



Sinking Aquifers: Insight from Continental-scale Sentinel-1 InSAR Survey

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Because of overextraction of groundwater, land subsidence is a widespread problem in many plain aquifers around the world. The extent and rate of displacement in many of the aquifers have been studied in the last years by field investigations or geodetic measurements, particularly Interferometric Synthetic Aperture RADAR (InSAR). These studies reveal the km-wide extent and decimeter-scale rate of land subsidence at some locations. But, they are mainly focused on local or regional areas and limited to major plain aquifers. However, to provide a broader overview on hydrological status of aquifers in a country-scale there is a need to develop a semi-automatic monitoring system to study the land subsidence on a near real-time basis in a large area.

Thanks to regular acquisition and large coverage of Sentinel-1 all over the world, it is now possible to generate continental-scale interferograms on a regular basis to study geological processes. In this study, we investigate the potentials of large-scale Sentinel-1 InSAR to study local phenomena of land subsidence in plain aquifers across the country of Iran and better understand the link between ground deformation data and hydrological parameters at large scales. We also assess the performance of Sentinel-1 InSAR in comparison to other SAR sensors, including Envisat ASAR, ALOS PALSAR, and TerraSAR-X in terms of availability of data, spatial density of displacement measurements, temporal resolution of the time-series, and processing load in some basins in Iran.