Geophysical Research Abstracts,
Vol. 11, EGU2009-12834, 2009
EGU General Assembly 2009

Statistical analysis of the Time Lapse Electrical Resistivity Tomography of the "Vence landslide" as a tool for prediction of landslide triggering

T. Lebourg, MH Hernandez, SEL El Bedoui, and HJ Jomard

University Nice Sophia-Antipolis, Geosciences Azur UMR 6526, Valbonne, France (lebourg@geoazur.unice.fr, 0033-49294-2610)

A temporal imagery of water circulation in a landslide by Electrical Resistivity Tomography (ERT) was conducted to analyses the electrical signal behaviour of the slope during 600 days of measurement.

This work is based on an experimental approach applied on the "Vence" landslide (South-eastern France) which is characterised by a sandy-clay sliding mass mostly controlled by high rainfall events. This instrumented landslide is considered as a translational landslide including 1.2[U+F0B4]106m3 of material, affecting an area about 250 m large by 350 m long, with a slope of 12°/14°.

In this study dipole-dipole pseudo-section scheme is used to image the "Vence" landslide.
The Permanent ERT (Perm_ERT) is based on an autonomous acquisition device constituted by a 120 m long profile with 24 nodes. It allows obtaining a daily acquisition with 574 sample points. The 2D resistivity data were recorded using the Syscal R1 48 Plus imaging system (developed by IRIS Instrument).

In order to detect small electrical variations, between the different temporal measurement series, a statistical analysis was improved. Theses variations are clearly coupling to external solicitations (temperature, rainfall event, water table movement...). The 1D and 2D statistical analysis shows:
- The majority of the rainfall events are associated to a loss of linear correlation between temporal data.
- The electrical signal has two distinguishable answers to the landslide hydric conditions: the first one (considered like a perturbation) is due to the rain and the second one (observable at a longer scale time) is due to the variation water table head.
- Several periods show electrical signal stability.
- The rainfall event impact on the electrical signal is different depending on the material saturation.