



Antarctica: working for 2 months at -40°C to complete the Little Dome C camp

The first ice core drilling campaign of Beyond Epica-Oldest Ice has been successfully completed. This international research project was funded by the European Commission with 11 million euros, supported by significant financial and in-kind contributions from the participating nations, and is coordinated by the Institute of Polar Sciences of the Cnr (National Research Council of Italy). The project aims to obtain information on the evolution of the temperatures, on the composition of the atmosphere and on the carbon cycle over the last 1.5 million years, by analysing a deep ice core extracted from the Antarctic ice sheet. During the 2021/22 campaign, the team completed the field camp installation, set up the drilling area reaching a depth of 130 metres, completed the temporary storage cave, and installed the complex drilling system, which is necessary to continue this unprecedented challenge during the next few seasons

At the remote Little Dome C site in Antarctica, the first ice core drilling campaign of Beyond Epica-Oldest Ice has been successfully completed. The campaign is an unprecedented effort in paleoclimatology studies, as its purpose is to go back in time by 1.5 million years to reveal invaluable information on temperature and on the concentration of greenhouse gases in the atmosphere in the past.

The project started in 2019 and will last seven years. It is funded by the European Commission with 11 million euros and supported by significant financial and in-kind contributions from the participating nations. It is coordinated by Carlo Barbante, director of the [Institute of Polar Sciences](#) of the National Research Council of Italy (Cnr-Isp) and professor at Ca' Foscari University of Venice. The project involves twelve European and non-European international research institutes and will benefit from synergies with the French Polar Institute and the Italian National Antarctic Programme activities at the Italian-French Concordia Station.

From late November 2021 to the end of January 2022, the international team reached a depth of 130 metres, where the ice preserves information on the climate and atmosphere of approximately the last 3000 years. The first firn and ice cores of Beyond Epica are currently stored at the Italian-French Concordia Station on the eastern Antarctic plateau. During the next few years, these samples and the ones that will be collected during the next field campaigns will be transported to European laboratories. The target is to reach a depth of about 2,700 meters, the ice thickness at Little Dome C. Little Dome C is an area of 10 km² located 34 km from the Italian-French Concordia Station — one of the most extreme places on Earth. Glaciologists, engineers and technicians of the international team have worked at an altitude of 3,233 metres above sea level, over 1,000 km away from the coast,

in one of the harshest places on the planet. Strong gusts of wind and a temperature almost always below -40°C , with lows of -52°C , made camp set-up even more challenging.

The main objectives completed by the Beyond Epica-Oldest Ice team, in fact, were the setting up of the camp, which can now host up to 15 people during the Antarctic summer, and the installation of a complex drilling system which is necessary to continue this unprecedented challenge during the next few seasons. The drilling tent now contains the control cabin, a tilting drilling tower for the maneuvering of the drilling system — which can extract ice cores up to 4.5-metre-long — and a laboratory for sampling preparation and storage. The drilling hole has been reamed and protected by a casing tube, two delicate operations that took several days to complete.

“We are very satisfied with the work done so far. Our next campaign will involve a final testing of the drilling system and then speedily proceeding to conduct deep drilling,” says Carlo Barbante, who is personally involved on the field in this campaign.

The climate and the environmental history of our planet is archived in the ice, which can therefore reveal information from centuries and even hundreds of millennia ago on the evolution of temperature and on the composition of the atmosphere. Researchers will thus be able to assess the content of greenhouse gases, such as methane and carbon dioxide, in the atmosphere of the past. Then, they will be able to link these findings with the evolution of temperature.

“We believe this ice core will give us information on the climate of the past and on the greenhouse gases that were in the atmosphere during the Mid-Pleistocene Transition (MPT), which happened between 900,000 and 1.2 million years ago,” says Barbante. “During this transition, climate periodicity between ice ages changed from 41,000 to 100,000 years: the reason why this happened is the mystery we hope to solve.”

The other scientists on site were Thomas Stocker, Remo Walther, and Jakob Schwander from the University of Bern. The drillers were Philippe Possenti, Gregory Teste, Olivier Alemany, and Romain Duphil of the University of Grenoble-Alpes, and Matthias Hüther of the Alfred Wegener Institute. Logistics and telecommunications were managed by Michele Scalet, Saverio Panichi, Giacomo Bonanno and Calogero Monaco of Enea, while the electrification of the camp was managed by Olivier Delanoe and Anthony Pauty of the French Polar Institute (Ipev).

Photos

<https://bit.ly/beoi2022>

Video: Little dome C drone view

<https://filesender.garr.it/?s=download&token=8373c581-85dd-4b75-9993-fe571cb0762b>

To learn more about Beyond EPICA Oldest Ice Core the field campaign 2021/22: <https://www.beyondepica.eu/en/about/field-diary/field-campaign-202122/> and about the project in general: https://linktr.ee/BeyondEpica_OldestIce.

In brief

What: closing of the first ice core drilling campaign for the European project Beyond Epica-Oldest Ice

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This project has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement No. 815384

The project has also been supported by national partners and funding agencies in Belgium, Denmark, France, Germany, Italy, Norway, Sweden, Switzerland, The Netherlands and the United Kingdom.