



Borehole and ground surface temperatures and their relationship to meteorological conditions in the Swiss Alps

M. Hoelzle (1), S. Gruber (1)

(1) Department of Geography, University of Zurich, Switzerland

In Switzerland several boreholes are monitored within the framework of the Permafrost Monitoring Switzerland (PERMOS). Three of these boreholes, at Murtèl, at Schilthorn and at Stockhorn, are at least 60 m deep. In addition, a number of shorter boreholes (c. 6 m deep) were drilled in other projects and have been continuously observed over several years. Results on long- and short-term behaviour of these boreholes are presented and compared to standard meteorological components, such as air temperatures and snow cover, measured directly at these borehole sites or nearby. First analyses show the importance of the snow cover duration and thickness; more importantly on a local scale are different surface and sub-surface characteristics influencing heat transfer by conduction and heat capacity. The concept of different offsets between atmosphere and lithosphere is discussed, and data reflecting these offsets are presented for typical alpine conditions. Over last three years, a slight cooling effect has been measured, which seems to be strongly related to reduced snow cover thickness and duration.