HEIGHT ESTIMATION OF BUILDINGS FROM HIGH-RESOLUTION SAR DATA BASED ON INTERFEROMETRIC ANALYSIS

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KEY WORDS: SAR, Interferometric analysis, TerraSAR-X, Building inventory, Building height

ABSTRACT: Building inventory is important information for monitoring urban development and evaluating damage risk of disasters. Owing to the developing of remote sensing technology, it is possible to create building inventory data from high-resolution satellite images. Building height is an essential element for inventory. There have been many researches for estimating building heights from optical and radar images. Interforematric analysis (InSAR) is known as an efficient method to build digital elevation models (DEMs). It also could be used to estimate building heights. In this study, the building height in San Francisco, California, USA was estimated by an Interferometric analysis (InSAR) and a geometric method from 1-m resolution TerraSAR-X HighSpot data. Two Single Look Slant Range Complex (SSC) data from the 2012 IEEE Date Fusion Contest taken in December 2007 were used. The normal baseline distance is 561 m, and thus the ambiguity height is 11.6 m for one cycle. A flattened interferogram image was obtained after removing the phases caused by the elevation and baseline. Instead of unwrapping the phases, the building height was measured directly from the number of phases within a layover area. The layover areas of buildings were extracted according to the coherence values. The building heights were also measured from the lengths of layover. The obtained results from the two methods were verified comparing with Lidar data. The Lidar data were taken in June 2010, and also provided from the 2012 IEEE Date Fusion Contest. According to the comparison, building heights could be estimated successfully by InSAR analysis with high accuracy.