Platinum-group element geochemistry and whole-rock systematics of mafic-ultramafic rocks from the Indo-Myanmar Orogenic Belt Ophiolites, NE India: Implications on mantle processes and tectonic settings

Monika Chaubey* A. Krishnakanta Singh

Wadia Institute of Himalayan Geology, Dehradun, 248001, Uttarakhand, India
*Email: monika.chaubey6422@gmail.com

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INTRODUCTION

The Nagaland-Manipur Ophiolite (NMO) that lies along the Indo-Myanmar Orogenic Belt (IMOB) is considered as leftover pieces of the Tethyan ocean lithosphere, formed as the Indian plate collided with the Myanmar plate.The rocks of IMOB represents the magmatism of supra subduction, mid-oceanic ridge and Ocean Island basalt.

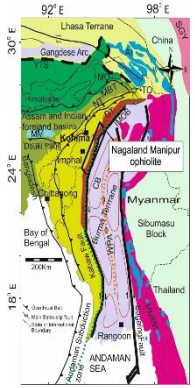


Fig. Global geologic map of northeast India and neighboring Myanmar (modified after Westerweel et al., 2019; Licht et al., 2019).

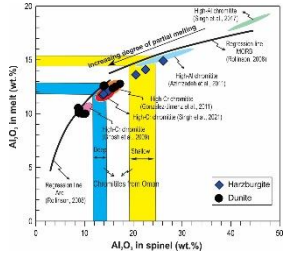
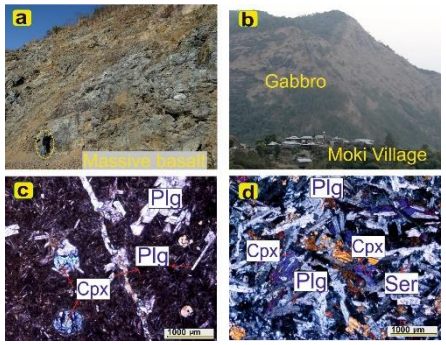
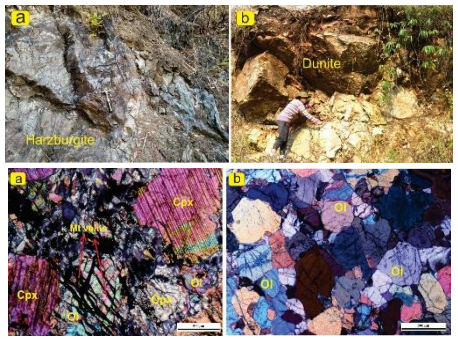


Fig. Al2O3 vs. TiO2 discrimination plot after Kamentsky et al.,2001 for the spinel of harzburgite and dunites from IMOB.

FIELD PHOTOS AND PETROGRAPGY(Mafics)



FIELD PHOTOS AND PETROGRAPGY(Ultramafics)



GEOCHEMISTRY

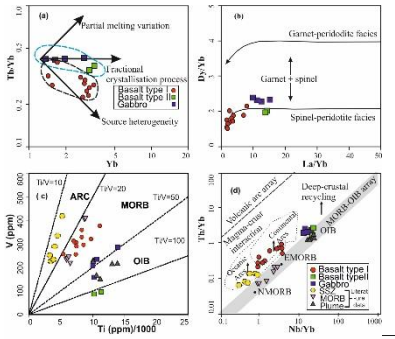
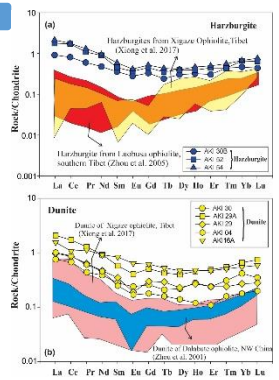


Fig. (a) Tb/Yb vs Yb plot. **(b)** Dy/Yb vs La/Yb diagram **(c)** Ti vs V (Shervais, 1982). **(d)** Th/Yb vs. Nb/Yb diagram modified after Pearce (2014).



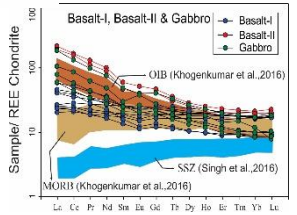


Fig. Chondrite-normalized REE patterns for Basalt, gabbro, Harzburgite & Dunite. All literature data for MORB,OIB and Plume SSZ are from IMOB. Normalization values are from Sun and McDonough, 1989.

PGE PATTERN & TECTONIC OBSERVATIONS

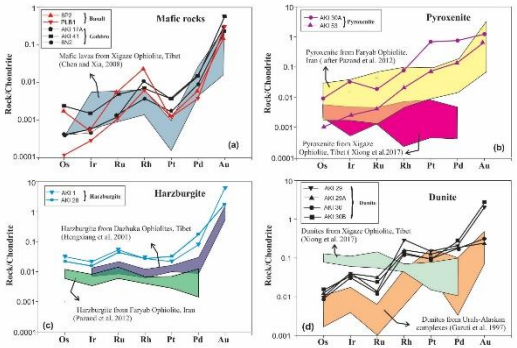
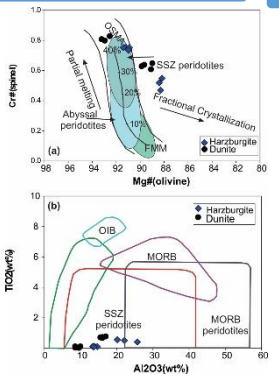


Fig.a) Olivine Spinel Mantle Array (OSMA) diagram (after Arai. 1994 and modified by Pearce et al. 2000) for harzburgite and dunites from IMOB. FMM represents the fertile mantle; **(b)**Al2O3 vs. TiO2 discrimination plot (after Kamentsky et al.,2001) for the spinel of harzburgite and dunites from Indo-Mayanmar Orogenic Belt.



CONCLUSION

1. The rocks from IMOB show geochemical characteristics of sub alkaline N-to E-MORB type (basalt-I) and alkaline OIB type (basalt-II and gabbro).The MORB-type Arc samples of basalt-I derived from a depleted mantle source in the spinel-peridotite facies while the samples of basalt-II and gabbro derived from an enriched mantle source in the spinel+garnel peridotite facies. The dual geochemical characteristics of basalt-I is due to the partial melting of upwelling asthenosphere with minor subducting slab melt in a subduction zone.
2. Whole-rock, mineral chemistry and PGE geochemistry of the studied ultramafic rocks suggest that the depleted residual mantle harzburgite and dunites have been refertilised by reaction with percolating basaltic melt in the mantle wedge region of subduction zone.