

Statistical and Analytical Comparison of GIS Overlay Modelings: An Appraisal on Groundwater Prospecting in Precambrian Metamorphics

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Abstract : Overlay modeling is the most widely used conventional analysis for spatial decision support system. Overlay modeling requires a set of themes with different weightage computed in varied manners, which gives a resultant input for further integrated analysis. In spite of the popularity and most widely used technique; it gives inconsistent and erroneous results for similar inputs while processed in various GIS overlay techniques. This study is an attempt to compare and analyse the differences in the outputs of different overlay methods using GIS platform with same set of themes of the Precambrian metamorphic to obtain groundwater prospecting in Precambrian metamorphic rocks. The objective of the study is to emphasize the most suitable overlay method for groundwater prospecting in older Precambrian metamorphics. Seven input thematic layers like slope, Digital Elevation Model (DEM), soil thickness, lineament intersection density, average groundwater table fluctuation, stream density and lithology have been used in the spatial overlay models of fuzzy overlay, weighted overlay and weighted sum overlay methods to yield the suitable groundwater prospective zones. Spatial concurrence analysis with high yielding wells of the study area and the statistical comparative studies among the outputs of various overlay models using RStudio reveal that the Weighted Overlay model is the most efficient GIS overlay model to delineate the groundwater prospecting zones in the Precambrian metamorphic rocks.

Keywords : fuzzy overlay, GIS overlay model, groundwater prospecting, Precambrian metamorphics, weighted overlay, weighted sum overlay

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