COMPARSION OF BEIJING-TIANJIN INTERCITY RAILWAY DEFORMATION MONITORING RESULTS BETWEEN ASAR AND PALSAR DATA

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ABSTRACT

First experimental results were got to estimate the subsidence pattern of the Beijing-Tianjin Intercity Railway roadbed in Tianjin area by different data types (ASAR and PALSAR), and the comparison between their results analyses are giving in this paper. The multi-interferogram differential synthetic aperture radar interferometry (DInSAR) analyses algorithm is used to monitoring the subsidence of this first high speed railway in China.

The nature of PS-InSAR is to exploit the phase component of the stable permanent scatterers (PSs) in SAR images. In the large SAR imaging space scale, the long thin railway line has different running directions. The satellite SAR sensor look into the ground in the same look angle, so some section will be imaged well, and some sections will be imaged badly. By means of PSs selection, some points in the railway line will be lost. That is, the whole long railway will not be sensed well all the time. But for different SAR sensors with slightly different orbits and look angles, the railway can be imaged from slightly different way. So here we use two kinds of SAR data, ASAR and PALSAR, to estimate the railway line deformation parameters apart and give comparison of results.

In this paper, in order to give validation and comparison of results from two kinds dataset, 10 descending ENVISAT ASAR images and 15 ascending ALOS PALSAR images are used to monitor the slow ground deformation of Beijing-Tianjin Intercity Railway line separately. The ASAR dataset, frame2817, cover the period from June 2008 to June 2009, forming 35 interferograms. The PALSAR dataset, including frame770 and frame780, cover the period 2008/07/05-2009/07/08, combining 45 interferograms. Both dataset used additional DEM to remove the coarse topographic phase. The presented advanced scaled double network multi-interferogram DInSAR technique is applied into both data experiments and preliminary experiment results were obtained. It is shown that, during the period of middle 2008 to middle 2009, both experiment

results give the same subsidence rate pattern along the roadbed corridor. And the most important is that, in the section of north Wuqing, there is no railway points shown in the ASAR results, but for the PALSAR results, the railway points is obviously well imaged and the subsidence pattern of this section is obtained. For this is the work we desired, it's seemed that the PALSAR data gives the more detailed work. The first results here also show that the roadbed is relative stable during the first year running of Beijing-Tianjin Intercity Railway. Our experiments give good meaning to both research and secure running.

Key words: Differential SAR interferometry (DInSAR), Multi-interferogram, Network, Subsidence, Beijing-Tianjin Intercity Railway, ASAR, PALSAR

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