

Geoelectrical subsurface characterization: A case study of saltwater intrusion in Kudat, Sabah

ABSTRACT

Saltwater intrusion is one of the primary sources of groundwater contamination, especially near the coastal line, and it is crucial to monitor saltwater intrusion to protect fresh groundwater. Due to the proximity of the coastal line, the area within Kudat Peninsula that was formed by the ophiolite basement, Kudat Formation Chert-Spilite Formation, and alluvium deposit is susceptible to saltwater intrusion. In this study, two survey lines of geoelectrical resistivity and induced polarization imaging survey with a total length of 200 m were carried out. The Wenner configuration was used to characterize the subsurface of the Kudat Peninsula. The interpolation between geoelectrical resistivity and chargeability profiles provided better interpretations of the subsurface environment. The saltwater intrusion zone displays a resistivity value between 0 – 5.0 Ωm and a chargeability value between 0 – 3.0 ms. The results showed that saltwater intrusion was detected at depths as shallow as 1.25 m to 36.90 m and intruded as far as 218.00 m into the mainland, from the coastline.