



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: July 9th – July 15th 2018 (Phase 24)

Distribution

Authorities

Swisstopo: P. Bossart, O. Lateltin
BfE: M. Stauffer, Ph. Schaub
RCJU: P. Mertenat, Th. Flüeler, M. Giamboni, J. Fernex, J. Chapatte, A. Herrmann
EC: Ch. Davies

Delegates of the Project Partners

ANDRA: E. Huret
BGR: K. Schuster
CHEVRON: R. Ewy
CRIEPI: T. Oyama
DOE: P. Nair, J. Birkholzer
ENRESA: J.C. Mayor
ENSI: M. Herfort
FANC: F. Bernier
GRS: K. Wieczorek
Helmholtz: M. Kühn
IRSN: J.-M. Matray
NAGRA: O. Leupin
NWMO: L. Kennell-Morrison
JAEA: K. Tanai
Obayashi: M. Fukaya
RWM: S. Thompson
SCK•CEN: C. Bruggeman
Swisstopo: A. Möri
TOTAL: A. Brisset

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 construction of Ga18 continued from the niche 1. Ga18 reached GM 18.0 on Thursday, July 12th. All construction work is stopped during the summer break.

AD (Experimental-Numerical Analysis of Discontinuities) experiment

- On Monday and Tuesday, July 9th–10th, the BGR drilling team drilled borehole BAD-1. The horizontal borehole exhibits 15 m length, 131 mm diameter and was drilled with the triple core technique, yielding p-samples of 101 mm diameter.
- The borehole was sampled by BGR for IfG Leipzig, which will perform a hydro-mechanical characterization and evaluate the swelling and shrinkage properties. Furthermore, University of Kiel (CAU) will perform an analysis on the initiation and development of thermally induced swelling and shrinkage fractures. The samples were delivered by T. Popp (IfG)
- The drilling and sampling procedure was surveyed by J. Lippmann-Pipke and J. Hesser (both BGR) together with a person from DAkkS for a BGR-internal audit.
- On Wednesday, July 11th, T. Tietz and F. Schulthe (BGR) came on site to perform interval velocity measurements (IVM) in borehole BAD-1. They finished the measurements on Thursday, July 12th.

CI-D (Diffusion across 10-year old Concrete/Claystone Interface) Experiment

- On Tuesday, July 10th, the PI V. Cloet (Nagra), U. Mäder (University of Bern) and K. Kontar (Solexperts) started the circulation of artificial cement pore water (APW-OPC) in the test interval. Presently, about 7.5 ml/min were circulated with pressures of less than 10 kPa. Next, pH and conductivity electrodes were installed and calibrated. All sensors are working and the data is being recorded by the Geomonitor System.
- On Thursday, July 12th, F. Jacobs and A. Widmer (TFB) backfilled borehole BCI-23. The same concrete composition as in 2017 was used.
- On Friday, July 13th, U. Mäder (University of Bern) conducted the injection of resin into the gap between the steel liner and rock that was completed from top. A fluid sample was taken from both intervals, one with cement fluid, the other with synthetic OPA pore water.

IC-A (Corrosion in Bentonite) experiment

- On Wednesday, July 11th, O. Leupin (Nagra), M. Frutschi and N. Burzan (EPFL), B. Reddy (Amec) together with K. Kontar and A. Jakubi (Solexperts) exchanged 6 of the IC-A modules and took some OPA samples for microbial and chemical analyses.

MA (Microbial Activity in Opalinus Clay) experiment

- On Friday, July 13th, Y. Lettry (Solexperts) and A. Boylan (EPFL) started the injection of water into BRC-3. The injection was stopped in the afternoon by S. Schefer (swisstopo).

MB-A (Hydromechanical Characterization of the Sandy Facies before and during Excavation) experiment

- On Wednesday, July 11th, the drilling company GeoSonic finished borehole BMB-A11 and reached a depth of 41.50 m with a diameter of 86 mm. The drill rig was positioned at future borehole BMB-A8 on Thursday, July 12th. The first 7.5 m of BMB-A8 were drilled on Thursday.
- On July 9th J. Lippmann-Pipke and J. Gerowski (both BGR) performed a gas sampling in all three facies of the Opalinus Clay of BMB-A5 (sandy, carbonate-rich and shaly facies).
- On Wednesday, July 11th, J. Gisiger, F. Chevalier and S. Fournier-Bidoz (Solexperts) installed an inclinometer in borehole BMB-A5 and an extensometer in borehole BMB-A12. The two boreholes were cemented on Thursday, July 12th, and connected to the data acquisition system.

Varia

- The Cantonal of Jura delivered the authorization for the Phase 24 on July 4th. The document is available on the Mont Terri Extranet.
- The Work Programme of Phase 24 is available on the Mont Terri Extranet.
- SUMMER BREAK: The Mont Terri Underground Rock Laboratory will be closed from July 16th until August 6th!

Visits

Day	Date	Name of the Group	Visitors	Guides
Tue	10.07.2018	Dutch Television: Documentary film	1	P. Bossart / P. Studer / O. Leupin
Tue	10.07.2018	Accreditation delegation for core recovery by BGR team	3	P. Bossart / D. Jaeggi
Wed	11.07.2018	ORANO Mining	3	V. Cloet

C. Nussbaum, S. Schefer, D. Jaeggi and R. Raselli, June 13th, 2018



Figure 1: Construction of Gallery 18: The construction of Ga18 continued. Ga18 reached GM 18.0 on Thursday, July 12th (Photo: S. Schefer, swisstopo). All construction work is stopped during the summer break.



Figure 2: AD experiment: The BGR drilling team drilling borehole BAD-1 (Photo: S. Schefer, swisstopo).



Figure 3: IC-A experiment: AMEC, EPFL, Nagra and Solexperts exchanged 6 of the IC-A modules (Photo: S. Schefer, swisstopo).