Geophysical Research Abstracts
Vol. 19, EGU2017-17521, 2017
EGU General Assembly 2017

Monitoring water level using Sentinel-1 Interferometric Synthetic Aperture Radar (InSAR) images

Eleni Stavroulaki, Dimitrios D. Alexakis, and Ioannis K. Tsanis

Technical University of Crete – TUC, Water Resources Management & Coastal Engineering Laboratory, Chania, Crete, Greece (alexakis@hydromech.gr)

Interferometric Synthetic Aperture Radar (SAR) methodology can successfully detect phase variations related to water level changes and produce corresponding water level maps. Two lakes located in Western Crete, Greece, namely Lake Kournas and Lake Agia were used as case studies to study water level change with means of SAR interferometry. The change of the water surface in the lake is examined over a period of two years, 2015-2016 using Sentinel 1 IW mode images and in situ water level data. Initially, all the SAR images were preprocessed in terms of atmospheric and radiometric corrections. Various interferograms were developed to study the multi-temporal regime of water level in both lakes. Optical satellite sensor data (Landsat 8) were used to study the vegetation regime and how this affect the interferogram processing. The results denoted the fact that the combination of SAR backscattering intensity and unwrapped phase water level data can provide additional insight into hydrological state. It is also shown that integrated analysis of the backscattering mechanism and interferometric characteristics can considerably enhance the reliability of the water-level retrieval scheme and optimize the capture of hydrological patterns spatial distribution.

Keywords: Sentinel-1, interferogram, water level, Backscattering