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Sentinel-1 analysis of land subsidence in Rafsanjan, SE Iran

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In this paper we have focused on subsidence caused by over-exploitation of groundwater supplies for agricultural fields in Rafsanjan region of southeast Iran. Our study area consists of several plains including Rafsanjan, Bahraman and Aanar. We have used Differential Interferometric Synthetic Aperture Radar (DInSAR) method for our analysis using radar images from Sentinel-1 satellite, covering October 2015 to October 2016 time period. For the time-series analysis we conducted coherence-based Small BAseline Subset (SBAS) methodology. 50 interferograms were produced for the time-series analysis. Results show that Rafsanjan region is subject to progressive subsidence. Areas subject to significant subsidence belongs to agricultural field of Bahraman plain, subsiding at a rate of 28 cm/yr. Maps of average velocity of subsidence in the line of sight (LOS) direction from satellite to the ground illustrate an increasing rate of subsidence in this area over the last decades. Also, data from groundwater levels in the area over the past four years have been investigated, which indicates the similarity between the process of reducing groundwater levels and the trend of subsidence in the area.