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Application of Multithematic GIS Modelling techniques for Mineral potential mapping along the Khodana-Narnaul area as a part of the North-East extension of Khetri Copper Belt.

Sinha,M.M[1]., Yadav, B.[2]

1.Senior Geologist, Geological Survey of India,Faridabad;moumita.mitra99@gmail.com

2.Senior Geophysicst, Geological Survey of India, Faridabad

ABSTRACT

Five decades of exploration by Geological Survey of India has generated huge inventory of spatial and related attribute data which need to be relooked again to find out new areas for further exploration, as ore reserves remained stagnant in Khodana-Narnaul belt over decades. Integration of the Geological, Geochemical, Geophysical, Aerogeophysical and Photogeological data of the area plays an important role in targeting potential mineral zones. Spatial analysis of various data sets in GIS environment has gained momentum worldwide as the newer areas are being explored to meet the growing demand.
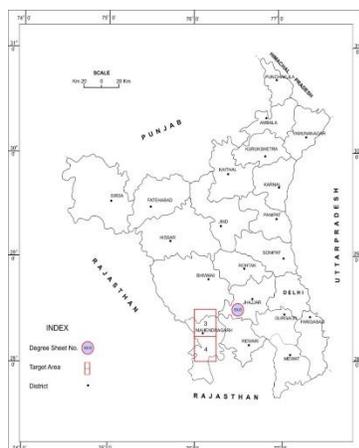
The study area belongs to the Southern part of Haryana around Mahendragarh district which is the extension of the Delhi Fold Belt and exposes rocks belonging to Alwar and Ajabgarh Group. These rocks are exposed as an elongated ridge with few isolated hillocks surrounded by a blanket of alluvial cover having variable thickness. There are several occurrences of sulphide mineralisation in the area.

Various GIS methods have greatly surpassed a human's ability to integrate and analyze quantitatively large amounts of spatially referenced data for mineral potential mapping. In the study area due to absence of established mineral deposits, a knowledge based model for identifying and locating potential copper zones was done. All the vector and raster datasets were imported to an ArcGIS platform for integration, analysis and modeling. The Universal Transverse Mercator Projection (Zone 43 North) with WGS 84 datum was used as the common projection for all the datasets. Spatial Modelling techniques like Boolean logic, Binary evidence index overlay, Index overlay method & Fuzzy logic have been used systematically in this study to target mineralized zone.

Validation conducted on the Predictive map corelates with the known deposits at Khodana and Narnaul which indicates that integration of all spatial evidences give satisfactory result to target mineralized zone in the study area. The New areas which came out after modelling are along the Dosi-Ragunathpura-Dharson, in the south and around Madhogarh-Naseebpura in the central part of the study area.