

Groundwater recharge estimation using surface electrical resistivity method

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ABSTRACT

A new method for the estimation of groundwater recharge is presented using a surface resistivity method and isotope technique. A linear relationship was obtained between the resistivity of the unsaturated top layer and the recharge estimated using a tritium tagging technique for the piedmont zone in the Himalayan foothill region, India. The relation can be used for the estimation of recharge using surface electrical resistivity measurements for the same geological formation. The data used for the study are 32 vertical electrical resistivity sounding measurements at a station interval of 2 km, tritium tagging studies at six selected sites and pre- and post-monsoon water-level monitoring in the piedmont zone of the Himalayan foothill region (India). The results of this study were mapped using GIS techniques. In the study area, a well-defined empirical relationship between unsaturated zone resistivity and recharge per cent was obtained. The method suggests a new application of surface electrical resistivity data in determining recharge per cent due to infiltration. The technique of estimating groundwater recharge using surface electrical resistivity measurement is efficient, economic, less time consuming and easy to use compared with other methods used for this purpose.