Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00981, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00981
EGU General Assembly 2008

Quantitative Modeling of Groundwater in Shiwaliks of Rupnagar district of Punjab using Remote Sensing and Geographic Information System.

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Water is a fluctuating resource, making it difficult to measure in time and space. Within the hydrological cycle, groundwater represents a major portion of the earth water circulatory system. The use of remote sensing technology involves large amount of spatial data management and the GIS technology provides an alternative for efficient and effective management of large and complex database. To demonstrate the efficiency of GIS for groundwater investigation, information on the parameters controlling groundwater such as a geomorphology, structure, and recharge condition were analyzed using GIS. The clue to ground water search is the premise that sub-surface geologic elements forming aquifers have surface expressions, which can be discerned by remote sensing techniques. These surface expressions are drainage, landforms of depositional nature, moist pockets seen as anomalous vegetation patches, lineaments etc. In this study we have used integration of remote sensing, GIS and data generated by ground truthing. IRS 1C LISS III and Landsat satellite image of Rupnagar was used to retrieve information on the lineaments and geomorphology. Data of groundwater was used to correlate it with geomorphology and lineament interpretation. To infer linear features, enhancement and directional filtering was performed on single bands of Landsat images. Thematic maps for hydrogeomorphology, slope and drainage density have been prepared and integrated with the help of GIS by assigning the weights to various attributes controlling occurrence of groundwater to generate the groundwater potential map for Rupnagar according to their likely infiltration capacities. The field data was found to have good correlation in terms of groundwater potential inferred by using

remote sensing and GIS. The results indicate that the southeast part of the Rupnagar has very good groundwater potential, whereas the steeply sloping area in the northern part having high relief and high drainage density possesses poor groundwater potential. Keywords: Lineament length density; GIS interpolation; Convolution filtering; Groundwater potential zones; Rose Diagram.