

## Petrography and petrology of basalts from southern segments of Central Indian Ridge

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Petrography and petrology of basalts from southern segments (from the Rodrigues Triple Junction through to the third segment of Central Indian Ridge (CIR)). Basalt samples were collected during KH03-03 cruise by R/V Hakuho-maru (Tamaki & Fujimoto, 1995) and YK06-05 cruise by R/V Yokosuka and Shinkai6500 submersible (Kumagai et al., 2006).

**Petrography:** Three dredges were conducted at the first segment of the Central Indian Ridge (CIR-S1) during KH93-03 cruise. Fresh to relatively fresh basalts with quench glass were recovered from these sites. Phenocrysts consist of plagioclase and olivine, and glomeroporphyritic assemblage and skeletal olivines are included. Groundmass shows intersertal texture, and hyaloophitic and intergranular textures are observed in places. Totally 10 dives of Shinkai 6500 submersible were conducted during YK06-05 cruise. The 926th dive was conducted at the Neo Volcanic Zone (NVZ) in the second segment of CIR (CIR-S2), and the 927th dive was at the NVZ in the third segment of CIR (CIR-S3). Furthermore, the 924th dive was conducted at the Knorr Seamount at the southern segment end of CIR-S3. At these sites, fresh basalts were recovered from pillow lava and/or sheet lava flow. Most basalts are aphyric to sparsely phyric basalts. Plagioclase and olivine are contained as phenocryst, and glomeroporphyritic assemblage and skeletal olivines are included. Groundmass shows intersertal texture, and hyaloophitic and intergranular textures are observed in places.

**Petrology:** Basalts from site KH03-01D1 and D3 at CIR-S1 and from the 926th dive at CIR-S2 have  $Mg\#=65$ , and those from KH03-01D4 at CIR and from the 924th dive at Knorr seamount have  $Mg\#=58$ . Basalts from the 927th dive have most evolved compositions in the studied area ( $Mg\#$  less than 55). Basalts from KH93-03D3 and D4 at segment end of CIR-S1 and those from the 926th dive at the segment center of CIR-S2 have low  $K_2O/TiO_2$ , indicating that they are 'typical' MORB samples. Basalts from the 926th dive at the segment center of CIR-S2 have lowest  $Na_8$  value (2.2-2.3), while those from KH93-3D4 and the 927th dive have  $Na_8=2.7-2.8$  and those from KH93-03D1, D3, and the 924th dive have  $Na_8=2.8-3.1$ . Differences of  $Na_8$  values can be explained by differences of degree of melting, if compositions of source mantle are homogeneous. If so, degree of melting is the highest at the segment center of CIR-S2 in the southern segments of CIR. However, variations in  $K_2O/TiO_2$  and  $P_2O_5/TiO_2$  spaces suggest that compositions of source mantle is heterogeneous at least for Na, K and P.