



RUFINE – Dendrogeomorphological reconstruction of past debris-flow activity in torrents and gullies of the Valais Alps

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Debris flows are fast flowing mixtures of water, gas and debris of different size, ranging from silt up to boulders with diameters of several meters. These flows generally occur during periods of intense rainfall, rapid snowmelt, a combination of these two triggering factors, or the breakout of a glacier lake (GLOF). Debris flows may also represent a major threat, causing fatalities or damage to infrastructure and transportation corridors. Information on the nature and the behavior of past events are, thus, of crucial importance for the assessment of hazards and risks as well as for the conceptualization or the design of e.g., torrent control works or retention basins. Consequently, a great deal of attention has been directed toward the analysis and documentation of processes in the aftermath of the widespread flooding and debris-flow events that affected large parts of the Swiss Alps in June and August 1987, September 1993, October 2000 or August 2005.

Nonetheless, data on past debris-flow activity normally cover only a few decades of the 20th century. Archival records may furnish additional information on past events, but these data generally do not reflect a detailed history of former events, and information on magnitudes remains exceptional. On forested debris-flow cones and along forested gullies, detailed tree-ring analyses (i.e. dendrogeomorphology) may provide data on magnitude and frequency of past events.

Over the last few years, several debris-flow cones have been successfully analyzed by means of dendrogeomorphological methods in the Valais Alps, reason why the Swiss Federal Office for the Environment (FOEN) and the Cantonal Department for Traffic,

Construction and Environment (Valais) have recently commissioned the Laboratory of Dendrogeomorphology at the University of Fribourg with the reconstruction and analysis of past debris-flow activity in 32 torrents and gullies of the Valais Alps over the next five years. The goals of the project can be summarized with the following key questions: (i) where, when and how often did debris flows occur? (ii) how much material has been transported during past events and where has it been deposited? (iii) how did the frequency of events change in the past? (iv) what were the meteorological conditions (precipitation amounts, temperature) during past events? (v) where can overbank sedimentation and the re-activation of abandoned channels be expected and where did such events occur in the past?

The project is called „RUFINE“ and was launched in fall 2006. Fieldwork and tree-ring investigations have been undertaken on eight debris-flow cones and gullies. First results on the past debris-flow activity in these gullies will be available by late 2007 (Further details on the project are available at: <http://www.dendrolab.ch>).