Geophysical Research Abstracts
Vol. 17, EGU2015-1701, 2015
EGU General Assembly 2015

Formation of a deep funnel-shaped depression at the tongue of Gepatschferner (Ötztal Alps, Austria)

Martin Stocker-Waldhuber (1,2), Andrea Fischer (2), Michael Kuhn (3), David Morche (1), and Lorenz Keller (4)

(1) Institute for Geosciences and Geography, Physical Geography, Martin-Luther-University of Halle-Wittenberg, Germany (martin.stocker-waldhuber@uibk.ac.at), (2) Institute for Interdisciplinary Mountain Research, Austrian Academy of Sciences, Innsbruck, Austria, (3) Institute of Meteorology and Geophysics, University of Innsbruck, Austria, (4) roXplore gmbh, Amlikon-Bissegg, Switzerland

In 2009, a shallow depression emerged at the tongue of Gepatschferner (46°52‘30“N, 10°45‘25“E) and slowly deepened until 2012. After a heavy precipitation event in August 2012 the process accelerated and peaked in 2013. As it progressed, ablation at the bottom decreased, compared with the surrounding area, because of the shade in the deep funnel-shaped surface depression. With the ongoing retreat of the glacier tongue, a slow-down of surface velocity to almost nil, and given the highly uneven surface ablation, the shape became flattened in 2014 and will disappear within the next years.

The development has been monitored with geodetic and direct glaciological methods. On the basis of multiple high-resolution airborne laser scans, total elevation change rates were measured. Surface ablation was measured directly at an ablation stake and the velocity and elevation change of the surface with DGPS. Vibroseismic soundings were carried out in 2012 and 2013, using a shear-wave vibrator at two profiles to measure the thickness of subglacial sediment layers and changes therein.

The surface depression is situated at the lowest part of the glacier tongue within an area of 200 by 200 metres and had a maximum depth of about 30 m on the uphill rim and about 15 m on the downhill rim. A subglacial sediment layer of more than 10 m was evacuated during the heavy precipitation event which accelerated the subsidence.