Geophysical Research Abstracts, Vol. 7, 09290, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09290

Landslide dam and the geomorphological evolution of mountain valleys and slopes. Case studies in the Western Alps.

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The analysis of relationships between large slope instabilities and drainage network offers an interpretation key for the mountain relief evolution at various scales. From a theoretical point of view the evolution of the alpine landscape results from the active interaction between

exogenic (independent) and endogenic factors. The detailed analysis of geomorphological features of unstable slopes, landslide and lacustrine deposits, structural and tectonic conditions of the valley's bedrock is crucial in the determination of the different perturbations responsible of landscape sensitivity.

For the assessment of rates and thresholds of geomorphic change in the mountain landscape of the Western Alps, the regional distribution of large slope instabilities and landslides dam has been analyzed, some sectors of the Susa and Aosta Valley have been detailed studied. The case-studies have been selected to outline different possible geomorphic responses to the interaction between endogenic/exogenic processes along regional fault systems (Susa-Chisone Shear Zone, Aosta-Ranzola Fault) crossing the major valleys of the Italian Western Alps.

Different methodologies (field observations, remote-sensing and geotechnical investigations for geomorphological, stratigraphical and structural outputs) have been used to develop multiscale analysis:

- long-term landscape evolution, related to geostructural setting and the Pleistocene glacial history (Seguret, Thuras Valley, Quart, case studies)

- intermediate to short-term evolution, related to post-glacial slope's and drainage network's dynamics (Serre la Voute, S. Vincent-Chatillon case studies).

A regional map and a geodatabase have been realized for a landslide dam inventory; data on magnitude and frequency of events have been obtained and interpreted in the general framework of the Plio-Quaternary migration of the major alpine drainage divide and in the local history of slope's dynamics, connected either to shallow landslides or to deep seated gravitational deformations.

Distinct processes (during certain time intervals) strongly affected different mountain sectors working out a "geomorphological selection" of the landscape. Only selected fragments of the landscape history are preserved, not necessarily the most recent one. Best reconstructions of erosional/depositional events resulted by analyzing "border zones" of geomorphological sectors, i.e. the hubs of the interaction between tectonic activity and earth surface processes.