

# Geomagnetic and gravimetric anomalies around the serpentine mud volcanoes in the fore arc area, Mariana

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There was not so much investigations for geological study on the serpentine mud volcanoes in the fore arc of Mariana. Several days of investigation (KR0003 cruise) by R/V Kairei in 2000 and the deep sea drilling investigation of ODP are given recently.

Investigation of the geomagnetism, the geographical features was performed for almost the whole area of serpentine mud volcano area, longitudinally 1 degree in width, from 13 N to 20 N, during the YK0307 cruise.

From S to N, the south Chamorro Sea-mountain (13 47'N, 146 0.2'E), the Bluemoon Sea-mountain (15 43.7'N, 147 11.7'E), the Celestial Sea-mountain (16 31.6'N, 147 12.7'E) and Bigblue Sea-mountain (18 6.4'N, 147 6.0'E), Pacman Sea-mountain (9 10.5'N, 147 3.5'E), Conical Sea-mountain (19 32.3'N, 146 39.0'E) and Coni-Pac area (19 38.3'N, 147 5.1'E), diversions of Shinkai6500 recovered many rocks from the surface of sea-mountains.

E-W survey lines with the length, 3 times of the size of sea-mountains, were determined for better record of geomagnetic study. Geophysical data were obtained (total survey line length, approximately 5400km) in the E-W direction about 60km, in the S-N direction about 650km. Reflection strength data were obtained also by SEABEAM 2112.

3 component magnetometer and proton-precession magnetometer almost worked normally though gravity data was not obtained during the YK0307 cruise by the malfunction of gravity meter. For getting recalculation coefficients, two 8 loop running (the south and north end of the survey area) were done to calculate the 3 component geomagnetic intensity. The geomagnetic anomaly data of 3 component magnetometer and proton-precession magnetometer were analyzed. These data were divided to five blocks around each sea mountain. Gravity data were obtained during the cruise of KR0003, and analyzed around the South Chamorro Sea-mountain only.

If the density of the South Chamorro Sea-mountain is assumed to be 1.5g/cm<sup>3</sup>, the average density, the Bouguer gravity anomaly becomes smooth around the summit part of the mountain. It is reasonable value because the density of the matrix is about 1.3 though the density of collected rocks is 2.3 to 2.8.

The magnetization of collected rocks, having different directions in matrix, and it doesn't reflect directly on the magnetic anomaly, and total effect of susceptibility can be thought to appear. Assuming that the South Chamorro is magnetized in about 1A/m, a magnetic anomaly around the summit of the sea mountain becomes 30-50nT. Magnetization of about 0.5A/m causes the anomaly to be 20-30nT. It looks like reasonable viewing the P-P value. Geomagnetic anomaly of other serpentine mud volcanoes seems to be a little bigger, 50 to 100nT P-P, but nearly the same estimations will be expected considering their peak depth and volume.