

## GEOCHEMISTRY OF PALEOPROTEROZOIC METASEDIMENTARY ROCKS FROM SONAKHAN GREENSTONE BELT, NORTH-EAST BASTAR CRATON, CENTRAL INDIAN SHIELD: IMPLICATIONS FOR PROVENANCE, PALEOWEATHERING AND TECTONIC SETTING

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### Abstract

Metagraywackes and matrix of conglomerates from the Sonakhan Greenstone Belt (SGB) in Bastar craton of Central Indian Shield, were analyzed for their major, minor and trace element including rare earth element (REE) content. Compared to Average Proterozoic Sandstone, the Sonakhan metaclastic rocks are enriched in major elements (e.g.  $Al_2O_3$ , FeO, MgO,  $Na_2O$ ,  $K_2O$ ,  $TiO_2$  and  $P_2O_5$ ); LILE (e.g. Rb, Sr, Ba, Th, U); HFSE (e.g. Y, Zr, Hf, Nb) and transition elements. But compared to Post Archaean Australian Shale (PAAS) the rocks are depleted in transition element content. Positive correlation between  $Al_2O_3$  and  $K_2O$  and slight negative correlation between  $Al_2O_3$  and  $TiO_2$  of the metaclastics indicate less intensity of weathering of the provenance. CIA values of greywacke (54.18 - 71.7 with an average value of 60.64) and conglomerate matrix (38.79 - 79.45 with an average value of 60.64) further corroborate a less intensity of weathering of their provenance. Transition element data, inter-transition elemental plot [e.g. Cr and Ni (0.81); Cr and V (0.86); Ni and V (0.86)] and positive correlation of these elements independently with MgO and FeO suggest that the sediments were derived from a local source of mafic composition. The REE patterns of the rocks (highly fractionated with LREE enrichment and HREE depletion along with negative Eu anomaly) however, are symmetrical to subduction related felsic magmatic rocks. It therefore appears that the sediments were derived from sources of mafic and felsic compositions. Mixing calculation of REE data involving older rocks of the area indicates that Sonakhan clastics are composed of Upper Unit Basalt (90%), Gneiss (5%) and Felsic Volcanics (5%). The geochemical data further suggest that plume-arc interaction model is the viable mechanism to describe the tectonic setting of the Sonakhan Greenstone complex.

*Keywords:* Paleoproterozoic clastics, Bastar craton, Provenance, Paleoweathering, Tectonic setting.