

## Mantle heterogeneity in the source region of MORBs along the northern Central Indian Ridge

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The northern Central Indian Ridge (CIR; 8°–17°S) is composed of seven segments whose spreading rates increase southward from ~35 to ~40 mm/yr. Although previous studies have analyzed a limited number of rock samples collected more than two decades ago, no systematic chemical or isotopic studies of the northern CIR have previously been conducted. During expeditions to study hydrothermal activity on the northern CIR onboard the R/V Onnuri, high-resolution multibeam mapping and systematic sampling of volcanic rocks along the ridge axis were carried out. Here, we report on major and trace element, and Sr–Nd–Pb isotopic compositions of basaltic glasses from the spreading axis along the northern CIR, which reveal two distinct enriched mantle sources. On the southern segments, the samples generally show high Nb/Yb and  $^{87}\text{Sr}/^{86}\text{Sr}$ , and low  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios, similar to the Reunion plume and to enriched lavas previously collected from the southern CIR. These patterns suggest that the southern segments were affected by the Reunion hotspot plume (EM2) and its trail, as the CIR migrated over hotspot-modified mantle. In contrast, lavas from the northern segments are characterized by high La/Sm and  $^{206}\text{Pb}/^{204}\text{Pb}$ , and low  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios, distinct from the Reunion plume but indicating a “focus zone” (FOZO) component. The “FOZO-like” enrichment in the northern segments cannot be attributed to an adjacent mantle plume or to delamination of the lower continental lithosphere. Instead, this enrichment may have resulted from recycling of ancient subduction-modified oceanic crust, possibly accompanied by carbonatite metasomatism.