13th FIG Symposium on Deformation Measurement and Analysis
4th IAG Symposium on Geodesy for Geotechnical and Structural Engineering

LNEC, LISBON 2008 May 12-15

USING SMALL BASELINE INTERFEROMETRIC SAR TO MAP NONLINEAR GROUND MOTION IN NORTHERN TIBET

Zhenhong LI[1], Paul CROSS[1], and Yanxiong LIU[2]

COMET, Department of Civil, Environmental and Geomatic Engineering, University College London[1]
Ocean Geomatics Center, the First Institute of Oceanography, State Oceanic Administration in China[2]

Abstract: Interferometric SAR (InSAR) techniques utilize the phase differences in complex (magnitude and phase) Synthetic Aperture Radar (SAR) images acquired in similar geometric conditions, but at two different epochs, to measure the component of the surface displacement (i.e. range changes) in the radar line of sight to the satellite with sub-centimetre precision and tens-of metres horizontal spatial resolution over a large region (e.g. 100 km × 100 km). With its global coverage and all-weather imaging capability, InSAR has been already revolutionizing our ability to image the Earth's surface and the evolution of its shape over time, which in turn has led to many new insights into geophysical and engineering processes, such as volcanoes, earthquakes, landslides and mining activity. In this study, we used Small Baseline (SB) InSAR time series technique to map ground motion in Northern Tibet using ENVISAT images acquired during the period between 2003 and 2007. In order to minimise the effects of baseline decorrelation, a subset of possible pairs with perpendicular baseline (i.e. orbital separation) less than 400 m was chosen in the SB InSAR time series analysis. Preliminary results reveal a nonlinear ground motion spreading over a 4.5 km × 2.7 km region: the studying area was relatively stable during the period 2003 to the middle of 2004, whilst it has exhibited an uplift of about 7 cm since the middle of 2004.

Key words: InSAR, small baseline, time series, nonlinear, ground motion.

Corresponding author contacts

Zhenhong LI
zhli@ge.ucl.ac.uk
University College London
United Kingdom