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AUTOMATIC DETECTION OF POTENTIAL BURIED ARCHAEOLOGICAL SITES IN SARUQ AL-HADID, UNITED ARAB EMIRATES

Abstract

The use of remote sensing in archaeological research allows the prospection of sub-surfaces in arid regions non-intrusively before the on-site investigation and excavation. While the actual detection method of expected buried archaeological structures is based on visual interpretation, this work provides a supporting archaeological guidance using remote sensing. The aim is to detect potential archaeological remains underneath the sand. This paper focuses on Saruq Al-Hadid surroundings, which is an archaeologist site discovered in 2002, located about 50 km south-east of Dubai, as archaeologists believe that other archaeological sites are potentially buried in the surroundings.The input data is derived from a combination of wavelength L-band Synthetic Aperture Radar (ALOS PALSAR), which is able to penetrate the sand, and multispectral optical images (Landsat 7). This paper develops a new strategy to help in the detection of suspected buried structures. The data fusion of surface roughness and spectral indices enables tackling the well-known limitation of SAR images and offers a set of pixels having an archaeological signature different from the manmade structures. The potential buried sites are then classified by performing a pixel-level unsupervised classification algorithm such as K-means cluster analysis. To test the performance of the proposed method, the results are compared with those obtained by visual interpretation.