

Press release

International research project starts drilling in Germany to investigate the climate development in the Alpine region

Winterstettenstadt. How did the climate in the Alpine region change during the ice ages and shape glaciers, flora and fauna over the millennia? In April, the Leibniz Institute for Applied Geophysics (LIAG), in cooperation with the Albert Ludwig University of Freiburg and the Geological Survey in Freiburg (LGRB), will start three research boreholes in the so-called Tannwald basin, within the community of Ingoldingen, southeast of Winterstettenstadt, Germany. The boreholes, which will be 160 metres deep, mark the start of the international project "DOVE - Drilling Overdeepened Alpine Valleys". The aim of this project is to reconstruct the spatial and temporal climate development during the ice ages in the entire Alpine region over the past 2.6 million years.

The sediments extracted from the boreholes will provide information about the climatic changes in the region and their effects on the characteristics of the former Rhine glacier as well as on landscape development. To this end, two flush boreholes and one core borehole, each with a depth of up to 160 metres. The flush drilling will begin mid-April. A few weeks later, the core drilling will begin.

Geophysical measurements and drill core analysis

LIAG researchers will take geophysical measurements in the boreholes using a wide variety of probes to determine the specific properties of the sediments. With seismic measurements between the boreholes, they record the conditions of the sediment deposits in detail. Initial results from preliminary investigations have already been converted into 3-D models. The project partners will analyze the sediments obtained from the core drilling for their age, pollen varieties, and the presence of microorganisms, among other things. In some cases, the sediments will be analyzed directly on site using a core scanner.

"With this project, we are conducting important basic research on the spatial and temporal dynamics of ice ages as well as on climate development in the past," explains Professor Gerald Gabriel, geophysicist and project leader at LIAG. "The insights are important not at least for the understanding of possible climatic development in the future. In this context, geophysics is crucial to transfer the punctual drilling results into a three-dimensional space."

"Through international cooperation, we can pool our expertise in this large-scale project and interpret the results across disciplines and countries, as well as forecast developments," adds Professor Frank Preusser, sedimentary geologist and ice age researcher at the Albert Ludwig University of Freiburg. Dr. Ulrike Wielandt-Schuster, Referent for Geological Fundamentals at LGRB, sees added value for the state: "Research drillings are very valuable for us, because the more well-founded and high-quality our data base is, the better we can understand the structure of the subsurface."

Data for groundwater supply and geothermal potential

In addition, the data collected will provide valuable information on applied questions: For example, they can be used to determine the long-term security of groundwater resources. The data can also be used to define the potential of geothermal drillings or basic geological properties and processes that can support future planning and forecasting.

The research drillings are co-funded by the International Continental Scientific Drilling Program (ICDP), as an international organization for the promotion and support of geosciences in the field of scientific continental drilling, by the LGRB, by the German Research Foundation in the context of further investigation, and by the LIAG, which is responsible for the coordination of the research and the drillings at Winterstettenstadt. Overall, the aim of DOVE is to study sediments from up to 16 boreholes at as many sites around the Alps within the next few years. More than 20 national and international partner organizations with over 100 scientists are participating in the large-scale project.

Further information

Project website: <https://www.leibniz-liag.de/en/research/projects/third-party-funded-projects/tannwald-borehole>

About LIAG

The Leibniz Institute for Applied Geophysics (LIAG), based in Hannover, Germany, is an independent, non-university research institution. Using methods of applied geophysics, future-oriented questions of public relevance are investigated. The main focus of the research work is the exploration of the usable subsurface and the development of measurement techniques and numerical methods. The institute has over 50 years of experience in geophysical research. LIAG is unique in Germany due to its many years of specialization in the near-surface application of geophysics, the equipment and data infrastructure, and the associated possibility to combine a wide range of geophysical methods within one institute to cover a wide range of topics. <https://www.leibniz-liag.de/en/>

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Pictures:

Figure 1: The region near Winterstettenstadt - today and about 450,000 years ago. (© LIAG)

Picture 2: Research drillings should give information about the climate at that time (© H. Anger's Söhne)

Picture 3: Glaciers - The Ice Ages in the Alps (© LIAG)