

Comparison of L-Band and C-band Radar images in monitoring subsidence in agricultural area

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ABSTRACT:

In this research we provide a comparison between studies using Small Baseline Analysis (SBAS) and Permanent Scatterers (PS) techniques using L-band and C-band SAR images. Previous studies using (SBAS) technique showed that Mashhad aquifer is subsiding with the rate of 20 cm per year and this high rate of subsidence along with agriculture landuse loss interferograms coherence with time. Hence, to show sensibility of the L-Band and C-Bands images to decorrelation image sequences PS analysis is utilized and compared with SBAS method. The SBAS technique is based on an appropriate combination of differential interferograms produced by image pairs with small orbital separation to overcome the spatial decorrelation phenomena. In contrast, PS techniques is an extension to the conventional InSAR techniques which addresses the problems of decorrelation and also atmospheric delay. In our study we processed 26 ASAR single-look-complex images of Envisat satellite from 2003 to 2008 and 13 PALSAR dual pole images of ALOS satellite from 2007 to 2011 captured in C band and L-Band, respectively.

The time-series analysis showed that the subsidence occurs within a northwest-southeast of Mashhad valley. The maximum accumulated subsidence during 8 years was almost 200 cm, located in northeast of Mashhad city. The comparison between obtained results by PS technique and continuous Global Positioning System measurements demonstrated root-mean-square error of $\square 1.0$ and 0.8 cm for Envisat and Alos respectively.

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