

## **EFFECT OF SOIL THICKNESS OVER THE HARD ROCKS ON THE RESPONSE OF APPARENT RESISTIVITY OBTAINED FROM GRADIENT PROFILING SURVEY FOR DETECTION OF GROUNDWATER SATURATED FRACTURES**

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### **ABSTRACT**

The gradient profiling is done in the presence of horizontal electric field which is one of the techniques to locate the low resistivity response within the hard rock formations. This low is obtained due to the presence of fractures, cracks, joints, fissures or even due to presence of shale which may create confusion for detecting the presence of groundwater. The thickness of soil cover may also play major role in the fluctuations of apparent resistivity response of gradient profiling. The paper deals to show the effect of soil thickness over hard rocks in the selected area where 5 gradient profiling and 7 geoelectrical sounding have been carried out. The presence of thick surface soil/clay at some locations clearly indicates its effect on the apparent resistivity response in terms of its magnitude and fluctuations as well. The prominent “low” on the apparent resistivity response has been observed along each gradient profile, but only more than 50% locations show the presence of fractured sandstone saturated with groundwater which is confirmed by the sounding results for that location. Only these locations, as indicated by the results of sounding, have sufficient fractured in a sandstone formation with good saturation of groundwater that has been verified from the nearby existing borehole drilled by the farmers. At few locations, groundwater may not be available due to presence of shale. It is inferred from the above study that, neither geoelectrical sounding alone, nor gradient profiling alone can provide sufficient information about the presence of a saturated fracture - zone for groundwater exploration.

**KEYWORDS:** Gradient Profiling, Geoelectrical Sounding, Groundwater Exploration, Hard Rocks & Fractured Sandstone