

Mapping of subsurface contamination zone using 3D electrical resistivity imaging in Hilla city, Iraq

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Abstract

Electrical resistivity imaging (ERI) method is very useful in mapping subsurface contamination zones. In this study, 3D ERI is used to identify the distribution and depth of subsurface soil contamination zone near Al_Furat state company for chemical and pesticides industries in Hilla city, Iraq. A 3D pure image of electrical resistivity distribution is obtained from a perpendicular square grid (80 × 80 m) which consists of three parallel and three perpendicular lines. The electrical resistivity values range from < 1 to 21 O.m, and the total root mean square (RMS) after four iterations is about 7%. The image gives eight different depth slices for the estimated model with a depth interval of about 1 m. The maximum depth of investigation is 13.7 m. The results mapped the contamination zone, where high electrical resistivity values (about 21 O.m) are observed possibly due to accumulation of alkaline waste disposed from the company. The ERI results show that the subsurface layers up to a depth of 4.99 m are of moderate-to-high electrical resistivity values. The study reveals that 3D ERI is an effective tool for subsurface contamination zone mapping in various depths, which extends in this study from the near-surface to a depth of about 5 m below the ground level.

Keywords

3D ERI Subsurface Hilla city Contamination

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