Geochemical Characterisation Of Petrogenetic Khairagarh Volcanics: Constraints On Magma Tectonics

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The Khairagarh volcano sedimentary sequence comprises high-Ti and low-Ti basic volcanics and high magnesium andesite (HMA). The range of SiO_2 varies from 49.31 wt % to 59.52 wt%. From the major and trace element analysis result and REE (rare earth elements) diagram indicates differential degree of partial melting of the heterogenous mantle source. Chondrite normalized REEs has shown enriched pattern. Enrichment of light REEs indicates enrich nature of incompatible elements and decrease in heavy REEs indicates presence of zircon in the source. Different depth of REEs pattern for low Ti and high Ti suggests different degrees of partial melting. Low and intermediate Ti shows higher degree of partial melting with respect to high Ti samples. High Mg sample shows higher degree of partial melting and enrichment of LILEs (large ion lithophile elements) with depleted heavy REEs. Primitive mantle normalized multi element pattern of Khairagarh volcanic shows low Ti, Zr, Nb, Y and high in LILEs. Normalized REEs binary diagram also shows enriched nature. Depleted mantle modal ages of Khairagarh volcanic vary from 2242 to 2687 Ma. Presence of both basalt and HMAs suggests lithospheric thinning follow with rifting and subduction at Proterozoic, Central India. Low-Ti and high-Ti basalt are due to the different degrees of partial melting of the heterogeneous mantle source. Occurrence of both basalt and HMA indicates subduction related environment and intracratonic rifting tectonic setting in volcano-sedimentary sequence of Khairagarh Group, Central India.

Keywords: High-Ti and low-Ti volcanic, HMA, volcano sedimentary sequence, rift tectonic setting