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ABSTRACTS

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Geochemistry and tectonic environments of Middle Proterozoic composite mafic intrusive rocks from the Main Central Thrust Zone, Garhwal Himalaya.

Rajesh K. SINGH, Rahul VERMA and Rajesh K. SRIVASTAVA, Department of Geology, Banaras Hindu University, Varanasi 221005, India

Atul SAHAI, Indian Institute of Remote Sensing, Dehradun 248001, India

The Garhwal group of rocks and central crystallines of the Bhagirathi and the Yamuna valley are intruded by a number of Middle Proterozoic mafic intrusive rocks, particularly amphibolites. They consist essentially of low- to medium-grade amphibolitic facies mineral assemblages. The Yamuna valley amphibolites have clouded plagioclase feldspars which may be caused either by a metamorphic or metasomatic reaction or by exsolution of Fe during slow cooling. This feature is not observed in the Bhagirathi valley amphibolites.

The amphibolites of present area are subdivided into the GMIR 1 and GMIR 2 mainly on the basis of their immobile element geochemistry. All are high-iron tholeiites and enriched in high-field strength elements (HFSE) and light rare-earth elements (LREE) than in the primordial mantle. The GMIR 2 has relatively higher concentration of rare-earth elements (REE), particularly LREE, than the GMIR 1. Another genetic difference exists between these amphibolites is that the GMIR 1 has smaller positive or no Nb anomalies and GMIR 2 has negative Nb anomalies on mantle-normalized multi-elemental spidergram. Both group of amphibolites are derived from the oceanic tholeiitic basalts but emplaced in different environments. The GMIR 1 shows mid-oceanic ridge basalts (MORB) characteristics, whereas the GMIR 2 shows within-plume basalts (WPB) characteristics.