Geophysical Research Abstracts
Vol. 16, EGU2014-9298, 2014
EGU General Assembly 2014

Monitoring the kinematic of active landslides with ALOS/PALSAR DInSAR processing.

Romy Schlögel, Cécile Doubre, and Jean-Philippe Malet

Institut de Physique du Globe de Strasbourg, CNRS UMR 7516, Université de Strasbourg, 5 rue Descartes, F-67084 Strasbourg Cedex, France (schlogel@unistra.fr)

This study targets the analysis of the kinematics of large active landslide through the interpretation of L-band ALOS/PALSAR interferograms. In mountainous areas, landslide monitoring with radar images is often difficult to interpret because of the complex topography, important changes in vapor content in the atmosphere, and the presence of highly variable surface states (vegetation, soil humidity, snow cover, superficial mass transfer).
Sliding sub-units of two large and continuously active landslides (La Valette and Poche), exhibiting displacement rates ranging from 0.1 to 4.0 cm.day-1, are used as case studies to develop and explain the methodology. The results corresponding to positive or negative difference in phase value allow for the detection of landslide sub-units characterized by different kinematic patterns (e.g. single rotational slide, translational slide, multiple rotational slides). In the upper parts of the landslides, predominance of vertical displacements (subsidence) is observed in addition to a displacement in the downslope direction; this kinematic pattern is highlighted by either positive phase values corresponding to motion far away from the satellite. In the lower parts of the landslides, accumulation is observed in addition to a displacement in the downslope direction; this kinematic pattern is highlighted by negative phase values in the interferograms corresponding to motion toward the satellite.
Extension of the landslides (downhill, uphill or laterally) is discussed according to geomorphological observations and a priori knowledge on the landslides. Quantitative measurements of the displacement are projected along the slope and the vertical components according to the observed landslide patterns. The InSAR displacements are in good agreement with on-site field measurements (permanent GNSS observations, GNSS campaigns on benchmarks, and terrestrial laser scanner surveys). Peaks in displacement rates are correlated to meteorological data.