

EFFICACY OF MAGNETIC METHODS IN GROUND WATER EXPLORATION–A CASE STUDY FROM CENTRAL INDIA

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Abstract

The aeromagnetic map of Central India covering part of the Narmada - Son Tectonic zone between Jabalpur and Damoh of Madhya Pradesh has delineated several linear magnetic anomalies of 200-400 nT aligned together to form a large magnetic lineament approximately 1 km wide and 100 km long. Ground magnetic and resistivity surveys in the area revealed large magnetic high (600-800 nT) and resistivity low (less than 80 Ω .m) respectively along this lineament suggesting a fracture zone with basic intrusive rocks at places. These results were confirmed by resistivity studies and available geohydrological information. The resistivity soundings carried out in the proximity of the lineament showed higher thickness of weathered/fractured rocks varying between 34 and 54 meters with a resistivity of 16 to 80 Ω m suggesting the presence of a higher ground water potential along it compared to the surroundings. The soundings at a distance of 1 to 2 km away from the lineament revealed less thickness and /or higher resistivities of weathered/fractured zone compared to the wells in close proximity of the lineament. This was reflected by a considerable difference in the yield of the wells varying between 220 and 20 Cu.m/day respectively. The ground water depletion in the wells close to the lineament was less (0.5 to 2.2 m) compared to those away from the lineament (4 to 5m) due to influence of the lineament. Thus, the efficacy of magnetic methods in narrowing down areas of interest for groundwater exploration was clearly demonstrated in the case study.

Keywords: Magnetic methods, Resistivity soundings, Ground water exploration, Central India.