

Geophysical survey of the southernmost Central Indian Ridge: Preliminary results of YK05-16 leg-1

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The southernmost Central Indian Ridge (CIR) shows slow-spreading morphological feature, which is characterized with prominent axial valleys and core complexes. The area also shows complicated along-axis and across-axis structural variation due to the complex tectonic history related to the evolution of R-R-R triple junction. During YK05-16 in January 2006, we conducted two types of geophysical surveys to understand the tectonics and structure of the area; one is the ordinary underway geophysical mapping using multibeam echo sounder, towing and shipboard magnetometer and shipboard gravimeter, and another is the detailed geomagnetic survey using deep sea three component magnetometer attached to the manned submersible Shinkai 6500.

The underway geophysical mapping focused on an oceanic core complex located near 25S and on off-axis abyssal hills up to 2.5 Ma seafloor in CIR Segment 3. The 25S core complex is a doomed topographic high with well-developed, flow line parallel corrugations on its top and is located just west of the current ridge axis between Segments 1 and 2. The pattern of magnetic anomaly shares common traits with the pattern in Segment 2 but shows much larger positive amplitude near the top of the core complex. It may suggest the induced magnetization due to the serpentinization of olivine in the lower crust/ upper mantle exhumed along the detachment. The submersible observations strongly support the idea that the corrugated hill top is the detachment surface. The off-axis area of CIR Segment 3 records the temporal variation of volcanism, indicating that the lower volcanism and large asymmetry characterize the seafloor before 1.7 Ma.

The deep sea magnetometer was attached to the submersible during total 10 dives. The magnetometer measures three component of vector geomagnetic field and logs these data with submersible attitude data from gyrocompass every 10 second. The effect of submersible magnetization is removed by using data collected when the submersible descends. The collected data are expected to include information about shallow and short-wavelength magnetic characteristics of crust and to lead better understanding of 1) geochemical composition and structure of corrugated surface of 25S core complex, and 2) character of CAMH (central anomaly magnetic high) within the neo volcanic zone.