRUST THICKNESS = Veneer to 2 cm
Avg < 1 cm

SUBSTRATE = basalt

COMMENTS:

49 DK

# 49 DK

Gesamtmenge: 25 kg
davon 5 kg Krustenmaterial
2 kg Sediment

- Basaltisches Substrat, 2 größere Stücke 30 × 30 cm
  sonst kleine Bruchstücke
- mit dicker Fe-Kruste 2 - 3 cm, 2 Generationen
- mit dünner Fe-Kruste ~ 0,8 cm, 1 Generation

| | |
|---|---|
| 49 DK 1 | in Basaltit eingebettete Fe-Kruste (3 cm) mit 2 Generationen |
| 49 DK 2 | Alkali-Olivin-Basalt mit 0,5 cm Umkrustung |
| 49 DK 3 | Alkali-Olivin-Basalt, alteriert, Bereiche von korrodierter Fe-Kruste |
| 49 DK 4 | isolierte Fe-Krustenbruchstücke |
| 49 DK 5 | Rest |

## Sample Description

Cruise I.D: S033

Sample I.D: Sta: 49DK

Location: SP Lee Surf area

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: |
|---|---|
| | |

5 6

Rock Type : Volcanogenic Breccia → -do-

Color : Light brown (5YR 5/6) (matrix), very pale Orange (10YR 8/2) (Cement) | Grayish brown (5YR 3/2) (general matrix color), White (N9) (Cement)

Texture : Clastic → -do-

Matrix : Basaltic rock fragments, ±75% → -do- ±30%
phosphorite fragments, ±5% → -do-, ±10%

Cement : phosphorite, ± ±17%
zeolites, ±3% ≠ phosphorized (±) chalk ±60%

Average grain size : quite variable, ± 3 mm, large → -do-
(Range: Sand size — small pebble size) → -do-

Grain shape : angular - subangular | angular — subrounded

Sorting : very poorly sorted → -do-

Porosity : ± 40% | ± 80%

Permeability : ± 5% | ± 10%

Alteration : extensive, See remarks on ±3 DK-4 → -do-

Remarks : See → -do-

[related (derived from) to 49 DK4]

Sample No : S033 49 DK 7

Rock Type : Foraminiferal chalk

Color : White (N9) to medium dark gray (N4)

Texture : granular

Matrix : Globigerina(?) Globorotalia : foraminifers - ±0.25mm, 0-50%
ferromanganese micronodules - ± 0.20mm, ±10%
manganese dendrites - variable size, ±50%

Cement : calcite, phosphorite(?) (not determined)

Average grain size : to 0.20mm

Grain shape : round, remnant

Sorting : well-sorted

Porosity : ± 90%

Permeability ± 90%

Remarks : rounded, corroded (scalloped) pebble-to-cobble-sized ch... penetrated by manganese oxide dendrites, (more numerous toward & at periphery), also penetr... by large pencil-like worm-t... very mottled appearance due to penetration of interior by dendri... manganese oxide; looks wate... worked; has thin veneer of ferromanganese oxide

## Sample Description

Cruise I.D: S033

Sample I.D: Sta: 49 DK

Location: S Lee Seafs Area

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: Plagioclase-phyric Basalt (Tholeiitic?) (weathered) | Basalt, massive, (tholeiitic(?)) flow |
| Color: Moderate brown (5YR 4/4) to Pale brown (5YR 5/2) → | Moderate brown (weathered) (5YR 4/4) to Dark grayish-brown (5YR 3/1) |
| Texture: Phyric, hyalopilitic, pilotaxitic ≠ | Aphyric, hyalopilitic, pilotaxitic |
| Phenocrysts: Plagioclase ±5%, ±2 mm dia (some glomerophyric, most single euhedra); Clinopyroxene <1%, ±1 mm dia. ≠ | absent |
| Groundmass: Plagioclase, Clinopyroxene(?), Olivine(?), Glass?, opaques? } not determined → | -do- |
| Vesicles % <1%; Size: ±1 mm; Shape: round; Filling: lined with zeolites(?) ≠ | absent (dense) |
| Alteration: extensive - almost complete; (oxidation, hydration, smectitization, zeolitization of glass, crystals) } | -do-, but much more segregated into zones (less altered/more altered) |
| Remarks: ellipsoidal clasts (originally may have been oblate spheroids) found loose in dredge; ~~may represent volcanic bombs (palagonite(?)~~ zones ±15 mm thick peripherally — may also simply be hydrothermal alteration aureoles — they are crystalline and appear to be continuous with the less-altered interior rock); serve as substrates for thin (<1 mm thick) ferromanganese deposits on surfaces exposed to seawater | Giant (boulder size) clast (free?, dislodged from outcrop by dredge?) of flow basalt, curved convoluted structure, including zones ~~of palagonitization~~ or hydrothermal alteration (oxidation, etc.), brecciation (material similar to altered palagonite zones forms the matrix material, phosphorite & zeolites the cement), and breccia composed of clasts of various types of volcanic rocks & phosphorite, cemented by calcareous (foraminiferal) ooze (chalk) (difficult to explain!) numerous veinlets of todorokite (dendritic penetration into chalk breccia); also serves as substrate for encrustation deposit (±3 mm) of knobby, warty ferromanganese oxides. |

at thinking: this is more likely →

↔

(probably same rock-type)

## Sample Description

Cruise I.D: S033

Sample I.D: Sta: 49 DK

Location: SP Lee Sea Area

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, massive, tholeiitic(?) → -do-

**Color:** (fresh break) Grayish-black (N2) | Dark brownish-gray (5YR 3/1)

**Texture:** Phyric; hyalopilitic, pilotaxitic | Subaphyric; intersertal, subophitic

**Phenocrysts:** glomerophyric and single euhedra
- Plagioclase ± 10%, ± 2 mm dia, avge → -do- ± 2 mm, ± 1%
- clinopyroxene ± 5%, ± 2 mm dia, avge → -do-, ± 2 mm, ± 1%
- Olivine (?) ± 2%, ± 1 mm dia avge

**Groundmass:** Plagioclase - major
clinopyroxene - -do-
olivine ?
Glass
opaques
} not determined → -do-

**Vesicles:** absent (dense) → -do-

**Alteration:** penultimate (almost total replacement - leaching and skeletonizing of plagioclase, olivine(?) phenocrysts; partial silicification of interstitial glass?) | Superficial (oxidation, smectitization of glass?)

**remarks:** Free (loose), angular, pebble-to-cobble-size clasts with almost no zone of weathering around the periphery; phenocrysts difficult to distinguish because of severe alteration; plagioclase (fresh) is glassy, yellowish, frequently glomerophyric with deep reddish-brown, glassy (looks black except on thin edges), virtually unaltered clinopyroxene. Rock appears vesicular at first glance on weathered surface, but cavities are merely hollows left by former phenocrysts. Curious that rock should have well-developed flow structure and yet be absent of vesicles (very dry magma?); outer surface of clasts covered thinly (<< 1 mm) first with $Fe(OH)_3$(?) or perhaps hematite, then ferro-manganese coating. → -do-