

Little Dome C

Beyond EPICA Oldest Ice Drilling Site (75.29917 °S, 122.44516 °E)

Situation Report #17, 3rd December 2025

Personnel @LDC:

Carlo Barbante (UNIVE, CNR-ISP, PI in the field), Gianluca Bianchi Fasani (ENEA, Camp Leader), Katrin Ederer (AWI), Matthias Hüther (AWI, Chief Driller), Marion Lahuec (IPEV), Gunther Lawer (AWI), Johannes Lemburg (AWI), Barbara Seth (UNIBE), Philippe Possenti (CNRS), Chiara Venier (CNR-ISP), Sergio Zannini (ENEA)

Personnel @DC:

Mohammad Vafadarmianvelayat (AWI)

Weather at LDC: sunny and cold

Meteo at DC 09 pm: T = -34,7 °C, Wind speed = 35kt, Windchill T = -42°C, Humidity = 66 %



The clock keeps ticking, but our spirits—and the drills—remain high as we continue our incredible quest for the oldest ice on Earth!

Today, December 3rd, was another day in the deep-freeze laboratory of Little Dome C, mixing cutting-edge science with ingenious problem-solving and a touch of Antarctic celebration.

We are still locked in a thrilling problem-solving phase, specifically battling the stubborn ice-rock interface. The mechanical structure of our drilling tower is holding up wonderfully, performing its complex movements reliably despite not being under ideal, controlled conditions.

The real challenge remains penetrating that boundary where the ancient ice meets the bedrock. This geological frontier demands patience and persistence. Today, we committed to a three-pronged approach:

1. Targeted Drug Delivery, Antarctic Style: We first attempted a strategy from yesterday: deploying a dose of high-density drilling fluid directly to the bottom of the bore-hole. The idea is to use this fluid to help clear the interface and stabilize the hole, getting rid of possible refrozen water formation and allowing the drill to advance. Our solution is a concept borrowed from medicine: targeted drug delivery. We need to deliver a specific "dose" of high-density, anti-freeze drilling liquid exactly to the basal part of the bore hole, which sits at 2800 meters beneath the surface. Easy to say, highly challenging to do! To achieve this, the team designed and implemented a specialized system: We used the newly designed core barrel tank with the white valve and a graft in the middle that will be pushed in like a cork to let the fluid getting out (see lowermost picture yesterday), hence, to baile down Estisol 165 to lift the ice from the bottom of the hole. This should deliver the anti-freeze liquid precisely where it's needed—at the ice-rock interface. The high-density liquid is quite transparent, making it hard to verify the drop's success visually.
2. A Blind Date with the Depths: To verify the hole's conditions, we lowered a camera for a visual inspection. However, the Antarctic cold played its hand; the rigid temperatures sapped the camera batteries, preventing us from viewing the deepest, most critical sections of the bore-hole.



3. The Late-Night Payoff: The final action of the day was to run the rock drill in its standard configuration. And the polar gods smiled upon us! Late into the Antarctic night, the drill was pulled up, rewarding the team's marathon effort with a small, precious piece of ice!

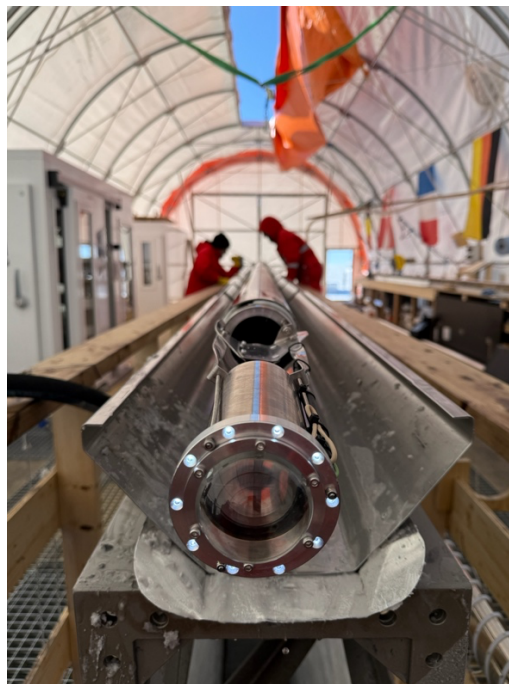
Tomorrow, we will have much more to report on the quality of this catch. That is when the core is taken to the “Red Light Lab”—and no, don't get any funny ideas! This is the scientific trench, buried deep and maintained at a constant -50 ° C. It's equipped with specialized red lighting to protect the ice core samples from high-energy light interaction, which could damage the delicate bio-chemical and physical information locked within the layers.

After a literal marathon session in the -50 °C Cold Trench, the DEP system is now fully calibrated and officially up and running!

With DEP online, the scientific trench now needs to be meticulously cleaned and prepared. It is getting ready to receive and process the first samples that will hopefully arrive from the deepest part of the bore-hole deviation—the ultimate goal of this entire operation!

On the logistical front, everything continues to run like a well-oiled machine. Every minor issue is being brilliantly resolved, often with nothing more than the limited resources available at the camp. A testament to the skill and ingenuity of the Little Dome C team!

And speaking of the team, today was another day for celebration! Following the recent Antarctica Day, we celebrated **Little Dome C Day**. December 3rd marks the birthday of Saverio Panichi, the historic Camp Manager of LDC. Our wonderful cook, Barbara, baked a phenomenal cake, and the team made a video call to Saverio, sharing the warmth of the moment across the cold, vast distance.



The camera mounted on the bottom of the drill barrel with the LED light ready to illuminate the deep part of the borehole. Photo C. Barbante





We were not fast enough to take a picture of the full cake baked by Barbara to celebrate the LDC Day. Photo, B. Seth

CB, GBF, BS & MH; LDC, 03.12.2025

