Geophysical Research Abstracts
Vol. 20, EGU2018-16117, 2018
EGU General Assembly 2018
© Author(s) 2018. CC Attribution 4.0 license.

How geomorphologic processes on slopes affect mid-mountain valley headwalls during the post-glacial history: a multi-methodical approach from the High Sudetes Mts.

David Krause (1), Marek Křížek (1), Tomáš Uxa (1,2)

(1) Department of Physical Geography and Geoecology, Faculty of Science, Charles University, Praha, Czech Republic, (2) Department of Geothermics, Institute of Geophysics, Academy of Sciences of the Czech Republic, Praha, Czech Republic

The present geomorphological state of mid-mountains reflects Cenozoic evolution containing tectonic, fluvial, glacial, periglacial and slope processes. The mountain valley headwalls are characterized by presence of all above-mentioned geomorphologic processes and they are one of the most dynamic parts of the landscape. The valleys also represent important corridors, in which the mass and energy is being transported from the upper parts of the mountains toward the foothills. Hence, the knowledge of their evolution is the key for complex understanding of geomorphological development of the mountains and their surroundings. The High Sudetes Mts. are suitable territory for geomorphic research of the upper parts of valleys, because there is a present insight about young tectonics, glacial, periglacial, fluvial and slope geomorphologic conditions during the Quaternary climate variations.

The mountain range is built of granites and metamorphic rocks, thus the type and intensity of slope processes affecting the surface morphology is quite different than in less durable flysch mountains (for example the flysch belt of Carpathians, where deep landslides prevail). In present time, debris flows and snow avalanches are the most dynamic processes affecting the surface of the High Sudetes, when some periglacial phenomena are still active on the slopes.

The presented poster is concerned on multi-methodical approach used to reveal complex evolution of post-glacial geomorphological development. Morphometric analysis combining field survey and GIS analyses of high-resolution LiDAR digital elevation models explains the genetic origin of valley headwalls (i. e. glacial, nivation or fluvial depressions). Under the changing climate during the Holocene, different intensity of ongoing processes have affected the environment. Periglacial landforms affecting the slopes were studied using geophysical, thermal and dendrochronological methods. Multiple generations of mass movement events (e.g. landslides and debris-flows) were reported in the mountain range. We studied the chronology of these processes (i.e. the age of deposit accumulations) and we used geophysical methods to estimate the volume and internal structure of these features. Present and historical activity of debris-flows and snow avalanches has been described using dendrochronological methods supported by old aerial photographs and written sources analyses. All of above-mentioned approaches create a mosaic of data helping us to understand the geomorphological development of mountain valley headwalls, and moreover, in the case of recent mass movements, to estimate potential natural hazards even in the feature.

Acknowledgments:

The research is supported by the Charles University Grant Agency, project number 1072116 and the Czech Science Foundation, project number 17-21612S. The terrain research is enabled by the Protected Landscape Area Jeseníky.