



## **Tracing permafrost in proglacial springs – first results from two alpine research areas**

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Permafrost degradation is related to an increase of natural hazards in the European Alps. The AlpSenseBench project aims at an analysis of natural hazards in four alpine catchments applying a multiscale monitoring concept.. In this study, the proglacial region of the Vernagtferner glacier (~3000m asml) and the Zugspitze summit (~2700m asml) are focus areas to determine the impact of permafrost degradation on rock fall activities, slope stability and the future water balance of Alpine catchments.

Both areas have been object of extensive geo electrical monitoring in order to detect permafrost. Here, we analyze waters from the glacier, snow, precipitation and springs from the same area in monthly time intervals in order to hydro-chemically detect and characterize permafrost thawing from bedrock and unconsolidated moraine sediments. The water analysis includes stable isotope signatures  $\Delta 2H$  and  $\Delta 18O$  and the radioactive Iodine nuclide  $^{129}I$  for the relative age determination.

The results show the spatial distribution of springs possibly fed by permafrost melt water and allow quantitativ implications about its seasonal variability.