

3D-resistivity and GPR Surveys for Shallow Archaeological Investigations

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Abstract

Near surface geophysical techniques have been commonly utilized in order to investigate the archaeological sites. The main purpose of doing this study was to map subsurface buried archaeological objects in the Beshra desert of south-west Saudi Arabia. Two geophysical data (3D electrical resistivity and ground penetrating radar) were acquired at four survey areas. In these locations, the distance between the survey lines for GPR and Resistivity were 0.1 and 1 meter, respectively, to provide a high-resolution image of the subsurface. The electrode arrangements for the resistivity survey were spaced 1 m apart over 11 parallel profiles. The GPR data were acquired using 250 MHz and 500 MHz antennas. The results indicate strong contrasts in resistivity and amplitude GPR data for hard archaeological materials compared to the surrounding soft sediment of the Wadi, at a depth range of 0.5–2.5 m. Highly consistent distributions of both GPR reflections and high-resistivity values were observed. Thus, the integration between resistivity and GPR data improves the location interpretations of anomalies associated with archaeological materials. Ongoing research involves the implementation of other geophysical techniques, including magnetic and electromagnetic methods, to obtain a direct comparison with the applied methods. The results of these techniques can be combined to better understand subterranean properties in shallow archaeological investigations.