



## **Imaging the structure of cave ice by ground-penetrating radar**

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Many caves in high elevated alpine regions host up to several meters thick ice. The age of the ice may exceed some hundreds or thousands of years. However, structure, formation and development of the ice are not fully understood and are subject to relatively recent investigation.

The application of ground-penetrating radar (GPR) enables to determine thickness, volume, basal and internal structure of the ice and provides as such important constraints for related studies. We present results from four caves located in the Northern Calcareous Alps of Austria. The GPR data are also compared with stratigraphic information obtained from outcrops and core drilling.

We show that the ice is far from being uniform. The base has variable reflection signatures, which is related to the type and size of underlying debris. The internal structure of the cave ice is characterized by banded reflections. These reflection signatures are interpreted as thin layers of sediments and might help to understand the ice formation by representing isochrones. Overall, the relatively low electromagnetic wave speed suggests that the ice is temperate, and that an unfrozen water content of about 2% is distributed homogenously in the ice.

We also would like to draw attention to the session CR11.20 which covers several of cave-ice related topics.