

## Calibration of partial saturation model (ghpps)

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Experimental measurements on actual Triassic Sandstone samples taken from the Wildmoor Formation obtained by Taylor and Barker (2002) have been used to validate the Glover, Hole and Pous (GHP) model (Glover et al., 2000) and partially saturated model (GHP<sub>ps</sub>) (Swaid F, 2009). Both models were calibrated on samples with various conductivities. Both models provide a very good fit to the experimental data.

The results obtained using GHP model have shown that the geometric factor ( $m$ ) of experimental samples has a range from 1.62 to 1.86 and the surface conduction has ranges from 10 to 24 (mS/m). There is a good relationship between the cation exchange capacity and geometric factor ( $R^2 = 0.5647$ ) obtained using GHP model and CEC. There also a significant correlation ( $R^2 = 0.70$ ) between surface conduction obtained using GHP model and CEC.

The results obtained using GHP<sub>ps</sub> have show that the saturation exponent of experimental samples has a range from 0.49 to 0.77. There is a significant correlation ( $R^2 = 0.91$ ), ( $R^2 = 0.89$ ) between  $n$  obtained using GHPPS model and concentration per unit pore volume respectively. These correlations allow the pore water salinity and degree of saturation to be estimated in the field.

There is good agreement between  $n$ ,  $m$  and surface conduction versus the CEC allows the GHP and GHP<sub>ps</sub> models to be constrained by measuring the CEC in the field. The GHP and GHP<sub>ps</sub> models can then be used to interpret electromagnetic induction and resistivity imaging surveys, so that predictions on the degree of saturation and pore water salinity levels can be made.

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