

Little Dome C

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

Situation Report #19; Wednesday 21 December 2022

Personnel @LDC:

Saverio Panichi (ENEA, Camp Leader), Frank Wilhelms (AWI, Chief Driller), Robert Mulvaney (BAS, Chief Scientist), Giuditta Celli (ENEA), Romily Harris Stuart (LSCE), Matthias Hüther (AWI), Gunther Lawer (AWI), Johannes Lemburg (AWI), Martin Leonhardt (AWI), Michele Scalet (ENEA), Julian Westhoff (NBI), Andrea de Vito (ENEA)

Personnel @DC:

Marcus Grimmer (UNIBE), Florian Krauss (UNIBE)

Weather at LDC 5 pm: sunny, 5 knots

Meteo at DC 5 pm: T = -36°C, Wind = SW, 5 knots, Wind Chill T = -48°C



Late the previous evening, the Danish barrels, hollow shaft and fluid pump had been replaced by the AWI components, after some modifications to the outer barrel and fluid pump to reduce the friction. We also got a complete set of new cutters on the drill head - a change from the 'stepped cutters' we had been using over the previous few days. Unfortunately, a mis-alignment of the fluid pump in the outer barrel rifling damaged the plastic locator ring (the orange section in yesterday's picture), so we quickly changed to a spare hollow shaft with a 'booster pump' (short Archimedes spiral). We can print new plastic components using a 3-D printer located in a warm cabin in the back corner of the drilling tent, so the damage was temporary.



New day, new cutters on the drill head. The second set of three cutters extending into the interior of the drill barrel are the core catchers, that are normally held in slots in the drill head until a drilling run finishes – pulling up on the cable engages the core catchers in the ice and breaks the core and holds it in the barrel while the drill is brought back to the surface. (Photo: Mulvaney, Leica SL2, 16mm, 1/30, f14, ISO160)



Unfortunately, the booster pump failed to collect the full production of chips produced by the drill head, which for ice core drilling is a dangerous situation because a build-up of chips in the borehole could trap the drill and prevent recovery. Thus, we had a series of short cores, and few chips, until we were able to again to switch back to the fluid pump. Runs from this point on gradually increased in length as the chips lost in earlier runs were recovered from the hole.



Lemmie cuts away part of the lower outer barrel to make triangular slots to better capture the chips produced by the drill head, directing them more efficiently to be captured by the spirals on the inner core barrel. (Photo: Leonhardt, Leica SL2, 16mm, 1/160, f8, ISO400)

End of day statistics:

Individual runs of the drill were recorded as: 1.07, 0.00, 1.60, 0.27, 1.30, 1.73, 1.93, 2.34, 2.20, 2.41, 2.41 m

Drillers' depth: 233.43 m; daily total 17.54 m

Loggers' depth: 238.91 m; daily total 17.68 m

Processors' depth: 112.0 m; daily total 11.0 m (planned maintenance at Concordia Station meant a power-down in the Processors cold workshop, and reduced their ability to measure and cut the cores today)

RM and FW, 23.12.2022

