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Earth Observation Applications, Societal Challenges and Economic Benefits (5)

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REMOTE SENSING APPLICATIONS FOR DELINEATING PALAEOCHANNELS CLOSE TO
ARCHAEOLOGICAL SITES

Abstract

Based on recent archaeological discoveries in the ME, there is more data that such sites in arid regions were subject to more humid climate. The presence of water sources including nearby rivers was necessary to the ancient society to settle and develop civilization. Saruq al hadid is an archaeological site located in the southern border of Dubai-UAE in active dune fields. After its discovery in 2002, thousands of artifacts were revealed on site and opened up numerous queries regarding the human activity and local civilizations from the Neolithic period to the bronze and iron ages. This paper studies the capacity of remote sensing to delineate paleochannels close to Saruq al hadid archaeological site in order to apprehend better the related society.

Our palaeochannels mapping is based on using the shuttle radar topographic mission DEM (Digital Elevation Model) and advanced land observing satellite-phased array type L-band synthetic aperture radar (PALSAR ALOS) images. This latter is used due to its capability to penetrate the sand layers and to reflect on the buried structures. The method eight-direction (D8) flow model is applied on DEM data to extract automatically the drainage patterns and how naturally the water was flowing. The results are compared visually to the features obtained from PALSAR images to determine whether these patterns were similar. A field survey based on geophysical investigations shall follow to identify the depth of palaeochannels.