IN SEARCH FOR MILLION-YEAR-OLD ICE, BELGIAN AND INTERNATIONAL SCIENTISTS RETURN FROM ANTARCTICA WITH FIRST CLUES



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Financed by the Belgian Federal Science Policy (BELSPO) and the Université Libre de Bruxelles' QUOI project, with strong logistical support from the International Polar Foundation (IPF), which is mandated to manage the zero-emission Princess Elisabeth Antarctica research station by the Belgian Polar Secretariat, the team of scientists from the FROID project ("Finding the world's oldest ice record around the Princess Elisabeth Station") spent several weeks on a field campaign in the Nils Larsen Blue Ice Field near the Sør Rondane Mountains in December and early January.

The field team consisted of four scientists - Maaike Izeboud (VUB), Etienne Legrain (ULB/VUB), Veronica Tollenaar (VUB), and Harry Zekollari (VUB) - who were supported by IPF field guide François Pallandre and IPF technician Nicolas Grosrenaud. They drilled shallow ice cores to date the surface age of the ice, took surface ice samples, planted stakes in the ice to see how much ice is being lost at the surface, and collected radar data to evaluate ice thickness. The data they obtain from all of this work will help the scientists figure out where the ice is the oldest, and therefore where to drill an ice core with the goal of retrieving million-year-old ice.

“Antarctica is covered by an ice sheet in most places, and the further down into the ice sheet you go, the older the ice is,” explained Prof. Harry Zekollari. “Air bubbles trapped in the ice, which formed as snow fell on the surface and turned into ice over time, can tell us how the composition of the atmosphere varied in the past and therefore what the climate was like going back hundreds of thousands, or even a million years.”

Some of the oldest ice in Antarctica lies at the bottom of the Antarctic Ice Sheet, where the ice meets the bedrock of the Antarctic continent. Previous international scientific expeditions to drill deep ice cores to find the oldest ice have been able to go back hundreds of thousands of years in climate history. The most well-known of these was the EPICA project (European Project for Ice Coring in Antarctica), which was able to retrieve an ice core going back 800,000 years at Dome C, one of the highest points on the Antarctic Ice Sheet. Recently, in a follow-up deep drilling project (Beyond EPICA), ice older than 1,200,000 years was recovered. However, many of these ice coring projects drilled straight down several kilometres into the ice sheet to retrieve the oldest ice. This method is technically difficult, expensive, and time-consuming.

“The FROID project takes a different approach to finding very old ice without having to drill kilometres-deep ice cores,” explained Dr. Veronica Tollenaar. "It takes advantage of the location of blue ice areas on the continent. The Antarctic Ice Sheet slowly flows from the centre of the continent to its coasts due to gravity. As the ice approaches mountains, in blue ice areas, the ice at the bottom of the ice sheet is pushed up closer to the surface, making the oldest ice easier to access.”

Altogether this season the research team collected 15 shallow ice cores, more than 1000 surface ice samples, and did 200 km of radar transects. The ice samples are currently being shipped back to Belgium, where they will be analysed in the labs of the participating universities.

The field camp for the FROID project was located in the Nils Larsen Blue Ice Field 2300 metres above sea level, not far from the Sør Rondane Mountains, about 50-60 km from the Princess Elisabeth station.

The team encountered an interesting phenomenon during their field work.

“One thing we came across during our time up at the field was a liquid surface lake, which is very rare to find in Antarctica, especially at the high altitude where we were,” Dr. Maaike Izeboud stated. “However, there were several warm days in December with high temperatures, so this lake may have formed due to surface melt. We need to investigate this further by modelling the surface mass balance to see how exceptional the formation of a surface lake at that altitude might be.”

They also had some unexpected visitors right before the new year.

“On New Year’s Eve, several south polar skuas, which are large sea birds that typically live near the coast, paid us a visit,” Dr. Etienne Legrain recounted. “While Henri Robert, the IPF Science Liaison Officer who is also a biologist, said it’s normal that skuas occasionally fly several hundreds of kilometres to breed in small numbers in the Sør Rondane Mountains, we were nonetheless amazed to see a form of life after so many days in the field!”

The FROID project plans to return to Antarctica for a second field campaign during the 2026-27 research season.