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Geophysical Investigation of the Fresh-Saline Water Interface in the Coastal Area of Abergwyngregyn

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ABSTRACT

The importance of the study of saline/fresh water incursion cannot be over-emphasized. Borehole sampling has been extensively used, but it is intrusive, quite expensive and time consuming. Electrical resistivity and electromagnetic techniques have proved successful in groundwater studies since geologic formation properties like porosity and permeability can be correlated with electrical conductivity signatures. Non-intrusive surface geophysical mapping comprising electrical resistivity and electromagnetic methods has been employed to investigate freshwater intrusion and delineate the fresh-saline water interface at the inter-tidal area of Abergwygregyn, North Wales, United Kingdom. Frequency Domain Electromagnetic Profiling and Constant Separation Traversing were used to produce 2-D images and contour plots enabling the identification of freshwater plumes onshore and in the central parts of the study area. Ground truth methods comprised chemical analyses and detailed, point specific information on the stratigraphy. The freshwater intruding from the coastal area appears to be pushing the saline-water further offshore due to the high piezometric head caused by the mountains and hills of Snowdonia adjacent to the study area. The fresh/saline water interface correlates quite well with previous studies carried out in the area. On the basis of the results of the resistivity and conductivity geophysical investigations the freshwater plumes and fresh/saline water interface in the study area were effectively identified and delineated.

KEYWORDS

Fresh-Saline Water

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References

[1] S. A. Soomro, "Detection of Saline Intrusions in Coastal and Estuarine Sediments," Ph.D. Thesis, University of Wales, Bangor, 1993.

[2] E. Rasolomanana, "Mapping Coastal Aquifers by Joint Inversion of DC and TEM Soundings-Three Case Histo- ries," Groundwater, Vol. 39, No. 1, 2001, pp. 87-97. doi:10.1111/j.1745-6584.2001.tb00354.x

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