Geophysical Research Abstracts, Vol. 8, 06148, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06148

Advances in point target based interferometric techniques to better monitor fast and non-uniform landslide movements

A. Wiesmann, U. Wegmuller, T. Strozzi, C. Werner
Gamma Remote Sensing

Point target based interferometric techniques are used to map surface deformation histories, terrain heights, and relative atmospheric path delays.

The use of targets with point like scatter characteristics has the advantage that there is much less geometric decorrelation. This permits phase interpretation even for large baselines above the critical one. Consequently, more image pairs may be included in the analysis. Important advantages are the potential to find scatterers in low-coherence areas and that interferometric image pairs with large baselines may be included in the analysis. Finding usable points in low-coherence regions fills spatial gaps in the deformation maps while the ability to use large baselines improves the temporal sampling.

At present one important limitation of the point target based interferometric techniques is poor performance in the case of faster movements and for non-uniform movments. Looking at the results currently presented shows that the techniques are in many cases only reliable up to deformation rates of about 1cm/year. Landslides often move faster than 1cm/year. Furthermore, non-uniform motion is very important.

The objective of our work is to reduce this obvious limitation to improve the applicability and therefore utility of the point target based interferometric technique for landslide monitoring and other applications with fast and non-uniform movements as mining subsidence. The methodology applied to achieve such improvement is to separate the determination of persistant scatterers, the estimation of the related point heights and the estimation of the deformation histories and atmospheric path delays. The results achieved confirm that the applicability of the technique could be extended to significantly higher deformation rates.

In our contribution we will present the methodology used and discuss the results obtained. The presented investigations are conducted within ASSIST, a FP6 EC financed project. It aims at improving the capabilities of risk warning and risk management in the alpine region by implementing an integrated pre-operational service based on existing precursor services and related infrastructure. Landslide related work is twofold, a survey of active zones in the ASSIST test area (border region Switzerland/Austria/Italy), and the monitoring of selected sites.