



## **DTM analysis of the 1961 rock avalanche, Illgraben creek (Switzerland)**

**T. Oppikofer**, E. Bardou, M. Jaboyedoff

Institute of Geomatics and Risk Analysis (IGAR), University of Lausanne, Switzerland  
(thierry.oppikofer@unil.ch / Phone: +41-21-6923542)

The Illgraben creek is situated in the canton of Wallis, SW Switzerland. It produces almost every year several flash floods. The frequency and the parameters (volume, viscosity...) of these debris flows are strongly influenced by geological events like rock avalanches and rockfalls within the catchment area. Historical information shows that during the 20th century the period with the most intense event and the highest frequency of debris flows is linked to a rock avalanche in 1961 of several  $\text{Mm}^3$  which generated deposits that filled completely the bottom of the narrow valley.

The main work consists in the analysis of the sequential DTM (i.e. pre-event and post-event DTM from 1959 and 1963) to estimate the erosion and deposit volumes. The differences between these two DTM allow the delineation of the scar area and the deposit zones. Interpretation of aerial photographs, also taken in 1959 and 1963, show a good correlation with the areas identified using the DTM. The total eroded volume, calculated by DTM differences, is  $4.7 \text{ Mm}^3$  with a maximum thickness of 142 m. In the valley of the Illgraben creek the deposited mass is evaluated at  $3.1 \text{ Mm}^3$  with thicknesses up to 80 m.

A basal surface of erosion is calculated on the DTM of 1959, using the sloping local base level (SLBL) concept. The topography modelled by the SLBL is very similar to the MNT of 1963. The zone with highest thickness of the rock above the SLBL corresponds to the area of the 1961 scar. Maximal thickness is 144 m what is in good agreement with the maximal difference in altitude between the MNT of 1959 and 1963 (142 m). The volume of rock contained between the SLBL and the topography of 1959 in the scar area corresponds to  $5.4 \text{ Mm}^3$ . This case study demonstrates the good correspondence between modelled topography and actual post-event topography.