



10-year monitoring of the temperature and the deformation of permafrost in the eastern ridge of Mt. Jungfrau.

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Progress of the thaw in the mountain permafrost has the correlation with the stability of steep slopes and rock faces. In the aspect of natural hazards, the monitoring of the response of the permafrost to the climate change therefore has importance, especially in the Alps. However, the distribution and the state of the mountain permafrost is difficult to estimate due to the large local variability of the ground surface temperature. As a consequence, the distribution is usually estimated by the empirical modelling and parameterizations. The on-site measurement from this study has a significance to verify such estimations, though they have been improved in a large extent in recent years, and also to grasp the temporal variation of the condition of mountain permafrost.

Since 1995, measurement of the temperature and deformation on the eastern ridge of Mt. Jungfrau has been maintained by the Laboratory of Hydraulics, Hydrology and Glaciology of Swiss Federal Institute of Technology. The measurement has a distinction for having deep borehole in the rock wall of high mountain, and for measuring the temperature and deformation in the same location, on the both of north- and south-wall of the same ridge.

Data have been accumulated for ca. 10 years hitherto, providing a unique aspects for understanding the thermal and mechanical processes of the seasonal variation of mountain permafrost. The data shows clear contrast between north and south walls, in terms of temperature range and water content, but no clear warming trends. It also indicates the relationship between the strain regime and the temperature range, which implies that both effects of freezing-thawing cycle and thermal expansion/contraction are acting as a source of the seasonal variation of strain in the rock wall.