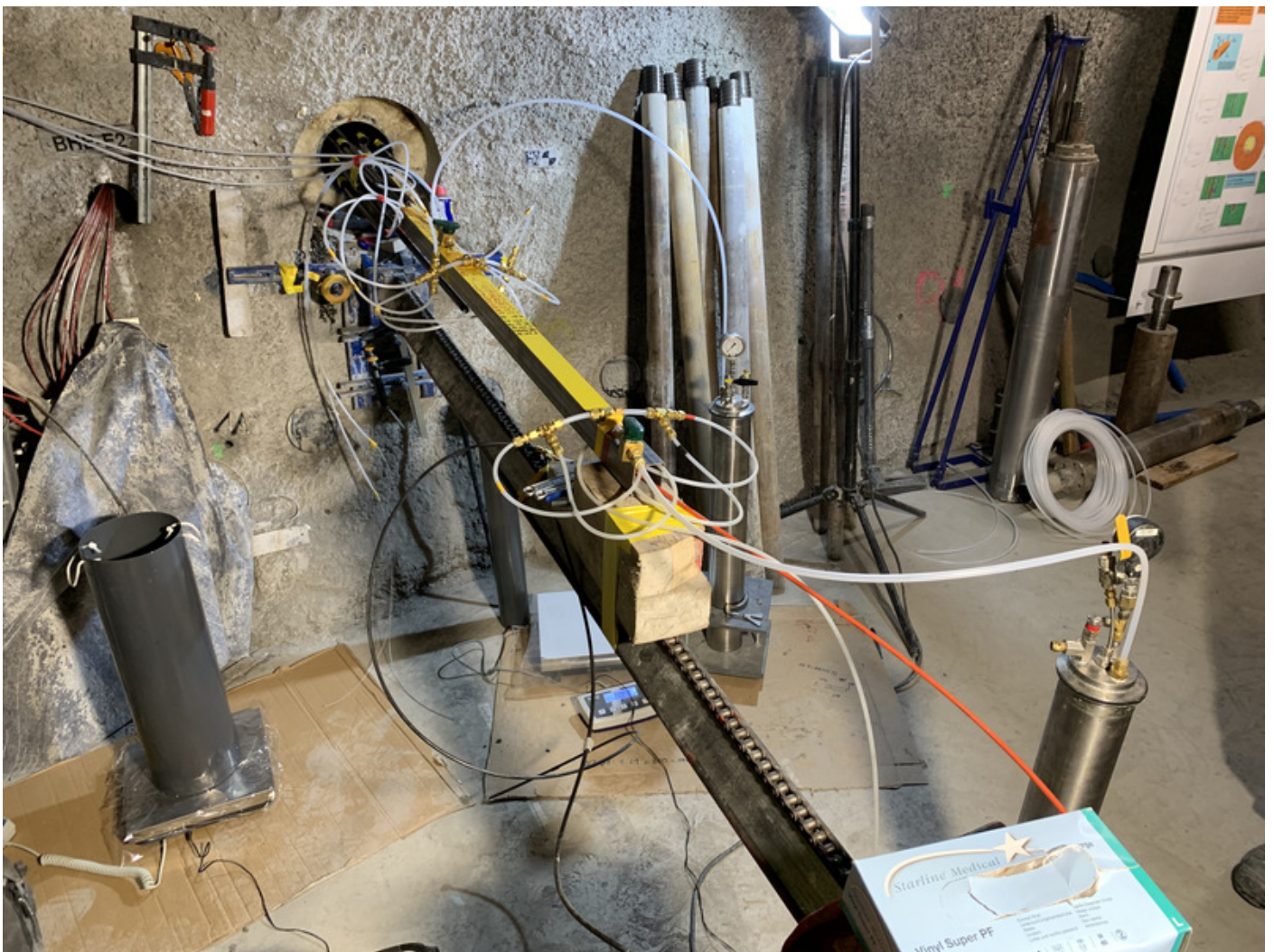
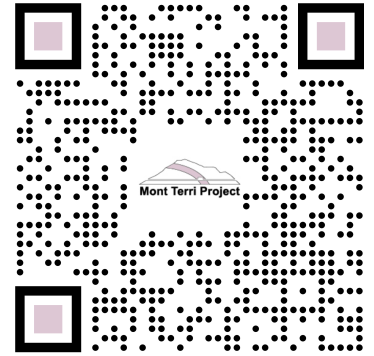


Mont Terri Project Underground Rock Laboratory

Report period: October 23–29, 2023

Assembled and edited by swisstopo, St-Ursanne



Spotlight of the week: HE-E is a scaled heater experiment (~1:2), installed in the former VE-test micro-tunnel ($\varnothing = 1.3$ m). The experiment is used to further understand an engineered barrier system for the calibration and validation of existing THM models in an early saturation phase. The geotechnical barrier consists of bentonite and a sand/bentonite mixture in two separate modules. Since 2012, the system has been heated at 140 °C, currently further hydration and pore pressure development is very slow. In order to decide on future operating procedures, the geotechnical barrier is currently being sampled with a telescope-like, focussed drilling approach from Gallery 98 while the experiment continues. An assessment of the THM buffer status is presently being carried out in the laboratory.

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

- On Tuesday, October 24, S. Schefer (swisstopo) restarted the psychrometric measurements.

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

- From Monday to Thursday, October 23–26, A. Eul and S. Braunschweig (Eul GmbH), supported by U. Mäder (RWC) did a fabulous job in retrieving a 3 m long compound core from BCI-D3 (4.6-7.6 m) consisting of a perfectly preserved section from Opalinus Clay, through OPC concrete, and back out into Opalinus Clay. The important top 2 m were previously stabilised with fiberglass and epoxy resin. Drilling was done with a long version of a 131 mm OD double barrel tool with PVC liner. To push our luck, we drilled a second core slightly offset from the same approach borehole, without stabilisation, and also obtained a second well-preserved section, with only minor disturbance at one of the interfaces. These two cores were sealed and will be sampled next week with a team from RWI Uni Bern (**Figure 1**).
- On Friday, October 27, A. Eul and S. Braunschweig (Eul GmbH) installed the drill rig for BCI-D4.

DR-E (Long-Term Diffusion Experiment in the Main Fault-Zone) experiment

- On Monday, October 23, S. Schefer (swisstopo) reduced the flow rate at BDR-E2 to 0.5 l/h.

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

- From Monday to Thursday, October 23–26, the second overcoring was attempted. Remember that we retrieved fairly successfully a first overcore from BHE-E3 covering the Opalinus Clay / bentonite interface. The subsequent step to install a template and guide 16 thin fiberglass lances into the loose, hot, dry granular bentonite proved to be quite a challenge, and only worked for an inner circle of lances, followed by resin injection with a special high-temperature epoxy resin (we measured 125 °C at the heater outer surface). This work was done by F. Kober, M. Treuthardt (Nagra) and U. Mäder (RWC). The drilling team A. Eul and S. Braunschweig (Eul GmbH) cleaned the borehole and installed a drilling guide for overcoring the partly stabilised loose granular bentonite with a simple thin-lipped core barrel with 131 mm OD. It turned out that the stabilisation was not robust enough, and we could not retrieve an "undisturbed" section through the loose material. We "only" got some loose material that we subjected to a simplified measurement program for water-content and bulk samples. This work was done by A. Jenni and C. Zwahlen (RWI Uni Bern). We presently assess the important experiences and decide on the next steps (**Figure 2**).

MA-A (Modular Platform for Microbial Studies) experiment

- On Tuesday, October 24, C. Rolland and P. Bena (EPFL) retrieved the two bio-reactors that were installed since 4 months. The bio-reactors will be sampled at EPFL.

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

- On Tuesday, October 24, S. Schefer (swisstopo) refilled the HPT of shaft 1.
- From Tuesday to Thursday, October 24–26, S. Schefer (swisstopo) stopped the injection on the LPT of shaft 2. The connection to the manual manometer M2 is not tight and all efforts of sealing it failed. The manometer was removed and a plug was put in place with a resin seal. This was finished on Thursday and the injection restarted.

Visits

Day	Date	Group Name	Group Size	Visitors Guide
Tue	24.10.2023	Contrôle Fédéral Des Finances	22	R. Nicol (swisstopo)
Thu	26.10.2023	Université De Franche-Comté	26	C. Nussbaum (swisstopo) S. Schefer (swisstopo)
Fri	27.10.2023	Gymnasium Hohe Promenade	8	R. Nicol (swisstopo)
Sat	28.10.2023	Fasnachts-Clique Schnooggekerzli Alti Garde	29	C. Boner (freelance) H. Hauser (freelance)

Figures



Figure 1: CI-D: The first core is finally out! A very happy moment (S. Schefer, swisstopo).



Figure 2: HE-E: The drilling support team inserting the needles for the resin injection (S. Schefer, swisstopo).