Geophysical Research Abstracts
Vol. 19, EGU2017-14921, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

GlacierRocks – Glacier-Headwall Interaction and its Influence on Rockfall Activity

Ingo Hartmeyer (1), Markus Keuschnig (1), Michael Krautblatter (2), Kay Helfricht (3), Kerry Leith (4), and Jan-Christoph Otto (5)

(1) GEORESEARCH, Salzburg, Austria (ingo.hartmeyer@georesearch.at), (2) Technical University Munich, Germany, (3) IGF - Institute for Interdisciplinary Mountain Research, Innsbruck, Austria, (4) ETH Zurich, Department of Earth Sciences, Switzerland, (5) University of Salzburg, Austria

Climate models predict continued climate warming and a decrease of Austrian glaciers to less than 20% of their present area by the end of this century. Rockfall from freshly exposed headwalls has been documented as an increasing risk factor with considerable significance for man and high-alpine infrastructure. Recent findings of a five-year terrestrial laserscanning campaign (2011-2016) monitoring glacial headwalls at the Kitzsteinhorn (3.203 m a.s.l.), Hohe Tauern Range, Austria, show the dramatic impact of glacier thinning on adjacent headwalls: 80 % of the detected rockfall volumes were triggered from areas located less than 20 m above the current glacier surface. Despite these implications, little is known about the thermal, mechanical and hydrological processes that operate at the glacier-headwall interface (randkluft). Systemic in-situ monitoring of stability-relevant parameters are lacking, leaving fundamental gaps in the understanding of rockfall preconditioning in glacial headwalls and the geomorphological evolution of glaciated catchments.

In this contribution we introduce the recently approved research project 'GlacierRocks', which starts in 2017 and will run for at least three years. 'GlacierRocks' will establish the worldwide first research site for long-term monitoring of stability-relevant processes inside a randkluft system. Based on the acquired monitoring data 'GlacierRocks' is pursuing three overall aims at (1) gaining a better understanding of rockfall preconditioning in randklufts and related geomorphological shaping of headwalls, (2) analyzing poorly understood glacial thinning dynamics near headwalls, and (3) estimating present and future rockfall hazard potential in headwalls on a regional scale.

The three system components (headwall, glacier, randkluft) will be investigated by combining geomorphological, glaciological and meteorological methods. 'GlacierRocks' will continuously monitor rock temperature, rock moisture, frost cracking, glacier ice temperature, glacier ice motion, randkluft depth/width changes and a series of meteorological parameters. The study site of 'GlacierRocks' is located in the summit region of the Kitzsteinhorn (3.203 m a.s.l.), which is home to an interdisciplinary Open Air Lab (OPAL) focusing on permafrost and rockfall monitoring. Utilizing the existing infrastructure of the OPAL and collaborating with several Kitzsteinhorn-based partner projects, 'GlacierRocks' will make a concerted effort to shed light on poorly understood processes operating at the transition zone between subglacial and subaerial process domains.