

海陸境界域での地磁気異常

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Magnetic anomalies along the subduction zone

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We investigate the subducting history of Japan Trench and Nankai Trough, which was made possible by the addition of the newly acquired and the existing marine geophysical data. The present dynamic relationship operating in the subduction zones have some relationships among the crustal structure, basic topography, geomagnetism, gravity, heat flux and seismicity.

The transition zones between island arc and subducting slab interaction are found to be with weak and ambiguous magnetic and gravity anomalies. Using the forward modeling of magnetic and gravity with seismic structural data, the qualitative interpretation to estimate the geometry, densities, magnetization, and magnetized depth were obtained. Determination the position and orientation of magnetic sources using the application and comparison of multiple depth estimation methods; such as, Werner, Euler, spectral methods, straight-slope and half-slope methods have been carried out. Several aspects of magnetic body, depth estimation from filtering of the input magnetic field, the selection of the structural style of the body have been interpreted.

Marine geophysical data obtained from the R/V Kairei surveying in the Japan Trench and Nankai Trough in 1997, 1998, and 1999 totally 30,000 nautical miles. Our targets are to reveal geophysical features across the trench and trough axis with precise source structure of gravity and magnetic anomalies, and to understand variation of subducting plate from the edges of the trench and trough to deep underneath the Island arc kinematically. In 1999 to reveal

precise crustal structure along the long lines from seaward to island arc. In the Japan Trench, well-developed horst and graben structures have subsequently been revealed along one of the MCS record which are being discovered, and though by exceeding ocean trench, the shape is kept over about 50km to landward across the trench axes (Tsuru et al., 1998). We have identified chrons M12 (135 Ma, south) to M8 (127 Ma, north) in the geomagnetic data, as well as southwest / northeast-striking magnetic lineations extending for more than 100 km across the trench axis. Interpreting the origin and persistence throughout subduction of these structures will require a thorough investigation of the trench's thermal structure. It is known that the observed distance of across the ocean trench axis differs in north and south along the Japan Trench. The observation of the magnetic anomaly held the ocean trench comes out the case in which deformation of oceanic crust, the magnetic anomaly and shapes of sinking plate, Curie point depth are examined. Widely landward anomaly zone can be explained in the existence of magnetic substance that it has physical property equal to granite in Cretaceous period in Kitakami and Abukuma.