

## Geophysical Investigation on Mariana forearc region by R/V Yokosuka - a preliminary result of a box survey by YK01-11 cruise -

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The R/V Yokosuka of Japan Marine Science and Technology Center (JAMSTEC) has surveyed the central Mariana forearc region in October, 2001. We focus on geophysical features in the survey area bounded by latitude, longitude: N18.5 - 19.5, E146.8 - 147.7, which is a forearc region characterized by the existence of serpentine seamounts discovered by dredge hauls, observation and sampling by submersible dives, and deep sea drilling. More than 8 \* 100 km North-South track lines with 10 km spacing and 1 \* 110 km East-West track line were surveyed during the YK01-11 cruise, using total and shipboard three-component magnetics (STCM), swath bathymetry and gravity data. The fine coverage of this dataset will be supplemented by information on seamount structure obtained from dredge and drilling data, and used to constrain numerical modeling of the depths of geomagnetic anomalies.

The geomagnetic total field measurement, is made by towing a proton magnetometer at about 300m distance from the ship's stern, with samples recorded at 20-30 second intervals. The data quality is checked via a real-time monitor in the onboard laboratory. The proton magnetometer records only the absolute value of the geomagnetic field, but provides no resolution of its direction. In order to obtain this information, a STCM measurement system has been developed over the past 30 years. Figure-eight maneuvers were performed during the leg to estimate shipboard magnetization effects. 8 Hz data including shipboard roll, pitch, and yaw were filtered to remove noise and sampling bias, and analyzed to determine whether anomalous features were essentially two- or three-dimensional.

The purposes of this study are: (1) to reveal the fine scale shape of serpentine seamounts and their vicinity; (2) to identify geomagnetic properties with intensity variations and shape of magnetic layers; (3) to reveal density contrasts and build up 3D crustal structure model in this region.

The total geomagnetic, free-air and bouguer gravity anomaly maps are compiled in the survey area for the purpose of determining the origin of potential field anomalies and estimating their distribution. Broad negative anomalies of both magnetic and gravity fields and the part dipole magnetic anomaly are obtained from the observed values. Geomagnetic two-dimensional modeling along 8 track lines and the waveform analysis were carried out. We also calculated intensity of magnetization using the Fast Fourier Transform with magnetic anomaly and bathymetry data files. Future work to conduct detailed processing will further elucidate tectonic structure in the forearc region, including fine scale 3-D variations.