



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: October 22 – October 28 2018 (Phase 24)

Distribution

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Principal Investigators and Experiment Delegates of Phase 24 experiments

ANDRA (E. Huret, G. Armand, A. Albrecht, J. Delay, Y. Linard, S. Necib, A. Vinsot, P. Henocq), BGR (K. Schuster, J. Massmann, S. Costabel, W. Graesle, C. Ostertag-Henning, H. Shao, A. Schippers, J. Hesser, T. Kneuker, G. Ziefle, D. Rebscher), CHEVRON (R. Ewy, H. Goodman), CRIEPI (T. Oyama, S. Yokoyama), DOE (P. Nair, J. Birkholzer, J. Rutqvist, Y. Guglielmi), ENRESA (J.C. Mayor), ENSI (M. Herfort, B. Graupner, J. Hansmann, E. Saraiva, M. Sentis), FANC (F. Bernier, P. De Cannière, B. Guiot, G. Pochet, M. Surkova), GRS (K. Wieczorek, O. Czaikowski), Helmholtz (M. Kuehn, S. Lueth, A. Cherkouk, A. Vieth), IRSN (J.-M. Matray, C. Wittebroodt, P. Dick), JAEA (K. Tanai, K. Aoki), NAGRA (O. Leupin, J. Becker, N. Diomidis, F. Kober, D. Traber, B. Garitte, V. Cloet, L. Cantieni, S. Giger, N. Giroud, G. Deplazes, S. Koehler, A. Reinicke), NWMO (L. Kennell-Morrison, S. Briggs, H. Kasani, K. Birch, J. Binns, P. Keech, T. Yang), OBAYASHI (M. Fukaya, Y. Kimura), RWM (S. Thompson, S. Norris, R. McLaverty, R. Hibberd, M. Bailey, J. Pearson, M. Cowley, H. Paireudeau), SCK•CEN (C. Bruggeman, D. Jacques, M. De Craen, N. Bleyen, N. Maes), Swisstopo (A. Moeri, P. Bossart, C. Nussbaum, D. Jaeggi, C. Minnig, S. Schefer), TOTAL (A. Brisset)

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
EPFL: L. Laloui, R. Bernier-Latmani, M. Violay, B. Lecampion

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_126 by Friday, October 26. Currently the excavation is located in the TS-2 section of the TS experiment. The TS-2-section comprises of seven steel arches with bullflex system followed by eight steel arches with shotcrete.
- On the night from Monday to Tuesday, October 23, Q. Boubillier and N. Philippossien (Sigeom SA) performed a laser scan along the newly built Ga18 until GM_82 (**Figure 1**). This scan will be used for the final shape of the tunnel and the control of the thickness of the shotcrete.

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

- On Tuesday, October 23, a kick-off meeting (TD-358) was held in St-Ursanne. All experiment partners involved discussed the upcoming activities for the experiment.

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

- On Monday, the drilling company GeoSonic finished the drilling of borehole BCS-D4. On Tuesday they moved the rig to BCS-D7, another vertical borehole (diameter 101mm). By Wednesday afternoon BCS-D7 was down to 13.5 m when the drill rig got stuck within a secondary fault zone. On Thursday afternoon it was decided to overcore the borehole in diameter 116mm to free the drill bit and the attacked string. The overcoring reached a depth of 2.2 m by Friday afternoon.
- On Monday, Y. Guglielmi, F. Soom and P. Cook (LBNL) arrived on site and brought their instrumentation into the lab (**Figure 2**). They will equip BCS-D7 with a SIMFIP probe measuring 3D deformation of the borehole wall during hydraulic stimulations.
- On Tuesday, October 23, G. Mühlebach (Terratec Geophysical Services) performed borehole logging on borehole BCS-D4. He ran 4 probes measuring optical borehole imaging, natural gamma ray, caliper and density log. A. Zappone, A. Rinaldi and M. Grab (ETHZ) were on site to supervise the logging.
- On Tuesday and Wednesday, J. Gisiger and L. Schwab (Solexperts) installed the packer system into BCS-D4.

FE-M (Long-term Monitoring of the Full-Scale Emplacement) experiment

- On Friday, October 26, F. Saladino (Sixense Soldata) came on site for the yearly maintenance of the FE data acquisition system.
- Also on Friday, L. Battisti (Rowa) came on site to repair the multi-purpose trolley that was stuck in the FE-gallery.

MA-A (Modular Platform for Microbial Studies) experiment

- On Tuesday, October 23, the PhD student N. Burzan (EPFL) and H. Gerber (MBraun) performed maintenance on the glovebox and started a regeneration cycle that ended successfully. On Wednesday, T. Theurillat (swisstopo) exchanged all the gas bottles for the glovebox.

MB-A (MineByTest 2018 Hydromechanical Characterization of the Sandy Facies) experiment

- On Tuesday, the PI J. Hesser (BGR) was on site to check on the installations.
- On Thursday, October 23, J. Gisiger and L. Schwab (Solexperts) saturated the 5 Minipiezometers in boreholes BMB-A13 to BMB-A17 and connected the pressure transducers and the PT1000 sensors to the Geomonitor interface (**Figure 3**). They furthermore established

the ftp-transfer of the Geomonitor data towards the Mont Terri DAS and finalized the cabling of the MB-A monitoring system.

SW-A (Planning and technical preparatory work for a large-scale Sandwich seal experiment) experiment

- On Wednesday and Thursday, October 24-25, TD-359 was held in St-Ursanne.
- The experiment partners were visiting the site on Wednesday.

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

- TS-2 started last Thursday with the first of seven bullflex supporting the steel arches successfully installed Thursday night. On Friday, October 26, the first of eight steel arches with shotcrete was installed.
- On Monday, October 22, A. Vlasek and M. Regli (Marmota Engineering AG) performed measurements on the first section.
- On Wednesday night, October 15, F. Fischli, A. Vlasek and H. Zimmermann (Marmota Engineering AG) installed the second profile of fibre-optic strain sensors in TS-2, GM_122.5. On Thursday morning the installation was damaged by the construction company RL. Thus marmot had to repair the fiber optical installation Thursday night. They also performed measurements on the first profile as well as the base measurement of the second profile.

Varia:

- Safety: On Thursday and Friday, October 25 & 26, M. Ringeisen and S. Schefer (swisstopo) drilled several small holes in the niches 7 & 8 to check the thickness of the shotcrete (**Figure 4**).

Visits

Day	Date	Name of the Group	Visitors	Guides
Tue	23.10.2018	Day of ENAC faculty, EPFL	8	C. Nussbaum G. Fiedler
Wed	24.10.2018	4th PM Sandwich VP SWA SWB Mont Terri & CD-A Meeting	21	P. Bossart D. Jaeggi
Fri	26.10.2018	Surveyors EPFL graduation year 1987	7	C. Nussbaum
Sat	27.10.2018	BFE, Training module Mont Terri rock laboratory	18	S. Branschi O. Moser G. Fiedler

C. Nussbaum, D. Jaeggi and S. Schefer, October 26, 2018



Figure 1: Gallery 18: N. Philipposien and Q. Bobillier (Sigeom SA) preparing the next laser scan (Photo: S. Schefer, swisstopo)



Figure 2: MB-A: L. Schwab (Solexperts) connecting pressure transducers to the Geomonitor system (Photo: S. Schefer, swisstopo).



Figure 3: CS-D: F. Soom and P. Cook (Lawrence Berkeley National Laboratory) preparing and assembling the SIMFIP probe for BCS-D7 (Photo: S. Schefer, swisstopo).



Figure 4: Safety: M. Ringeisen (swisstopo) drilling holes in shotcrete in the niches 7 & 8 to check and verify the thickness of the shotcrete (Photo: S. Schefer, swisstopo).