



Destabilization of Masjed-Soleyman rockfill dam observed by satellite radar interferometry

Mahmud Haghshenas Haghghi (1), Mahdi Motagh (1), and Lotfollah Emadali (2)

(1) GFZ German Research Center for Geosciences, Potsdam, Germany (mahmud@gfz-potsdam.de), (2) Department of Surveying and Geomatics Engineering, University of Tehran, Tehran, Iran

Differential interferometry using Envisat, ALOS, ALOS-2, TerraSAR-X and Sentinel-1 data, and terrestrial geodetic surveys are used to assess post-construction settlement of the Masjed-Soleyman embankment dam, southwest Iran. The Masjed-Soleyman dam, a rockfill dam with a vertical central clay core, was constructed between 1995 and 2000 on the Karoun River, which is one of the largest and longest rivers in Iran (length \sim 950 km) and one of the most important surface water resources in the country. Soon after the first impoundment of the dam in December 2000, cross and longitudinal cracks developed in the dam crest, especially at the junction of concrete or steel elements to the rockfill dam shell, causing growing concern that dam might be at risk of failure. Therefore, geodetic monitoring of Masjed-Soleyman dam became particularly important. In this paper, we report on the detection and analysis of ongoing destabilization of this dam from both space-based synthetic aperture radar (SAR) measurements and ground-based terrestrial survey and evaluate the potential of various space technologies and processing algorithms for efficient monitoring of this infrastructure.