Mapping groundwater hydrocarbon contamination using VES

Roshanak Vadoodi and Dr. Mohammad-Kazem Hafizi

Abstract

The geophysical methods especially the electrical ones are useful and practical to examine contaminated soil and groundwater. We can estimate the contaminated area in considered regions using vertical electrical sounding (VES) and one-dimensional interpretation. In this study, it has been considered the oil pollution of groundwater in Shiraz oil refinery. First of all, we tried to show contamination in place by drilling operation. Next, we utilize resistivity method to verify the leakage source of pollutions. Oil pollution under the influence of biodegradation processes which leads to changes in resistivity of groundwater and surrounding rocks, so the contaminated areas are regarded as areas with the low resistivity. The measurements of electrical resistivity in mentioned area are along with four profiles of E-W direction and using 24 soundings. Then the obtained data interpreted individually with resistivity sections at each of the profiles. The changes in electrical resistivity data at different profiles are coordinate to oil pollution in surrounding drilled wells. As a result, the contaminated areas have been considered as areas with low resistivity.

Keywords: Electrical resistivity method, biodegradation processes, electrical sounding, oil pollution, one-dimensional interpretation.