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Diversity and evolution of suboceanic mantle: constraints from Neotethyan ophiolites at the eastern margin of the Indian plate

Biswajit Ghosh^{1,2*}, Sarmishtha Mukhopadhyay¹, Tomoaki Morishita², Akihiro Tamura², Shoji Arai², Debaditya Bandyopadhyay¹, Soumi Chattopadhyaya¹, Thungyani N Ovung¹

¹*Department of Geology, University of Calcutta, 35 Ballygunge Circular Road, Kolkata, India*

²*School of Natural System, College of Science and Engineering, Kanazawa University, Japan*

ABSTRACT

The mantle sections of four Neotethyan ophiolite bodies viz. Nagaland, Manipur, Andaman island and Rutland island lie along the eastern margin of the Indian plate. Among the at least two existing ophiolite belts in this region, all of these four ophiolite bodies belong to the western ophiolite belt. The major and trace element signatures of the constituent minerals of mantle peridotites of these ophiolites suggest that the samples from Nagaland, Manipur bear unequivocal signatures of abyssal peridotites. The compositional spectrum observed in them is within the limit of anhydrous melting of a MORB mantle source under reasonable melting condition. The Andaman ophiolite although overall characterizes the same, however, some mantle peridotites from this ophiolite might have experienced a hydrous melting event. The Rutland samples are distinct, showing signatures attesting to their forearc origin. The compositional spectrum observed in Nagaland, Manipur and a group of Andaman samples are grossly similar with samples recovered from Philippine Sea basins. Accordingly, interpretation regarding the geotectonic setting for the origin of these ophiolites straddles between mid-ocean ridge (MOR) and back-arc. If they truly represent their origin at MOR setting then the plagiogranites in these places showing arc affinity likely represent a later arc-related event, without having much connotation to the age of these ophiolites. Alternatively this study establishes a back-arc origin of these ophiolites.

Keywords: Ophiolite; Mid-ocean ridge; Supra-subduction zone; Nagaland; Manipur; Andaman

*Corresponding Author. E-mail: bghosh_geol@hotmail.com Tel: +91-33-2461-4891

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