



## **Glacio-meteorological investigations in an Alpine ice cave (Eisriesenwelt, Austria)**

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A number of caves in the European Alps host substantial underground ice masses that may be considered as a variety of permafrost bearing a certain potential for paleoenvironmental analysis. However, the specific environmental conditions determining their existence, the potentially inherent paleoclimatic information, as well as their fate in a global warming perspective are largely unexplored.

Some of these aspects have been addressed by a recent multidisciplinary research project focussing on a prominent ice cave (Eisriesenwelt, Austria). We present first results from long-term records of air temperatures in the ice-bearing part of this cave which are related to the outside atmosphere. Moreover, we consider detailed specific meteorological and glaciological measurements that were performed near the distal end of the ice-covered part of the cave during a full annual cycle. These data are discussed in the context of the mass and energy balance of the ice masses within the cave. The modern conditions at this site are characterized by a negative mass balance, which is supported by steady energy input from longwave radiation fluxes and turbulent sensible heat fluxes. The latent heat fluxes are characterized by pronounced seasonal changes from prevailing condensation during summer and evaporation during winter time. Conductive heat fluxes within the ice play only a minor role.