Geophysical Research Abstracts
Vol. 14, EGU2012-1410, 2012
EGU General Assembly 2012

Deepening of inner gorges through subglacial meltwater — An example from the UNESCO Entlebuch area, Switzerland

M. Dürst Stucki (1), F. Schlunegger (1), F. Christener (1), J.-C. Otto (2), and J. Götz (2)
(1) University of Berne, Switzerland (mirjam.duerst@geo.unibe.ch), (2) University of Salzburg, Austria

This paper explores the mechanisms by which inner gorges in the Alps were formed. It focuses on the ca. 1.5-km-long, 80-m-deep, and a few hundred meter wide Lammschlucht located in the northern foothills of the central Alps. We reconstructed the glacial cover using lateral moraines and hanging talus cones that record the elevation of the ice surface at the deglaciation stage of the LGM (Last Glacial Maximum). We used the reconstructed ice thickness patterns to calculate the erosional potential of the subglacial meltwater. The applied model is based on the principle of energy conservation and yields the pattern of downstream changes of the dynamic pressure, which is considered a measure for erosion potential. The model results suggest a maximum of the dynamic pressure at the end of the inner gorge. We interpret, therefore, that the subglacial meltwater scoured the reach toward the end of the Lammschlucht because of the enhanced dynamic pressure, which was ultimately controlled by the ice overburden. Post-glacial fluvial erosion then resulted in a readjustment through a regressive shift of the erosional front along the inner gorge farther upstream. The current location of this front lies almost in the middle of the Lammschlucht inner gorge where a step-pool channel changes into a straight plane-bed channel flowing on a deeply scoured bedrock.