

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: January 14–20, 2019 (Phase 24)

Distribution

Authorities

Swisstopo: P. Bossart, O. Lateltin
BfE: M. Stauffer, Ph. Schaub
RCJU: P. Mertenat, Th. Flüeler, M. Giamboni, J. Fernex, 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. Pairaudeau), 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

- This week, the urgent renovation work in the existing part of the rock laboratory has started. Renovation comprises removing of cracked and damaged shotcrete, including loose parts of the Opalinus Clay in the Excavation Damaged Zone (EDZ), the drilling of additional anchors, the placement of steel nets and shotcrete. Renovation is completed in Niches MI, FM-C and HE-D (all in Gallery 98). It will be continued next week in Niches HG-A and EZ-B niches in Gallery 04.
- There was no excavation this week because of the repairs in the existing lab. This will be the same the next week.

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

- From Monday to Wednesday the drilling company GeoSonic drilled borehole BFS-B7 which is the last of the five geophysical boreholes. The borehole has a final length of 47.3 m.
- On Thursday afternoon, D. Fischer (Terratec GMBH) logged borehole BFS-B7 with an optical scanner, including magnetic deviation and natural gamma ray.
- On Wednesday and Thursday, January 17 & 18, J. Gisiger and L. Schwab (Solexperts) installed and cemented the fiber optic cables into borehole BFS-B7. The signal quality of the fiber optic cables was controlled and checked continuously by D. Jaeggi (swisstopo).

MB-A (Mine-by test in sandy facies) experiment

- On Monday and Tuesday, T. Kostreva and F. Herfurth (Glötzl) performed a resin injection into boreholes BMB-A18, BMB-A19, BMB-A20 and BMB-A21 (**Figure 1**). The boreholes are instrumented with devices for stress monitoring. The resin was injected in order to enhance the coupling between the stress cells and the grout/rock. The on-site works were supervised by the PI J. Hesser (BGR) and D. Jaeggi (swisstopo).

SI-A (Seismic imaging ahead of and around underground infrastructure) experiment

- From Tuesday to Friday, a team from GFZ Potsdam consisting of the PI S. Lüth, R. Esefelder, B. Wawerzinet, A. Jurczyk, M. Mach and K. Krüger, started a seismic pilot survey in Gallery 08 (**Figure 2**), Niche TT and Niches 7 and 8. Three types of seismic sources were used to perform tomographic investigations of the shaly and sandy facies. 3-component geophones were hooked on 2 m long aluminum anchors, previously inserted into boreholes SI-A1 to SI-A32. The survey will last until the middle of next week.

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

- On Thursday, January 17, a press conference, organized by SED (ETH) together with swisstopo, and related to the CS-D experiment (Elegancy project), took place in the Visitor Centre, including a guided tour to the Mont Terri Rock laboratory led by A. Zappone, M. Grab, S. Wiemer (ETHZ), A. Ferrari (EPFL) together with P. Bossart and C. Nussbaum (swisstopo) (**Figures 3 & 4**). P. Mertenat (Commission de Suivi) welcomed the journalists on behalf of the cantonal authorities (RCJU). In total, 15 journalists from TV, radio and newspapers (all Swiss media) participated to the press conference. The key motivation was to show and explain how the new CS-D experiment can contribute to a better understanding of the geological storage of CO₂ and which risks are related to this technology (well integrity, fault- and caprock integrity). The CS-D aims at demonstrating the sealing integrity of a faulted caprock, and here the Main Fault is used as a representative analog intersecting the Opalinus Clay, considered as reference caprock for research.

Visits

Day	Date	Number of persons	Name of the group	Guide
Tue	15.01.2019	7	Delegation Russland	M. Rahn/ P. Bossart
Thu	17.01.2019	15	Elegancy Media visit Press Conference on CS-D experiment	P. Bossart/ M. Grab/ C. Nussbaum/ A. Zappone S. Wiemer/A. Ferrari
Fri	18.01.2019	13	La Poste CH SA / Postlogistics 2800 Delémont	M. Pretalli

C. Nussbaum, D. Jaeggi, S. Schefer and R. Raselli, January 18, 2018



Figure 1: MB-A: T. Kostreva and F. Herfurth (Glötzi) during the installation for the resin injection (Photo: R. Raselli, swisstopo).

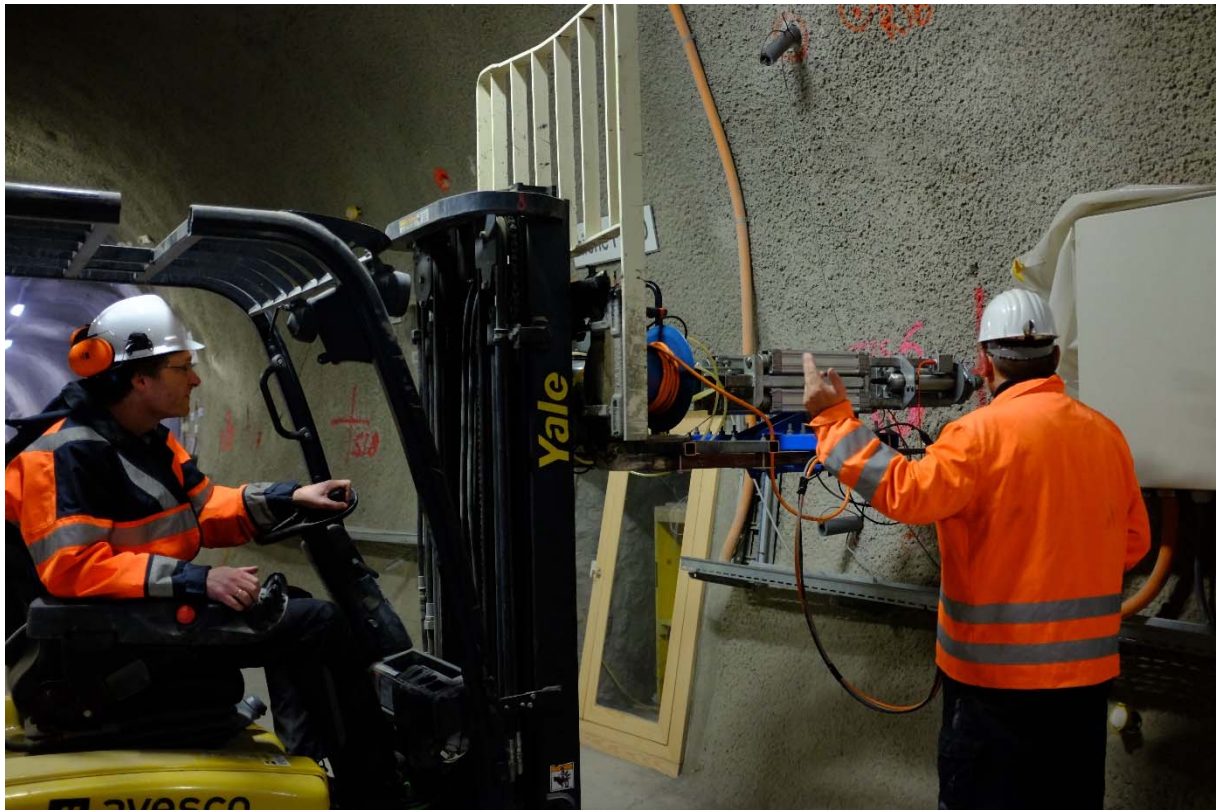


Figure 2: SI-A: S. Lueth and A. Jurczyk (GFZ Potsdam) performing a 100-1200 Hz sweep in Ga08 (Photo: S. Schefer, swisstopo).



Figure 3: Media Visit: P. Bossart (swisstopo) showing the Main Fault to members of the press in relation with the CS-D experiment (Photo: S. Schefer, swisstopo).