

XXI. PETROGRAPHY OF VOLCANIC ROCKS FROM THE GH79-1 AREA IN THE CENTRAL PACIFIC BASIN

Hidekazu Tokuyama and Atsuyuki Mizuno*

Volcanic rocks were collected from two sites on a seamount and abyssal basin in the northern Central Pacific Basin. One site (GH79-1-1486) is on the uppermost slope of a seamount in the southeastern part of the survey area (Fig. XXI-1). Another one (GH79-1-1452A) is at a foot of small seamount on abyssal basin area at a depth of about 5,600 meters in the middle-northern part of the area. Position, water depth, and the results of observation are summarized in Table XXI-1.

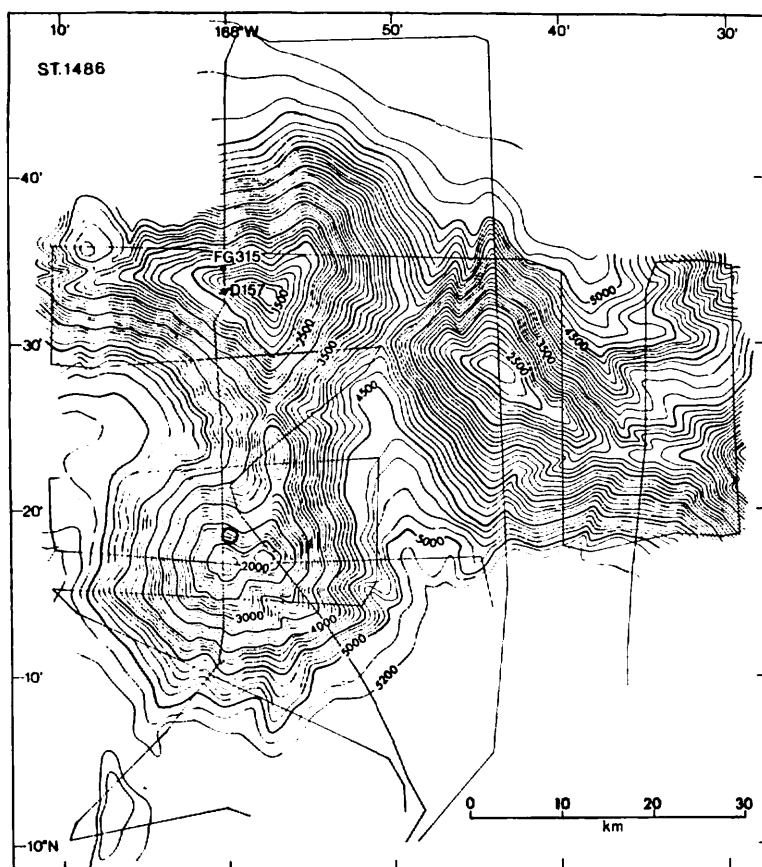


Fig. XXI-1 Bathymetry near St. 1486. Open circle shows the dredge site reported by NATLAND (1976).

*Ocean Research Institute, University of Tokyo, Tokyo

Table XXI-1 Volcanic rocks from the GH79-1 area and their site data.

Sta. no.	Sample no.	Position	Depth	Method	Results
1486	D315	10°33.19'N 168°00.11'W	1609 m	Chain-bag dredge	Pyroclastic rocks
1452A	FG158C-2	12°58.99'N 174°00.18'W	5567 m	Freefall grab	Mugearites, alkalic basalts

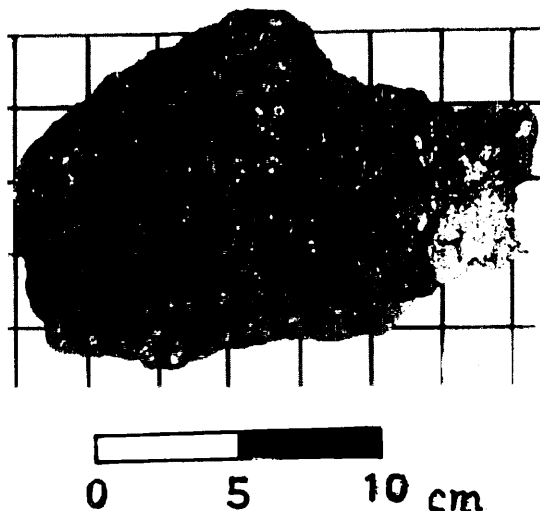


Fig. XXI-2 Photograph of a fragment of pyroclastic rock from St. 1486.

The pyroclastic rocks, coated with manganese layer (Fig. XXI-2), are mainly composed of volcanic glass shards under a microscope. The glass shards are brownish and vesicular. The seamount belongs to the Line Islands Cross Trend Chain, and the bed rocks at 10°18'N, 168°00'W, very near St. 1486, have been studied by NATLAND (1976). He describes the occurrence of biotite-bearing potassic nephelinite and hyaloclastite. The detailed petrographic nature of our samples are not clear, but they are expected to have similar nature to the rocks reported from the same seamount.

From St. 1452A in the middle-northern part of the survey area we collected many fragments of rock, which are mostly mugearites and alkalic basalts, by means of a photo-boomerang. St. 1452A is located on the eastern foot of a small seamount with relative height of about 3,000 meters. Seismic reflection and 3.5 kHz records show no transparent layer beneath very rough sea floor in the vicinity of the station. Piston corer could collect only a fragment of hard shale, and two photo-boomerangs could collect a small amount of zeolite-rich clay and many subangular to subrounded fragments of volcanic rocks (Fig. XXI-3), together with calcareous rocks (see Table I-6). Sea floor photographs taken by the photo-boomerangs (Fig. XIII-2) confirm that bed rocks are exposed on the sea floor at the station with little covering of sediments.

The volcanic rocks from St. 1452A are classified into two types; mugearites and alkalic basalts. Mugearites are characterized by vesicular and trachytic texture (Fig. XXI-4A). High vesicularity and fluidal structure suggest that the rocks erupted on land. The

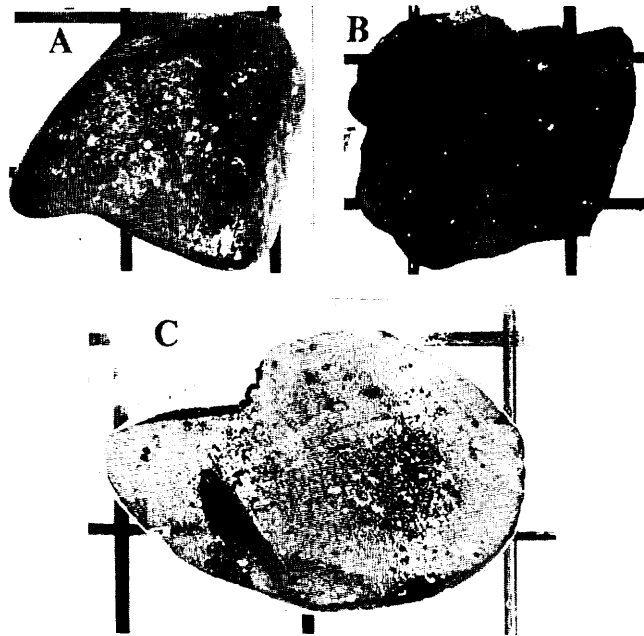


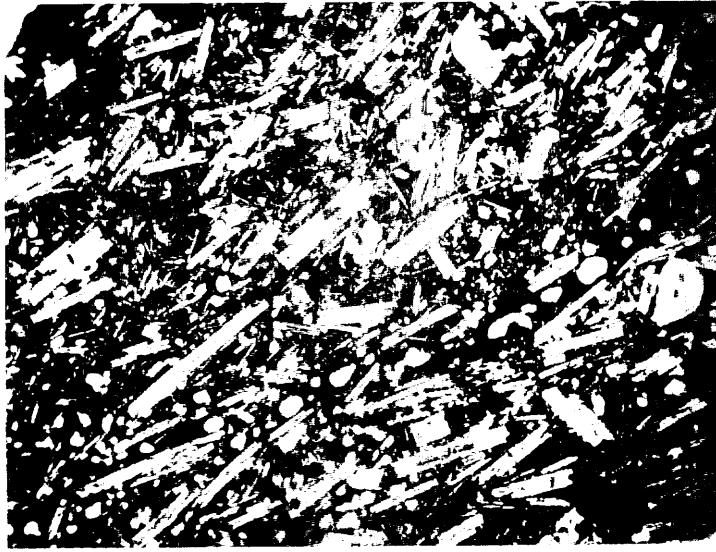
Fig. XXI-3 Photographs of fragments of volcanic rock from St. 1452A. The lower photograph shows a split surface. An interval of heavy solid lines is 2.5 cm.

mugearites are composed of phenocrysts of lath-shaped plagioclase (10 to 20 per cent) and groundmass of plagioclase (40 to 50 per cent), skeletal shaped titanomagnetite (3 to 5 per cent), and glass (20 to 30 per cent). Glass is highly altered to clay minerals. Petrographically the rocks are similar to the mugearites reported from DSDP Site 170 (WINTERER, EWING, *et al.*, 1973). Alkalic basalts are characterized by fine grained and intersertal texture (Fig. XXI-4B). The alkalic basalts are composed of phenocrysts of lath-shaped plagioclase (1 to 3 per cent) and of groundmass of plagioclase (30 to 40 per cent), titanogite with dendritic texture (30 to 40 per cent), dust-like titanomagnetite (3 to 5 per cent), and glass (20 per cent). The basalt may have erupted into waters.

Field occurrence of subrounded to subangular fragments of the rocks from St. 1452A is still subtle, but their similarity to the rocks reported from DSDP Site 170 suggests that the rocks under discussion may have derived from the nearby small seamount where the Cretaceous basement basalts are expected to be exposed.

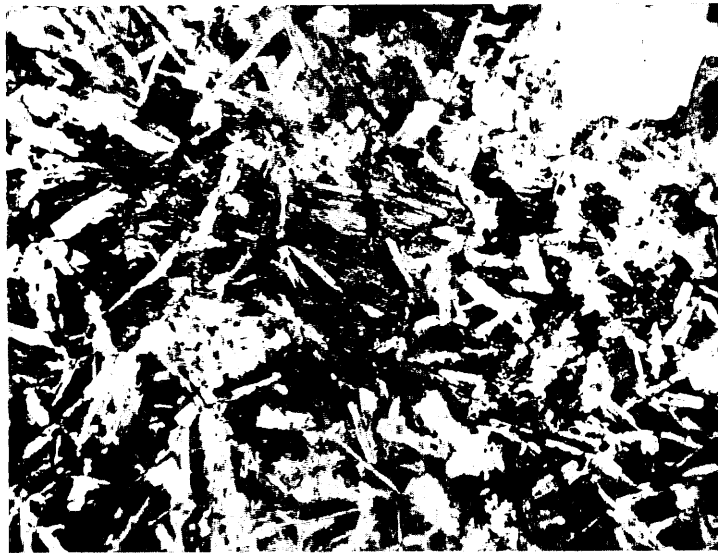
References

- NATLAND, J. H. (1976) Petrology of volcanic rocks dredged from seamounts in the Line Islands. In SCHLANGER, S. O., JACKSON, E. D., *et al.*, *Initial Reports of the Deep Sea Drilling Project*, vol. 33, Washington (U.S. Government Printing Office), p. 749-777.
- WINTERER, E. L., EWING, J. I., *et al.* (1973) *Initial Reports of the Deep Sea Drilling Project*, vol. 17, Washington (U.S. Government Printing Office), xx + 930p.



500 μ

(A)



500 μ

(B)

Fig. XXI-4 A: Photomicrograph of mugearite (St. 1452A, FG158C-2). B: Photomicrograph of alkalic basalt (St. 1452A, FG158C-2).