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Vertical Magnetization Structure of Ocean Crust and uppermost Mantle

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One of objectives of drilling a complete section of 'typical' oceanic crust and uppermost mantle is a study of their vertical magnetization structure. Understanding of variation of magnetization intensity and degree of alteration of in-situ lower crust and uppermost mantle provides a long-awaited opportunity to approach the question of the origin of marine magnetic anomaly.

Spot sampling to save the drilling time is acceptable, but rock core samples are definitely required. Oriented core sampling is critical for the study. Down-hole magnetic measurements and other logging tools are useful to fill gap between sampling.

At least, one deep hole through the oceanic crust to the mantle is absolutely essential to reveal the complete section of the magnetization structure. In addition, several shallow holes should be combined along the seafloor age flow line for the study of spatial and temporal variations. Oceanic lithosphere originated at a fast-spreading ridge is preferable to drill in order to obtain high-resolution records. Of course magnetic anomaly stripes are clearly demonstrated at the drilling site.

The understanding of the magnetization structure evaluated from the drilling results benefits a comprehensive understanding of marine magnetic anomaly observed at near-bottom, surface, and satellite, and that gives insights of the correct 4-D magnetization structure and nature of magnetic polarity transitions.

Paleointensity of the geomagnetic field is probably recorded in the oceanic lithosphere. Global variations of the crustal magnetization distributions extracted from globally collected near-bottom magnetic anomalies will provide independent evidences of temporal variations of the paleointensity. The oceanic lithosphere is the consecutive magnetic storage media in the past 200 million years, therefore we expect to decode the long history of the paleointensity.