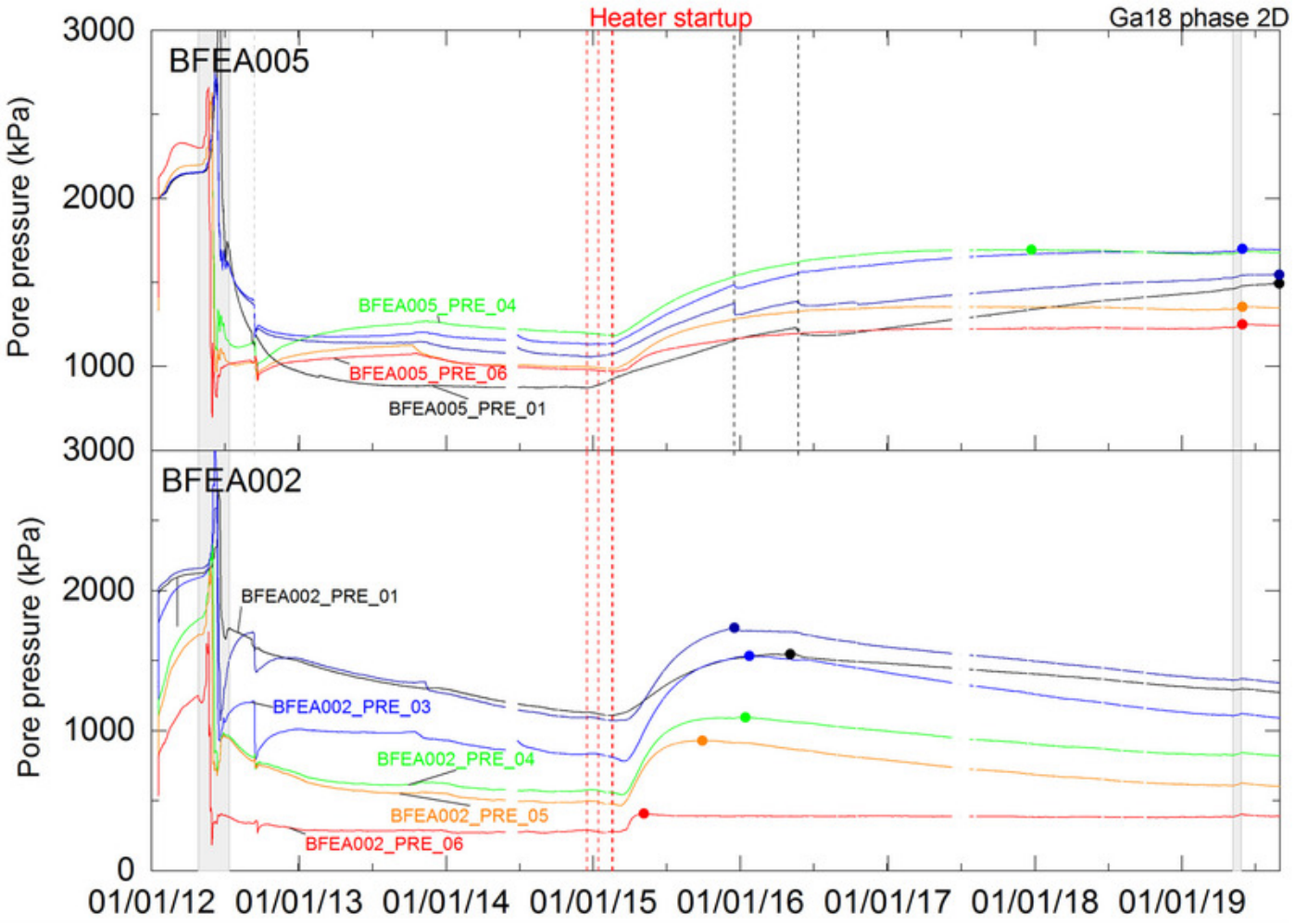
Mont Terri Project
Underground Rock Laboratory

Report period: November 20–26, 2023

Assembled and edited by swisstopo, St-Ursanne



Spotlight of the week: Long-term monitoring of the Full-scale emplacement experiment. The FE-M is a long-term experiment dedicated to the monitoring of the FE. The FE experiment is a full-scale heater simulating the construction, waste emplacement and backfilling of a single disposal tunnel for high-level waste. The heaters had run at 1350W since 2015 until March 2023, when power was increased to 1500 W. The monitoring of FE focuses on investigating repository induced thermo-hydro-mechanical coupled effects on both the backfill as well as the Opalinus Clay. For example, the pore pressure increase in response to heating could be well captured in the boreholes surrounding the tunnel. Partners of the FE-M are: Andra, BGE, BGR, DOE, FANC, Nagra, NWMO, NWS. Figure: Measured interval pressure in BFEA002 (parallel to bedding) and BFEA005 (normal to bedding) (Lanyon et al. 2020, NAB 19-46) .

CD-A (Influence of Humidity on Cyclic and Long-Term Deformations) experiment

- On Thursday, November 23, M. Sack and M. Ratz (BGR) optimised the single-sided NMR installation and performed the NMR measurements of the CD-A niche walls according to seasonal monitoring schedule (**Figure 1**).

CI-D (Diffusion Across 10-Year-Old Concrete/Claystone Interface) experiment

- On Monday, November 20, BCI-D4-OC3 was drilled and retrieved without any issues in perfect condition. The core was preserved in its liner awaiting sample preparation later this week.
- On Tuesday, November 21, C. Zwahlen and M. Kiczka (UniBern) sampled the core of BCI-D4-OC. Radioprotection measures were in place.
- On Wednesday, November 22, the sampling team C. Zwahlen and L. Aschwanden (UniBern) with support by M. Treuthardt, F. Kober (Nagra) and U. Mäder (RWC) processed the remaining samples from BCI-D4-OC2 and all of BCI-D4-OC3, including aqueous extracts and samples for water content determination.
- On Thursday, November 23, the last remaining fibreglass tubes for stabilising overcoring from within the steel liner of BCI-D1 were filled with mortar. The lid of BCI-D1 was removed and the top cleaned, all in preparation for the overcoring of the circulation interval next week. A. Jenni (UniBern) organised a large pile of sealed samples from BCI-D3 and BCI-D4, and started to vacuum-seal imporatent back-up samples with an additionaly layer of plasticized aluminium foil. A large number of samples for water-content measurements went into the drying oven.

CL (CO2LPIE-CO2 Long-Term Pulse Injection) experiment

- On Monday, November 20, J. Windisch, A. Grignaschi and L. Borgeaud (swisstopo) tested for the third time the hydraulic packer in a steel tube by injecting water up to 20 bar. They also tested the resin pump with water (**Figure 2**).

CS-E (Mini-Fracturing and Sealing) experiment

- On Tuesday, November 21, K. Tuinstra, M. Nuus and P. Annan (ETH) performed a sparker timelapse survey and GPR in BCS-D5 and BCS-D6 (**Figure 3**).

HE-E (In-Situ Heater Test in VE-Micro-Tunnel) experiment

- From Tuesday to Wednesday, November 21–22, PX. Meury (GéoEnvironnement) performed the mapping of BHE-E4.
- On Wednesday, November 22, we drilled and sampled another small borehole from within BHE-E4. This went very well, with many good samples. We measured a peak temperature of 129 C at the heater surface. C. Zwahlen and L. Aschwanden (UniBern) were doing sampling and sample processing. M. Treuthardt and F. Kober (Nagra) with U. Mäder (RWC) formed the technical team.
- On Thursday, November 23, A. Eul and J. Eul (Eul GmbH) drilled a fourth small borehole in BHE-E4, again with quite a bit of sample material retrieved in an orderly fashion. Sampling was done by M. Treuthardt, F. Kober (Nagra), A. Jenni (Uni Bern) and U. Mäder (RWC).

LT (Long-Term Monitoring) experiment

- On Tuesday, November 21, J. Windisch (swisstopo) measured the changes of the x/y/z axis of the joint meter in Niche EZ-B and at the main fault in Ga98.

SI-B (Seismic Imaging of Structures Below the Mont Terri Tunnel and Rock Laboratory) experiment

- From Tuesday to Thursday, November 21–23, L. Borgeaud, A. Grignaschi, J. Windisch and S. Schefer (swisstopo) measured the geodetic position of the 200 shot points for the seismic survey inside the Security Gallery.

SW-A (Large-Scale Sandwich Seal in Opalinus Clay) experiment

- On Monday, November 20, T. Theurillat (swisstopo) refilled the HPT attached to the borehole BSW-A1.
- On Thursday, November 23, S. Schefer (swisstopo) repaired the outlet of shaft 2 low pressure tank with the magic tape provided by Amberg and slightly increased the pressure to 5.7 bar.
- On Friday, November 24, S. Schefer (swisstopo) refilled the HPT of shaft 1.

Visits

Day	Date	Group Name	Group Size	Visitors Guide
Fri	24.11.2023	**Office Cantonal De L'environnement, Genève**	19	R. Nicol (swisstopo) S. Schefer (swisstopo)
Fri	24.11.2023	**Busch Vaccum Solutions, Chevenez**	10	R. Nicol (swisstopo) S. Schefer (swisstopo)

Figures

Figure 1: CD-A: NMR measurements are a time intensive task. Luckily the surrounding is nice… (S. Schefer, swisstopo).

Figure 2: CL: J. Windisch and L.Borgeaud (swisstopo) testing the resin pump for CL experiment (A. Grignaschi, swisstopo).

Figure 3: CS-E: The ETH-team during the discussion of the measures (S. Schefer, swisstopo).