

III. SUBMARINE TOPOGRAPHY

By Atsuyuki Mizuno and Kaichi Ishibashi

Bathymetric survey was carried out throughout the whole cruise by means of the Deep Sea Precision Depth Recorder with a frequency of 12 KHz (12 KHz PDR) manufactured by the Nippon Electric Co. Ltd. (NEC). Here, the result in the surveyed area, based upon the observations along the tracks shown in Fig. I-5 is briefly shown, with a joint consideration of the previously published data on submarine topography.

As shown in Fig. III-1, wide deep sea basin occupying the larger part of the surveyed area is surrounded by seamounts and guyots of the Christmas Ridge to the north and to the east. In the chain seamounts are distributed in the north of the basin, and guyots tend to be restricted to the east of the basin. The summits of these topographical highs are variously leveled. In the northern chain, that of the shallowest is about 1,500 m in depth, and in the eastern chain, the shallowest flat top of guyot is about 1,000 m in depth.

The deep sea basin with a depth of about 5,000 m is characterized by a linear arrangement of relief in a NW-SE direction, which includes small deep sea hills, seamounts and deeps. This feature is more striking in western peripheral area, as indicated in Fig. III-1.

Another characteristic of the topography of the basin is the remarkable difference between the eastern half and western half.

According to Chase et al. (1971), a nearly flat floor is widely developed in the eastern half, while many deep sea hills are scattered in the western half, and their boundary lies obliquely in the median part of the surveyed area from NW-SE, slightly crossing the linearity mentioned before. This was ascertained also by our survey.

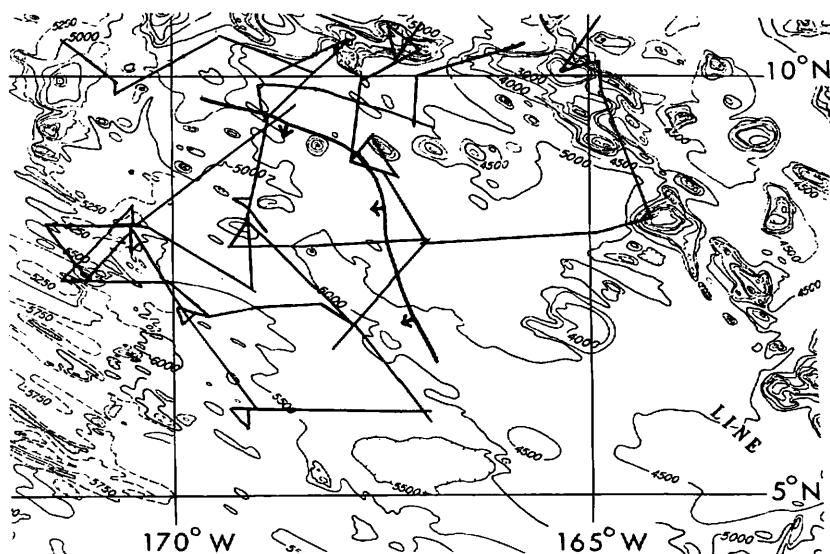


Fig. III-1 Outline of submarine topography (after Winterer, et al., 1973).
The solid line with arrow shows the western hilly area.

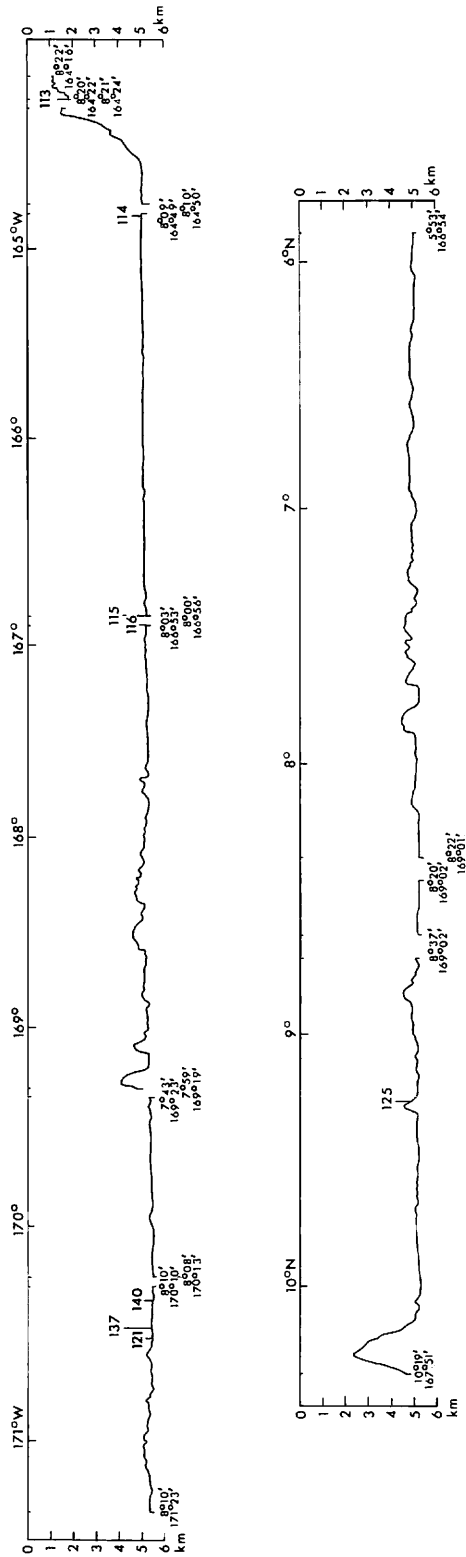


Fig. III-2 Topographical profile along a west-east line in the median part of the surveyed area.

As shown in Fig. III-2, for example, in the west-east profile representing topographical feature of the surveyed area the eastern half consists of very gently sloped flat floor, while the western half is characterized by rolled topography. This rolling topography is caused by many deep sea hills and some seamounts, which tend to be arranged in a NW-SE direction with many inter-mountainous small flat basins.

Discrimination of such two topographical patterns becomes somewhat obscure in the northern part of the basin, as some hills and seamounts are developed in the eastern flat area there and also a rather wide deep sea basin is developed with a west-east extension at the immediately south of northern seamounts chain. Nevertheless, it is convenient to call the western rolled area as the western hilly area.

References

- Chase, T. E., Menard, H. W. W. and Mammerickx, J. (1971): *Topography of the North Pacific (Chart Tr-14)*. La Jolla, Inst. of Marine Resources, Univ. Calif. at San Diego.
- 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+930pp.