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Identification of Groundwater Potential Zones in Manar River Sub-Basin, Maharashtra using Remote Sensing and GIS Techniques

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Abstract

Groundwater is the most essential drinking water source in draught prone area of Marathwada region in Maharashtra State. In the present study, geology, geomorphology and hydrogeomorphological investigations were carried out to assess the groundwater potential zones of Manar river sub-basin, through visual interpretation of satellite image FCC of IRS P6 LISS-III, ASTER DEM and Survey of India (SOI) topographic maps on 1:50000 scale with adequate ground truth in ArcGIS 10.1 environment. In the west and central part of the study area Deccan basalt of Late Cretaceous to Early Eocene age is exposed, while in the eastern part granite and granite gneisses of Eastern Dharwar craton (Peninsular Gneissic Complex) are exposed. The secondary porosities developed during the cooling of lava such as fractures, joints and lineament pattern of the rocks play a vital role for groundwater development, whereas geomorphology and morphometric characteristics are important in groundwater yield and recharge. Geomorphological analysis was carried out by using six geomorphic surfaces, such as alluvial plain, pediplain, pediment, valley fill sediments, highly dissected plateau and denudational hill. Good quantity of groundwater occurs in alluvial plain area, groundwater potential is restricted in valley fill sediment. Pediplain area has moderate to good groundwater potential, pediment area has moderate to poor, while the areas of highly dissected plateau and denudational hills are associated with poor groundwater potential.

Keywords: Manar river, Geomorphic surfaces, RS-GIS, Groundwater potential