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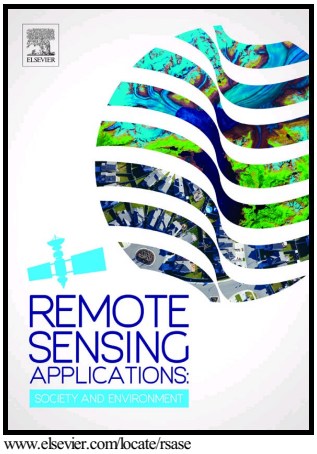

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Qualitative Assessment of Groundwater Quality based on Land Use Spectral Retrieved Indices: Case Study Sohag Governorate, Egypt

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Abstract

Sohag governorate, as one of the highly inhabited governorates in Upper Egypt, is characterized by developmental projects implemented in its desert zone, west to the River Nile. The present study aims to evaluate groundwater quality parameters in west of Sohag governorate, based on a set of retrieved land use spectral indices. Two multispectral Landsat images; ETM 2008 and OLI 2016 provided the necessary spectral information for this study. The calibrated images were processed to calculate the Normalized Difference Vegetation Index (NDVI), Normalized Differential Salinity Index (NDSI), Normalized Difference Built-Up Index (NDBI), Modified Normalized Difference Water Index (MNDWI) and the Land use Land cover (LULC). Groundwater quality was analyzed and assessed in 2008 and 2016 including some physicochemical characteristics. Correlation coefficient between spectral retrieved indices and groundwater quality was calculated to address the temporal and spatial changes in groundwater quality in response to LULC changes. The study area was mainly covered by urban and cultivated lands (>75 %) which increased the sources of groundwater pollution. In 2008, NDBI and NDSI showed significant correlations (> 0.5) with TH, EC, TDS, SAR and SO_4 which explains the negative impact of urbanization and land degradation on groundwater quality. In 2016, the response of groundwater quality to urbanization and degradation appeared in the levels of groundwater

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