



Permafrost Monitoring Sonnblick

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Within the project 'Permafrost Monitoring Sonnblick' (PERSON) the spatial distribution of permafrost is investigated by the 'Zentralanstalt für Meteorologie und Geodynamik' (ZAMG) in the Sonnblick area, in the Hohe Tauern in Austria. The aim of PERSON is to identify parameters affecting permafrost (geological, geomorphological, orographical and climatic factors), to determine its spatio-temporal behaviour under present day climate conditions and to estimate its possible future extension under a climate change scenario.

PERSON makes use of a permafrost monitoring network that was installed 2005 in the Sonnblick area and is made up by four study sites: On the one hand the spatial extension of permafrost was focused at the ice-dammed lake Pilatus and the rock glacier Zirmsee. On the other hand, at two sites, namely Goldbergspitze and Wintergasse measurements of 'Ground-Surface Temperature' (GST) and 'Bottom Temperatures of the Snow cover' (BTS) are measured. In order to record temperatures in the uppermost layer of the ground and avoid heating by direct solar radiation loggers were buried a few centimetres into the ground or installed in boreholes at depths between 2 and 140 cm. Each of the 'Near Surface Temperature' (NST) borehole mouths is closed up with insulating foam to protect the measurements from atmospheric influence. In addition to these measurements, continuous temperature records from three 20 m deep boreholes located at the southern slope of Hoher Sonnblick are available since 2007, which represent the longest series of its kind in Austria. Furthermore, data from seismic and geoelectric measurements, temperature sensors readings at the surface and extensive meteorological observations from the Sonnblick Observatory are available.

Already collected and evaluated data indicate that the thickness of the debris layer around the boreholes reaches a depth of 2 m but no more. The active layer thickness measured in the borehole next to the glacier ranges between 0.7 m and 1.35 m during the past six years and between 0.8 m and 1.04 m from 2008 to 2011 in the borehole nearby the Observatory. The year to year thickness of the active layer mostly depends on depth and duration of the snow cover. Ground temperatures have been slightly increasing during the past three years. The evaluation of the GST data yielded following results: the lower limit of the Permafrost-distribution at the south-east facing slope Goldbergspitze is about 2750m a.s.l. and at the north-west facing slope Wintergasse it is about 2500m a.s.l. Further statements are not yet possible, because of the heterogeneous topography in the study area and the shortness of the records.