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Hydromorphological Mapping and Analysis for Characterizing Darfur Paleolake, NW Sudan Using Remote Sensing and GIS

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ABSTRACT

The north-western part of Sudan, which is the driest region on earth has revealed newly surface and near surface paleodrainage network underneath sand sheets indicating the possibilities for economic groundwater reservoirs. Advanced Space-born Thermal Radiometer (ASTER), the Shuttle Radar Topography Mission (SRTM ~90 m) DEMs and Quickbird images corroborate the presence of surface and near surface paleodrainage network. Bivariate quadratic surfaces with moving window size of 3×3 were fitted to the SRTM DEM. The second derivative surface curvature was calculated to reveal landform classes that may receive most of fossil water. The results showed that the new unnamed depression which recharges by a longitudinal paleodrainage network may receive vast amount of groundwater during humid phases. The results demonstrate that the D8 and curvature algorithms are very efficient tools for revealing and characterizing hydrological elements in arid and semi-arid regions and they provide information for hydrological exploration in remote deserts over large scale prior to geophysical survey.

KEYWORDS

Darfur; Groundwater; Sudan; Paleodrainage Network

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