Geophysical Research Abstracts,
Vol. 11, EGU2009-12249, 2009
EGU General Assembly 2009


# A method to characterize the 3D geometry of complex landslides in clayey soils: the Valoria, Super-Sauze and La Valette case studies

A. Daehne (1), J. Travelletti (2), J.-P. Malet (2), A. Corsini (1), and F. Ronchetti (1)

(1) University of Modena and Reggio Emilia, Department of Earth Sciences, Modena, Italy (alexander.daehne@unimore.it), (2) CNRS – University of Strasbourg, School and Observatory of Earth Sciences, Strasbourg, France (julien.travelletti@eost.u-strasbg.fr)

Bedrock geometry drastically influences the kinematic deformation pattern of slow-moving landslides exhibiting some flow characteristics. The development of extension and compression zones within the landslide body is largely controlled by the geometry (crests, bumps, hollows) and roughness of the topography covered by the moving mass. A challenge to progress in the forecast of such type of landslides is to precisely define 3D geometrical and geomechanical models.

The objective of this work is to present a methodology for 3D geometrical modelling of the landslide structure, and to discuss the main possible errors in integrating multi-source and multi-resolution data in the modelling. The methodology is presented through the analysis of three landslides with similar geomorphological features (e.g. flow-like geomorphology) and development patterns (retrogression of the crown, roto-translational failures of the upper part, and translational movements in the lower part), and for which an extensive dataset of geophysical, geotechnical and geomorphological information is available. The three cases studies are the complex Valoria earth-slide-flow located in the Northern Apennines, the Super-Sauze and La Valette mudslides in the French South Alps. All three landslides are predominantly developed in a clay-shale soil formation.

First, interpretation of the multi-data information, their resolution and accuracy is presented for the landslides. Second, a procedure to construct 3D geometrical models of the landslides is proposed (by using the Rockware's Rockworks geological modeller) and the influence of the interpolation algorithms is discussed. It is demonstrated that the model uncertainty is strongly depending on the density and distribution of the input data which vary for the three landslides. The quality of several geometrical models is then compared; a best-fit is achieved by using available geological and geomorphological site interpretation.