

## Detailed morphology of the Central Indian Ridge between 20deg15S and 15deg30S: implication for ridge-hotspot interaction

# Kyoko Okino[1]; yasushi Ichikawa[2]; Kensaku Tamaki[3]

[1] ORI; [2] Geosystem Engineering, Univ. of Tokyo; [3] ORI, Univ of Tokyo

<http://ofgs.ori.u-tokyo.ac.jp/~okino/>

The Central Indian Ridge (CIR) (intermediate spreading rate) offsets toward west from the Rodrigues Triple Junction to the Egeria Fracture Zone and then offsets toward east from Marie Celeste Fracture Zone. Between these two fracture zones, the Rodrigues Segment is known as the loci of hotspot-ridge interaction. This long portion of the ridge consists of two second-order segments Seg-15 and Seg-16. The western off-axis of Seg-15 is characterized by an east-west trending chain of seamounts and minor ridges, that is considered as a trace of volcanism influenced by Reunion hotspot. The Great Dodo Cruise, KH06-4 legs 3 and 4 of R/V Hakuho-maru, was conducted from December 2006 to January 2007 to understand the ridge-hotspot interaction of this area and to discover a new hydrothermal vent. We collected bathymetry data between 20deg15S and 15deg30S in unprecedented quality and resolution using 20kHz SeaBeam2120. The axial valley of CIR Segments 15 to 18 was fully covered and the Marie Celeste FZ and off-axis areas of Seg-16 were also mapped. Seg-15 can be divided into four sub-segments from Seg-15A (south) to Seg-15D (north). The axial valley is 8-13 km wide and 600-800m deep in average. Offsets of each sub-segments is less than 8 km. Seg-15A is characterized with relatively deep axial valley and an axial volcanic zone (AVZ) is recognized approximately at the center of the valley. Seg-15B is the longest sub-segment in Seg-15 and shows asymmetric morphological structure, where the eastern rift flanking valley wall is steep and straight, on the other hand the western one is ambiguous and winding. In Seg-15C, the faults develop nearly symmetrically and the segment center becomes shallower. Seg-15D is a deep, short sub-segment and a relatively large volcanic cone is located at the segment center. On the western off-axis of the Seg-15 east-west trending minor ridge structures, Three Magis and Gastiao Ridges, are considered as the volcanism under the influence of plume from the Reunion hotspot. Our new mapping data clearly shows detailed morphology of the eastern extension of the Gastiao Ridge and the axial volcanic chain of Seg-15. The very contact of the Reunion Hotspot plume and CIR spreading axis seems to be located at the western rim of the Seg-15B. The extension of the Gastiao Ridge forms topographic high, which was named as the Roger Plateau. Whole the feature of the Roger Plateau appears to be formed by hotspot-ridge interaction process. The eastern foot of the plateau branches out over the CIR axial valley wall and active volcanic feature that was not deformed by faults nor fissures are recognized on the plateau. Within the Seg-15B axial valley, on the other hand, the axial volcanic zone (=mid-ocean ridge volcanism) consists of many small volcanic cones aligned parallel to the general ridge trend. The AVZ shows a small offset, likely third-order segmentation, and shifts westward near the Rodger Plateau. These observations reveal the pinpoint of ridge-hotspot interaction and that two types of volcanism occurs within several kilometers on the axial zone simultaneously