

GEOCHEMICAL CHARACTERIZATION OF QUARTZITES OF THE SRISAILAM, BANGANAPALLE AND PANIAM FORMATIONS FROM THE NORTHERN PART OF THE CUDDAPAH BASIN, TELANGANA AND ANDHRA PRADESH

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Abstract

Geochemical analysis of non-mineralised quartzites (n=25) was carried out for characterization of the Srisailam, Banganapalle and Paniam Formations from the northern part of the Cuddapah Basin covering parts of Telangana and Andhra Pradesh, as the chemical composition of terrigenous sediments is a good indicator of provenance, degree of weathering, transportation, and diagenesis. The geochemical data indicate variable degree of maturity of these quartzites. The quartzites of Srisailam Formation grade from sub-feldspathic arenite to quartz-arenite and exhibit medium to high mineralogical maturity. They also indicate the presence of chloritic matrix/cement, and minor carbonate (dolomite) cement. In contrast, the quartzites of Banganapalle Formation show a considerably high degree of mineralogical maturity, while those of the Paniam Formation are mineralogically the most mature. Petro-mineralogical studies have also revealed that the Paniam quartzites being devoid of feldspars, clay matrix, are typical quartz-arenite. The geochemical data indicate a gradual increase in mineralogical maturity of these quartzites ranging from the Srisailam Formation (67.20–98.60% SiO₂) through Banganapalle Formation (86.31–98.67% SiO₂) to the Paniam Formation (96.66–98.99% SiO₂). Quartzites from all these formations show a considerably low abundance of most of the trace elements. The gradual decrease of Rb and Ba in successively younger formations indicates depletion of K-feldspar and/or clay matrix, which reflects a relative increase in mineralogical/textural maturity. Further, the gradual decrease of TiO₂ and Zr indicates hydraulic sorting of heavy minerals (anatase/rutile and zircon respectively) during recycling/reworking. TiO₂/Zr ratio in these quartzite samples ranges from 4 to 75 (majority 14–31) indicating derivation of the precursor sediments from dominantly felsic to subordinate intermediate igneous source rocks. SiO₂ vs. (Al₂O₃+K₂O+Na₂O) plot indicates generation of the sediments under a dominantly semi-humid palaeoclimatic condition.

Keywords: Geochemical Characterization, Srisailam Quartzite, Banganapalle Quartzite, Paniam Quartzite, Cuddapah Basin, Telangana, Andhra Pradesh