Geophysical Research Abstracts
Vol. 17, EGU2015-1194, 2015
EGU General Assembly 2015

Developing a postglacial rockfall chronology in the mountainous fjord landscape of western Norway

Katja Laute (1), Achim A. Beylich (1), and Stefan Winkler (2)

(1) Geological Survey of Norway (NGU), Geo-Environment Division, Trondheim, Norway (katja.laute@ngu.no), (2) University of Canterbury, Department of Geological Sciences, Christchurch, New Zealand

Large areas of glacially sculpted mountain landscapes worldwide exhibit a high spatial density of postglacial rockfalls and rock-slope failures. However, the temporal patterns of rock-slope failure frequencies after Deglaciation are still fairly unknown. The mountainous fjord landscape in western Norway represents a suitable study area as it exhibits a high number of rockfalls and rock-slope failures within a region with a well known Deglaciation history. Two steep, parabolic-shaped and glacier-connected neighbouring drainage basins, Erdalen (79.5 km2) and Bødalen (60.1 km2), located on the western side of the Jostedalsbreen ice cap in western Norway are selected as study areas.

The focus of this study is on (i) the temporal reconstruction of rockfalls and rock-slope failures within the two defined and nearly lithologically homogenous study areas and (ii) the identification and explanation of possible triggering and controlling factors of the investigated rock-slope failures.
First investigations have started by applying Schmidt-hammer exposure-age dating (SHD) at seven larger rockfall deposits as well as at five moraines of known age within both study areas. During the sampling 50 to 100 impacts using a mechanical Proceq N-type instrument were taken from the surface of 5 to 50 single rockfall boulders located at the outer margin of the rockfall deposits. In order to avoid sampling of more recent rockfalls or redistributed debris material the sampling strategy selected preferred a larger number of individual boulders sampled with few impacts over sampling just a small number of boulders with a high number of multiple impacts. First results show that the mean rebound (R-) values measured at the seven rockfall deposits fall into recognizably different age categories. Based on the SHD measurements obtained from the moraines of known age, the determined rockfall age categories are situated between the Preboral and Little Ice Age period.

The chronology and possible controls of more selected postglacial rockfalls and rock-slope failures in western Norway will be explored in more detail based on the application of a combination of different relative and numerical dating techniques together with detailed hillslope morphometry analyses and investigations on lithological and structural rock properties.
Results of this study can be used to improve geomorphic hazard assessments as well as to attain new insights regarding anticipated consequences of global warming (e.g. with respect to permafrost degradation in mountain areas).