Geophysical Research Abstracts
Vol. 15, EGU2013-8069, 2013
EGU General Assembly 2013

Geoelectric monitoring of the Bagnaschino landslide (Italy)

Birgit Jochum (1), Robert Supper (1), David Ottowitz (1), Stefan Pfeiler (1), Jung-Ho Kim (2), and Mario Lovisolo (3)

(1) Geological Survey of Austria, Geophysics, Vienna, Austria (birgit.jochum@geologie.ac.at), (2) Korean Institute of Geoscience and Mineral Resources, Daejeon, Korea (jungho@kigam.re.kr), (3) Centro Servizi di Geoingegneria, Ricaldone, Italy (mario.lovisolo@csgsrl.eu)

Landslides are one of the major natural threats to human lives, settlements and infrastructure. Permanent geoelectrical monitoring using the GEOMON4D instrumentation in combination with high resolution displacement monitoring by means of the DMS system was performed at an active landslide area in Italy (Bagnaschino). These sites are part of a geoelectrical monitoring network of the Geological Survey of Austria, which currently comprises six permanently monitored landslides in Europe.

The Bagnaschino site represents a landslide/earthflow reactivated within an old landslide mass. The old landslide is situated on the slopes of the Val Casotto about 4 km SE of Torre Mondovì (NW Italy). Evident indications of deep-seated gravitational deformation suggest that the current slopes are in a condition of limit-equilibrium and are predisposed to slow instability, triggered most probably by rain and/or snow melting and river erosion at the foot. The recent landslide was activated during 1994 rainfall event. It covers an estimated area of 150,000 m^2 and comprises a displaced material of 1.2 million m^3. It endangers a regional road and potential formation of a dam. For the purpose of early warning a DMS monitoring column with 60 m length was installed in October 2008. Total displacement recorded by DMS during the events between 2008 and 2010 was 600 mm. Subsequently, the GEOMON4D geoelectric monitoring system was installed there in 2010. Resistivity measurements are performed along a 224 m long profile, which is oriented parallel to the main movement direction. Its midpoint is next to the DMS station. One set of data comprising around 4000 gradient-type measurements is taken every 4 hours. For power supply a combination of a fuel cell and a solar panel is used.
Within the observation interval one distinct displacement event was monitored. This event was accompanied by a decrease of electric resistivity. In addition to our standard analysis of resistivity data (e.g. time series of apparent resistivity, 2D inversion) the application of an innovative 4D inversion algorithm made it possible to investigate in detail the infiltration processes. We conclude that resistivity monitoring in combination with DMS and precipitation data can significantly help to investigate the dynamics of a landslide body.

The geoelectric monitoring is supported by the project “TEMPEL - Temporal changes of geoelectrical properties as possible indicator of future failure of high risk landslides”, funded by the Federal Ministry for Transport, Innovation and Technology (BMVIT) and the Austrian Science Fund (FWF): TRP 175-N21