

## **AN INTEGRATED GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL APPROACH TO CHARACTERIZE CIRCULAR ELECTRO MAGNETIC ANOMALY, BHIMA BASIN, KARNATAKA**

I. Patra\*, A. K. Chaturvedi, V. Ramesh Babu and P. K. Shrivastava

Atomic Minerals Directorate for Exploration & Research,

Deptt of Atomic Energy, Begumpet, Hyderabad

*E-mail: ijpatra@rediffmail.com*

### **Abstract**

A distinct Time Domain Electromagnetic response over an area of 50 sq km is noticed in south eastern margin of Bhima Basin, around Bechabal-Agni area, Gulbarga district, Karnataka from recently conducted high resolution Heliborne surveys for uranium exploration by Atomic Minerals Directorate for Exploration and Research (AMD). Such high amplitude circular electro-magnetic (EM) anomaly is unique compared to the rest of the area surveyed and could not be modeled with discrete/formational conductor. Besides, aero-magnetic, radiometric and satellite image signatures over the zone is not correlatable with that from EM and hence it is difficult to pinpoint the cause. This zone is marked in the basement rock, which shows low Electro-magnetic response compared to the formational conductors of Bhima sediments (shale) and Deccan Traps in the area. Therefore, geochemical tool (hydro-pedo-stream sediments) along with detailed geological investigation was adopted to decipher the cause of the EM response. Hydro-geochemical survey indicates that the ground water in this part is saline compared to adjacent area with very high TDS and conductivity values. These are basically of evaporation-crystallisation in nature. Pedo-geochemical survey also indicates the natural soil contamination and presence of thick transported soil (black) over the basement rock. Stream sediment sampling gives mixed provenance from the mineralogical assemblage.

Hence, the circular EM response is due to water salinity as well as high saline soil prevailing in the area. Thus, the exercise shows that an anomaly of this nature should be interpreted carefully and to attribute the geological cause, ground investigation using geochemical-geological tool is essential.

*Keywords:* Time Domain Electro-magnetic, Hydro-geochemical Survey, Bhima Basin.