

Investigating peat soil stratigraphy and marine clay formation using the geophysical method in Padas Valley, northern Borneo

ABSTRACT

A geophysical survey including electrical resistivity tomography (ERT), induced polarization (IP), and seismic refraction (SR) was carried out to estimate peatland thickness in Beaufort District, Eastern Malaysia. Peatlands are important natural carbon storage and play a key role in the global carbon cycle. The ERT and IP studies were performed along three profiles over different peat thicknesses using Schlumberger configuration. The SR survey was carried out using vertical geophones along the same profiles. The peat soil material was characterized by low seismic velocity and high resistivity. Our results show that ERT and IP methods were able to clearly detect the interface between the peat soil and marine clay underneath. These layers differ greatly in geoelectrical characteristics showing clear contrast, thus enabling the delineation of peat soil stratigraphy, while the SR image obtained was not able to determine the base of the peat soil layer as the stiffness difference on the transition layer was very small. Overall, it was concluded that the ERT and IP method offer a useful alternative in delineating the peat soil stratigraphy. The combined application of ERT and IP method with the conventional boring method meets the demand for large volume peat stratigraphy mapping, which, moreover, has various ecological conditions and undulating strata.