Geophysical Research Abstracts
Vol. 12, EGU2010-10572, 2010
EGU General Assembly 2010

Characterization of two events of rockslide in the Prealps region of Fribourg. The case of the Dent de Lys and Varvalanna (Fribourg, Switzerland)

Nicolas Gendre, Andrea Pedrazzini, and Michel Jaboyedoff
Université de Lausanne, Switzerland (nicolas.gendre@unil.ch)

The Dent de Lys and Varvalanna landslide lies in the Swiss Prealps. They took place at the end of April 1992 and on the 15 of May 2006 respectively. The failure area of the Dent de Lys is composed of Jurassic massive limestone and siliceous limestone. In the case of Varvalanna landslide the failure area is more complex and is composed by heterogeneous rocks.
This study deals the geomorphology, structural and rock mass conditions its goal is to understand the failure mechanisms, the triggering factors and the run-out of the two study areas.
The methodology consists to a detailed field survey linked to a High Resolution DEM (HRDEM) analysis. Field observations allow having detailed but local overview of the main rock mass and structural parameters. In particular a quantitative analysis of the discontinuity sets characteristics (spacing, persitence, infilling material, etc.) and the rock mass conditions (weathering fracturing, dissolution, etc.) have been carried out. The local analysis has been compared with the HRDEM to a more large-scale structure. In order to better define the different structural domains and the influence of the lithological changes in the mode of failure and in the landslides extension.
Complementary Terrestrial laser scanner acquisitions have been performed in order to estimate the rock slide volume and to provide accurate analyses of the structure of the rock mass. Finally geomechanical models of both landslide events have been performed in order to validate the preliminary results related to the failure mechanisms. Based on the rock mass condition analysis (Geological Strength Index), the preliminary results indicate that the Dent de Lys zone behaves as a structurally controlled rock mass. The failure mechanism of the 1992 event is probably a complex wedge sliding controlled by three main discontinuity sets.
The Varvalanna landslide instead of the Dent de Lys seems to have a less important structural control. Very low GSI values on the failure area indicates that the 2006 event behaved as a debris slide where the influence of water pore pressure represents the main triggering factor.