

Geophysics electrical characterization for identification of Seawater intrusion in the coastal area of Papar, Sabah

ABSTRACT

Seawater intrusion is known to be a major problem that influences the quality of groundwater within coastal regions globally. The groundwater table within the coastal area is usually close to the ground surface due to low topography or human development activities such as land reclamation and man-made drainage systems that keep the water table at constant low level. Electrical resistivity method is one of the geophysical methods that has been extensively used to investigate seawater intrusion due to the high electrical conductivity contrast produced by saline water. Papar, Sabah is located at the west coastal region of Sabah and is generally formed by Crocker formation and Quaternary alluvium. The sedimentary rock of Crocker Formation mainly consists of thick sandstone unit, interbedded sandstone, siltstone and shale unit and shale unit. A total of Five 2D electrical resistivity imaging (ERI) methods were carried to image and model the subsurface within the research area to investigate the possibility of seawater intrusion. The ERI results are also supported by four groundwater samples and detailed lithologies from the borehole. Interpretation of the results divided the research area into three main zones of seawater intrusion potentials. Zone 1 is considered the highest potential of seawater intrusion, Zone 2 interpreted as potential extended zone or mixing zones between seawater and fresh water and finally Zone 3 did not indicate any low resistivity or potential of seawater intrusion. The seawater intrusion map produced from this research initiated and divided the potential zones based on the occurrence of seawater in the subsurface.