

Comparison of Petrophysical Relationship for Soil Water Content Estimation at Peat Soil Area Using GPR Common-Offset Measurements

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Abstract : The appropriate petrophysical relationship is needed for Soil Water Content (SWC) estimation especially when using Ground Penetrating Radar (GPR). Ground penetrating radar is a geophysical tool that provides indirectly the parameter of SWC. This paper examines the performance of few published petrophysical relationships to obtain SWC estimates from in-situ GPR common- offset survey measurements with gravimetric measurements at peat soil area. Gravimetric measurements were conducted to support of GPR measurements for the accuracy assessment. Further, GPR with dual frequencies (250MHz and 700MHz) were used in the survey measurements to obtain the dielectric permittivity. Three empirical equations (i.e., Roth's equation, Schaap's equation and Idi's equation) were selected for the study, used to compute the soil water content from dielectric permittivity of the GPR profile. The results indicate that Schaap's equation provides strong correlation with SWC as measured by GPR data sets and gravimetric measurements.

Keywords : common-offset measurements, ground penetrating radar, petrophysical relationship, soil water content

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