

Tectonic evolution of the Pacific-Izanagi-Farallon triple junction in Late Jurassic

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We present the tectonic history of the Pacific-Izanagi-Farallon triple junction revealed by the minute bathymetric survey in the northwestern Pacific Ocean by Hydrographic Oceanographic Department, Japan Coast Guard.

The Mesozoic magnetic lineations exist in the western Pacific Ocean. The two sets of the Mesozoic magnetic anomaly lineations, the Japanese and Hawaiian lineation sets, have been identified and extended to M29 in the whole northwestern Pacific and to M35 in a part of the area (Nakanishi et al., 1989). The Japanese and Hawaiian lineation sets was formed at the Pacific-Izanagi Ridge and Pacific-Farallon Ridge, respectively. The magnetic bight between Japanese and Hawaiian lineation sets indicates the configuration of the Pacific-Izanagi-Farallon triple junction was a ridge-ridge-ridge type.

Magnetic bights were identified at the junction of lineations between M24B and M23. Its trace trends N15 W. The lineations from M29 to M25 are equivocal in the Hawaiian lineation set so that the older part of this bight could not be identified in this period. The Japanese lineations, however, have unequivocal lineations from M29 to M25. The northeastern ends of these lineations show a direction of about N15 W. The direction agrees well with that of the bight. The magnetic bight hence may be continuous throughout from M29 to M23. The junction of lineations older than M29 is obscured because of the existence of many seamounts, a paucity of available data, and the small amplitudes of magnetic anomalies older than M29.

To exposed the detailed tectonic evolution of the Pacific-Izanagi-Farallon triple junction, other evidence than magnetic anomaly lineations are indispensable. Lineated abyssal hills, which are basaltic ridges formed at and parallel to spreading centers, is one of the effective evidence. Hydrographic Oceanographic Department, Japan Coast Guard has conducted the minute bathymetric survey in the northwestern Pacific Ocean for Continental Shelf Survey. The bathymetric data are dense enough to expose lineated abyssal hills. We also used the bathymetric data obtained by R/V MIRAI, R/V Hakuho-maru, R/V Thomas, G. Thomson and R/V Thomas Washington. Our detail mapping illustrates that the lineated abyssal hills have two distinct azimuths. One is N45 E, which is parallel to the Japanese lineation set, and the other is N55 W, which is parallel to the Hawaiian lineation set. Near the junctions of the Japanese and Hawaiian lineation sets, we found the curved abyssal hills, which could have been formed at the triple junction.