

Mont Terri Project

Underground Rock Laboratory

ANDRA BGR CHEVRON CRIEPI DOE ENRESA ENSI FANC GRS HELMHOLTZ IRSN JAEA NAGRA NWMO OBAYASHI RWM SCK•CEN SWISSTOPO TOTAL

Mont Terri Rock Laboratory

Field report: November 26 – December 2, 2018 (Phase 24)

Distribution

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JAEA: K. Tanai
Obayashi: M. Fukaya
RWM: S. Thompson
SCK•CEN: C. Bruggeman
Swisstopo: A. Möri
TOTAL: A. Brisset

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Supporting Research Organisations

Paul Scherrer Institute PSI: S. Churakov, M. Glaus, Th. Gimmi, L. van Loon
ETHZ: S. Löw, M. Ziegler, S. Wiemer, A. Zappone
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Project Management

Swisstopo: C. Nussbaum (Project Manager), T. Theurillat (Site Manager), S. Schefer (Deputy Site Manager), D. Jaeggi (Research Associate)
GGT: F. Burrus (Project Engineer), Th. Küttel, R. Daneluzzi

Construction of Gallery 18

- The excavation continued along Gallery18 and reached GM_141.0 by Friday, November 30. The swisstopo team composed of D. Jaeggi, R. Raselli, M. Ringeisen, N. Dietler and the guest Chaocheng Dai performed the daily geological mapping.

CS-D (CO₂: Studying Caprock and Fault Sealing Integrity) experiment

- On Tuesday, November 27, M. Lukovic, A. Rinaldi, M. Grab and S Hellmann (ETHZ) performed a crosshole seismic measurement in borehole BCS-D3.
- On Thursday, November 29, Q. Wenning, M. Lukovic, A. Rinaldi, M. Grab and S Hellmann (ETHZ) performed another crosshole seismic measurement in borehole BCS-D4.

DR-B (Long-Term Diffusion) experiment

- On Monday, November 26, M. Jaquenoud (Nagra), with help of N. Dietler (swisstopo), moved the XRF probe from borehole BDR-B8 to borehole BDR-B6 (**Figure 1**). The start of the scan was rescheduled to Friday due to a technical issue with the probe.
- On Friday, November 30, M. Jaquenoud worked on repairing the XRF-probe which has a motor defect. No matter the repair progress, the start of the scan was rescheduled to next week.

FS-B (Imaging the Long Term Loss of Faulted Host Rock Integrity) experiment

- From Monday to Wednesday, the drilling company GeoSonic continued the drilling of borehole BFS-B5. On Wednesday at noon, the borehole reached the final depth of 59.0 m. Right after drilling G. Mühlebach (Terratec geophysical services) performed an optical borehole imager (OBI) log, which includes as well magnetic deviation and gamma log.
- From Monday to Wednesday, M. Robertson (LBNL) was preparing the fiber optical installations of borehole BFS-B5 (**Figure 2**).
- Wednesday night, K. Kontar, L. Scheidecker and J. Gisiger (Solexperts) installed the PVC casing and the FO cables (**Figure 3**). The installation of the fiber optical cables for strain monitoring behind casing was supervised by M. Robertson (LBNL). After the installation, the 2 km long cable (2 spools and cable in BFS-B5) was successfully tested with the OTDR device of LBNL. On Thursday the Solexperts team cemented the outer annulus of the installation (**Figure 4**). A water-bentonite-cement mix was hand-pumped into the grout tubing.
- Thursday afternoon GeoSonic started with borehole BFS-B3. The first few meters will be drilled conventionally with 101 mm and then the technique will be changed to the faster wireline drilling with reduced diameter of 96 mm. They reached a depth of 7.5 m by Friday, drilling will be continued next Monday afternoon. By contrast to BFS-B5 drilled in the hangingwall, BFS-B3 will be drilled in the footwall of the Main Fault, parallel to it at a distance of 5 m.

HM-C (Calibration and Validation of a New Constitutive Model for Opalinus Clay) experiment

- From Monday to Wednesday, the drilling company Schützeichel conducted the drilling of BHM-C1 in the north part of Ga08. The borehole is oriented parallel to bedding and exhibits a length of 30.95 m with a diameter of 131 mm, and was performed using the triple core drilling method. The PhD student L. Winhausen and R. Jalali (RWTH) took samples dedicated to a rock mechanical testing program of RWTH Aachen, group of Prof. F. Amann (**Figure 5**).

MA-A (Modular Platform for Microbial Studies) experiment

- On Tuesday, N. Burzan and V. Berweiler (EPFL) performed the saturation of the bioreactors 1.1 to 1.4. They furthermore installed the H₂-electro-valves for bioreactors 1.1 and 1.2.

TS (Testing Different Tunneling Support in Sandy Facies during Extension of Ga18) experiment

- On Friday A. Vlasek (Marmota Engineering) performed the installation of fiber optical strain sensors in the floor of the 3rd TS section in Gallery18. The zero measurement will be performed on next Monday.

Visits

Day	Date	Number of persons	Name of the group	Guide
Wed	28.11.2018	12	„Nuclear energy SystemLis“, ETH master level	O. Leupin

C. Nussbaum, D. Jaeggi, G. Fiedler and R. Raselli, November 30, 2018



Figure 1: DR-B: N. Dietler (swisstopo) and M. Jaquenoud (Nagra) lowering an XRF-probe into the borehole BDR-B6 (Photo: R. Raselli, swisstopo).



Figure 2: FS-B: M. Robertson (LBNL) was on site, preparing for the fiber optical installations in the borehole BFS-B5. She spliced pigtails onto both ends of the cables in preparation for downhole installation (Photo: R. Raselli, swisstopo).

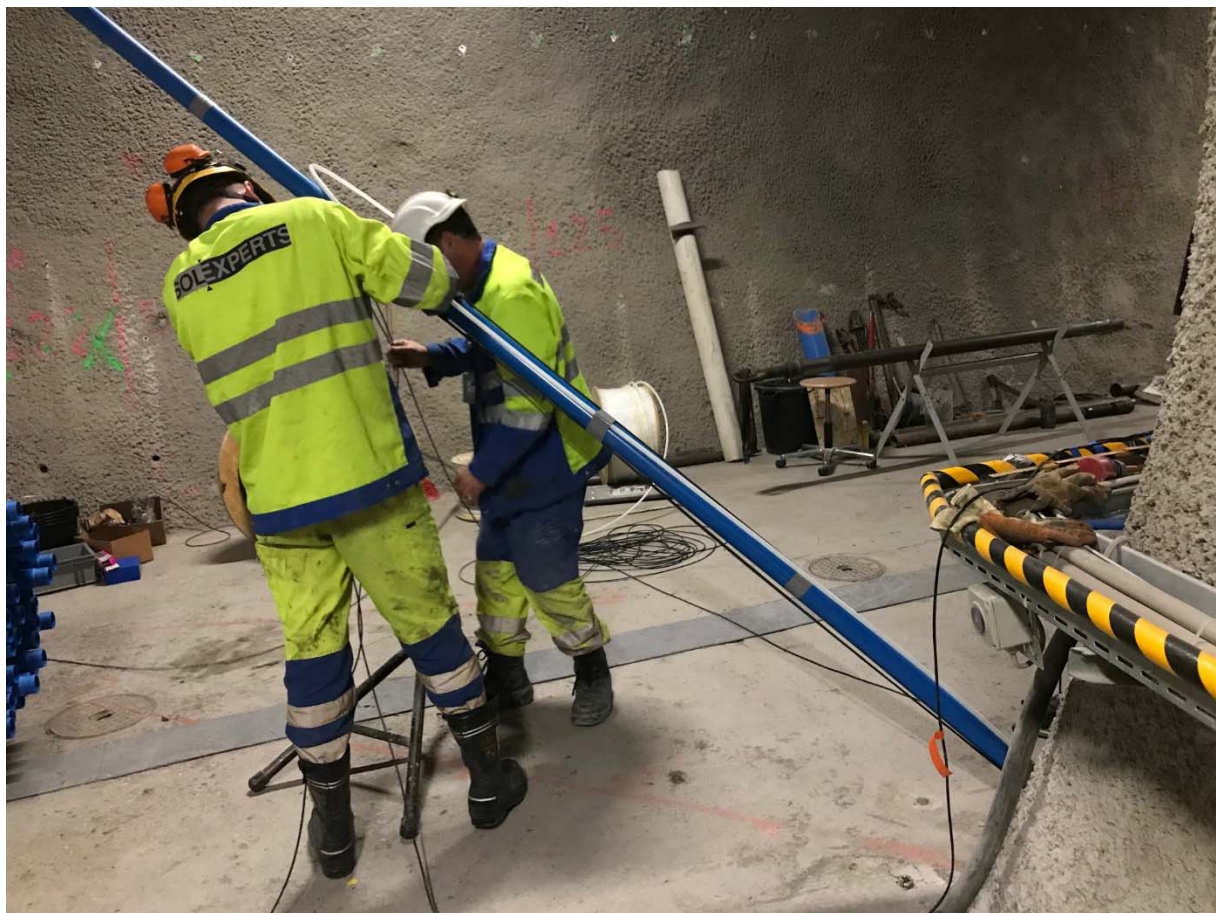


Figure 3: FS-B: L. Scheidecker and K. Kontar (Solexperts) installing the FO cables (behind casing) into borehole BFS-B5 (Photo: M. Robertson, LBNL).

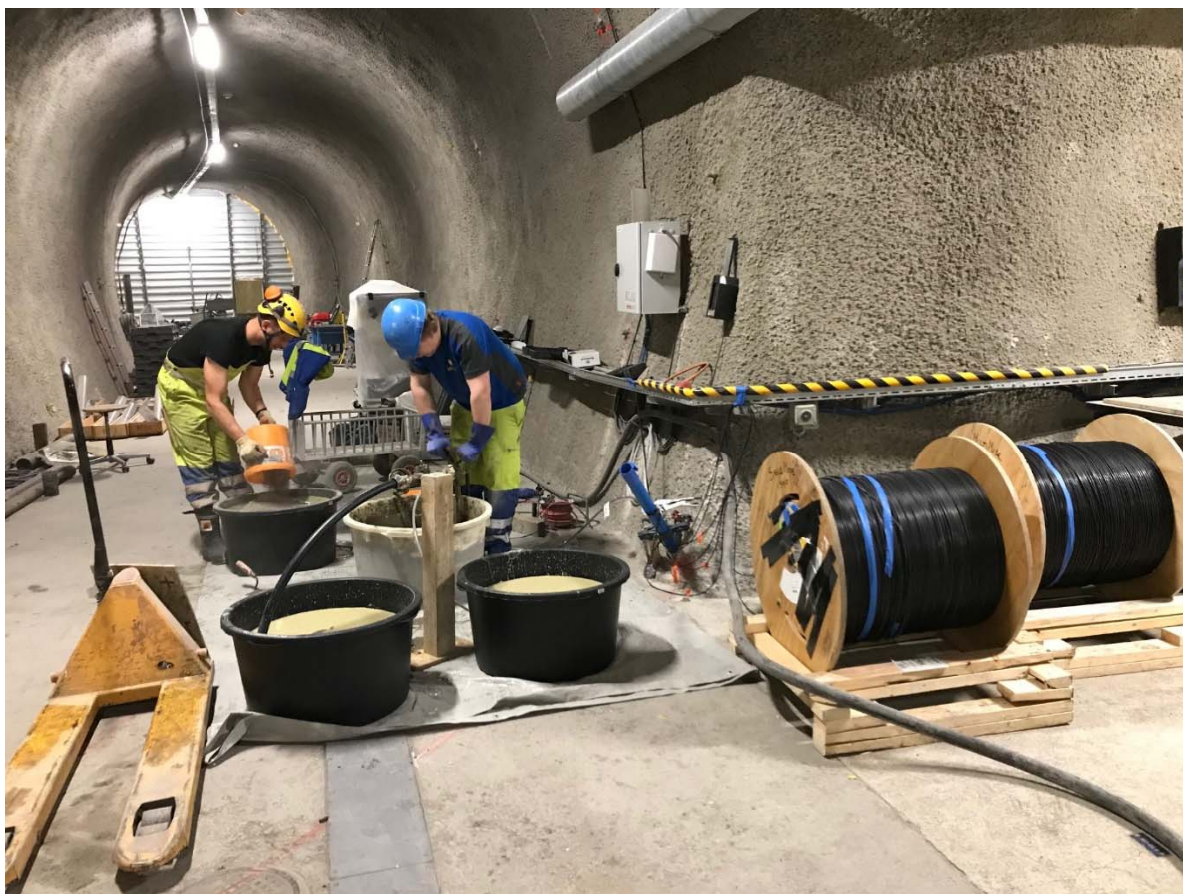


Figure 4: FS-B: Solexperts team cementing the outer annulus behind casing in BFS-B5 borehole and view of both fiber spools on the left (Photo: M. Robertson, LBNL).



Figure 5: HM-C: R. Jalali and L. Winhausen and (RWTH Aachen) preparing the rock sampling for their rock mechanical testing programme (Photo: R. Raselli, swisstopo).