

عنوان مقاله:

Change Detection of Surface Water of Atfih Spring by Integrated Effect of Rainfall Storms and Geological Structures using Landsat Data

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خلاصه مقاله:

The eastern border of the Nile valley south of Cairo is distinguished by numerous springs and associated surface water bodies, e.g. Ain El-Sira, Helwan, and Atfih. Except the latter, all of them were disseminated in urban areas, and were hardly detected by remote sensing data. Thus, studying the surface water of Atfih spring is key to understanding the nature of the east Nile spring system. Change in this surface water has been detected based on the integration between the spatiotemporal analysis of the multi-spectral satellite images and the Modern-Era Retrospective Analysis for Research and Applications (MERRA-2) rainfall data from ۱۹۸۷ to ۲۰۱۹, and the field investigation. The normalized differential water index analysis reveals an increase in the surface area of the Atfih water body by two to three times during the years ۲۰۱۶-۲۰۱۷. The results clarified the relationship between the appearance of the surface water of Atfih spring and rainfall amounts. Another factor controlling the Atfih water body treated in this work is the geological structures. A field survey aided by the processed satellite data revealed the presence of three fault populations: WNW-ESE, E-W to ENE-WSW, and NNE-SSW. The E-W to ENE-oriented faults are the main faults and have a right-lateral strike-slip sense of movement. This fault pattern and Pliocene shale have a substantial impact on the appearance of the Atfih water body. These faults act as a horizontal channel that allows lateral movement of meteoric water through Eocene carbonate, and water recharge occurs at the highly fractured strike-slip transfer zones.

کلمات کلیدی:

Multi-temporal Landsat Data, Atfih water body, Rainfall storms, Geological structures

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