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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

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The Platinum Group Element (PGE) systematics and whole-rock geochemistry of *mafic* and *ultramafic* rocks from the ophiolites of Indo-Myanmar Orogenic Belt, northeast India were studied to comprehend their source characteristics and the fractionation behavior of PGE during magmatic evolution. Geochemical studies of mafic rocks reflect Mid-Oceanic Ridge (MOR) Basalt to Ocean Island Basalt (OIB) affinities while ultramafic rocks have both MOR and Supra Subduction Zone (SSZ) setting signatures. The basaltic rocks show flat REE patterns and slightly depleted LREE [(La/Sm)_N = 0.97-1.01], showing MOR-type basalt whereas gabbro shows enriched LREE [(La/Sm)_N = 2.85-4.24; (Sm/Yb)_N = 2.50-2.88], and characterized by OIB-type mafic rock. Conversely, pyroxenites exhibit depleted LREE (La_N/Sm_N = 0.54-1.16) but flat MREE (Sm_N/Yb_N = 2.78-4.02) reflect spoon-shaped pattern, whereas harzburgite and dunite show U shaped [(LREE and HREE enrichment (La/Sm)_N = 2.55-3.61, (Tb/Yb)_N = 0.51-0.86, respectively] REE patterns which indicate formation in a forearc environment. The PGE contents in gabbro (ΣPGE = 8.8-16.0 ppb) and basalt (ΣPGE = 5.6-15.3 ppb) are lower than PGE abundances of harzburgite (ΣPGE = 125.6-142.8 ppb), dunite (ΣPGE = 248-360 ppb) and pyroxenites (ΣPGE = 159.7-1156.8 ppb). The rocks show strongly enriched PPGEs over the IPGEs which indicates co-precipitation with early sulfide fractionation. In all samples (except pyroxenite) pronounced Rh and Pd enhancements relative to Pt suggest its removal during fractional crystallization. Pyroxenites mark the transition from sulfide-undersaturation displayed by harzburgite and dunite to sulfide-saturation displayed by basalt and gabbro. It is, therefore, substantiated that PGE distribution in mafic and ultramafic rocks of Indo-Myanmar Ophiolites was controlled by sulphide saturation in parental magma and have not only been affected by partial melting processes but also affected by crystal fractionation process during their generation in diverse tectonic environments such as MOR, OIB (plume-type), and SSZ.