Geophysical Research Abstracts
Vol. 12, EGU2010-8962-1, 2010
EGU General Assembly 2010

Improvement on the structural, failure and movements analysis of the Randa rockslide and the surrounding area using remote sensing techniques

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The Randa rockslide is one of the most studied rockslide in the world. The structural and the failure mechanism of the 1991 rock slide are now better understood. A potential unstable mass is still present in the upper part of the scar and is presently monitored by different techniques. The present study focused on the application of the high resolution digital elevation model (HRDEM) to analyze at regional and local scale rock instabilities. In particular, the structural and the morphometric characteristics lead to a preliminary susceptibility analysis. First, a regional study have carried out in order to define the main structural sets influencing the slope stability and the slope morphology of the hanging wall close to the Randa rockslide. The main discontinuity sets and their variability have been analysed on the different locations. Failure mechanisms and morphometric analysis have been carried out in order to define the most susceptible zone. The results have been successively compared to field and orthophoto observations.
Second, a detailed of the structural setting of the Randa scar has been carried out and compared to previous studies (Sartori et al., 2003). Ground deformations, detected by PSInSAR data in the upper part of the Randa rockslide have been analyzed and interpreted.
Using the available structural and geomorphological observations the volume of the 1991 rockslide event has been re-evaluated using DEM reconstruction and using the Sloping Local Base Level method. Based on displacement maps and structural observations the volume the new potential unstable area has been also estimated. The potential mechanisms affecting this area, postulated since the beginning of the first geodetic system (Jaboyedoff et al., 2004), have been discussed and verified with the new available displacements data (Gischig et al., 2009).