



The Use of Ground Penetrating Radar to Exploring Sedimentary Ore In North-Central Saudi Arabia

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Ground Penetrating Radar (GPR) is a non-destructive geophysical method that provides a continuous subsurface profile, without drilling. This geophysical technique has great potential in delineating the extension of bauxites ore in north-central Saudi Arabia. Bauxite is from types sedimentary ores. This study aim to evaluate the effectiveness of Ground Penetrating Radar (GPR) to illustrate the subsurface feature of the Bauxite deposits at some selected mining areas north-central Saudi Arabia. Bauxite is a heterogeneous material that consists of complex metals such as alumina and aluminum. An efficient and cost-effect exploration method for bauxite mine in Saudi Arabia is required. Ground penetrating radar (GPR) measurements have been carrying out along outcrop in order to assess the potential of GPR data for imaging and characterising different lithological facies. To do so, we have tested different antenna frequencies to acquire the electromagnetic signals along a 90 m profile using the IDS system. This system equipped with a 25 MHz antenna that allows investigating the Bauxite layer at shallow depths where the clay layers may existed. Therefore, the 25 MHz frequency antenna has been used in this study insure better resolution of the subsurface and to get more penetration to image the Bauxite layer. After the GPR data acquisition, this data must be processed in order to be more easily visualized and interpreted. Data processing was done using Reflex 6.0 software. A series of tests were carried out in frequency filtering on a sample of radar sections, which was considered to better represent the entire set of data. Our results indicated that the GPR profiling has a very good agreement for mapping the bauxite layer depth at range of 7 m to 11 m. This study has emphasized that the high-resolution GPR method is the robust and cost-effect technique to map the Bauxite layer. The exploration of Bauxite resource using the GPR technique could reduce the number of holes to be strategically placed in the most promising zones.