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STREAM SEDIMENT GEOCHEMISTRY OF NALLAMALAI SUB-BASIN, DORNALA – CUMBUM AREAS, SOUTH INDIA - A TOOL FOR MINERAL EXPLORATION.

Nandhagopal, N¹, Thirumurugan, M². and Bhadra Kumary, S.R.³

¹ Geological Survey of India, Southern Region, Hyderabad, India (geonandha79@gmail.com).

² Geological Survey of India, SU: AP&T, Southern Region, Hyderabad, India.

³ Geological Survey of India, M&CSD, Mangalore, India.

ABSTRACT

Geochemical mapping through stream sediment sampling is an useful method for identification of geochemical patterns/anomalies. Understanding the pattern of distribution of major, trace and rare earth elements will help in targeting the mineral potential and identifying the anthropogenic process. The approach involved preparation of elemental distribution maps and integration of the geochemical anomaly signatures with the geology and structural maps using GIS for mineral targeting. A total of 1200 stream sediment and slope wash samples were collected between Dornala to Bestavarapupeta areas, Prakasam district, Andhra Pradesh, Southern India. The sampling was done on 1×1 km² grid covering an area of 1200 km². The area forms a part of Nallamalai sub-basin of Proterozoic Cuddapah basin. It consists of older Bairenkonda Formation composed of predominantly quartzite with shale, while the younger Cumbum Formation basically an argillaceous unit with inter layers of quartzite. The samples were analysed for major oxides, trace elements and rare earth elements. The stream sediment shows variations which are consistent with the types of rock exposed. High percentage of SiO₂ with low Al, Ca, Mg, Fe, Ti, Ca and very low Mn, Na, K is in tune with the composition of quartzite which is the major lithounit of the area. Fairly strong to very strong positive correlation occurs among Sc, V, Sr, Nb, Th and U, which is attributable to natural association of lithophile elements. Other elements which include Ni, Co, Cr, Pb, Cu, Zn and Co indicate siderophile and chalcophile associations. Cu, Co, Ni and Th anomalies are observed in the northern, south eastern and western part of the study area which corroborates with the ground geology by the presence of visible mineralization of pyrite, chalcopyrite, haematite, Specularite within dolomite and quartzite. Pb & Zn anomalies were observed in the south eastern part of the study area. Gold anomalies were identified through this study which is occurring mainly over the areas of silicified zones within quartzite in the northern part of the study area. Anomalous concentrations of LREE higher than the crustal abundance are identified in the northern and southern part of the area. These anomalous geochemical signatures were integrated with the proximity of faults,

fractures and other structures using GIS to delineate the favourable targets for mineralization. The results demonstrate the usefulness of the procedures followed to extract significant anomalies from the geochemical data and in targeting for new potential mineralized zones.

Key words: Geochemistry, Streams sediments, Mineralization.

