

InSAR processing for the recognition of landslides

B. Riedel

Institut für Geodäsie und Photogrammetrie, Technische Universität Braunschweig, Gaußstraße 22, 38106 Braunschweig, Germany, (b.riedel@tu-bs.de)

The use of Synthetic Aperture Radar Interferometry (InSAR) for the detection and monitoring of earth surface processes is meanwhile an established method. However, this approach has only significant success if the observed area fulfils specific requirements, like sufficient backscattering, flat slope gradients or very slow change of vegetation. The early identification of endangered areas plays the main important role for the population. For the recognition of surface movements one has investigated the capability of InSAR.

For this purpose several test sites i.e. in Greece, Germany, Hungary, Romania and China were investigated. The represented approach consists of several levels of SAR data processing of the European Remote Sensing satellites ERS 1 and 2. At the beginning of the processing levels the subsampled 3sec-SRTM Digital Elevation Model (DEM) was used instead to the standard approach of using data of the ERS1/2 tandem mission for the DEM determination, because it turned out that one got more precise results. This DEM serves on the one hand as a necessary processing level for the further SAR processing and on the other hand as an important data source for GIS applications, e.g. for the derivation of slope parameters. The further processing levels were based on the differential interferometry approach using two or more coherent ERS 1 and 2 radar scenes for the final interferogram calculation.

The results from InSAR processing of different landslides in the above mentioned areas of investigation are in extremely good coincidence with the geodetic derived movement rates. This proves that there is a strong potential for the detection of landslides and possible earth surface movements with SAR Interferometry.