Wavelet Transform and Neural Network on Integrated Geophysical data for Decipher the Saline and fresh water Aquifer

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Abstract

Delineation of ground water resources in hard rock terrains is one of the important topics to be treated with a more advanced approach than simple one-dimensional attitude, particularly when looking for deeper water saturated horizons and decipher the saline and fresh water aquifer. The present study deals the advance technique wavelet transform (WT) and Artificial neural network (ANN) on an integrated geophysical data to identify structural features such as fractures, weak zone and intrusive bodies that can control and host potable ground water at greater depths. The study is conducted in an area of about 8 km^2 along east cost of Tamilnadu, India that has been identifies as a major rain shadow zone. Geophysical measurements (resistivity, magnetic and electromagnetic techniques) were carried out in very close grid pattern. The sensitivity of each technique WT and ANN and also integrated geophysical data to different rock properties have been considered to resolve the problem. A major weak zone running in SW-NE direction is demarcated that is characterized by many intrusive dyke bodies. The conductivity distributions at different depth throw light on many structural features. The varying thickness of weathered rock calculated from the horizontal loop electromagnetic and deep resistivity sounding (DRS) for entire area reflects the extension of weathering associated with dyke implements geoelectric section obtained through DRS studies concentrated mainly along the week zone have shown in the occurrence potable ground water resource. Our main intention to apply advance technique is that the WT and ANN gave a result highly correlated with that of conventional serial algorithms. It proved to be a fast, more accurate for depth and geological estimation of above data.

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