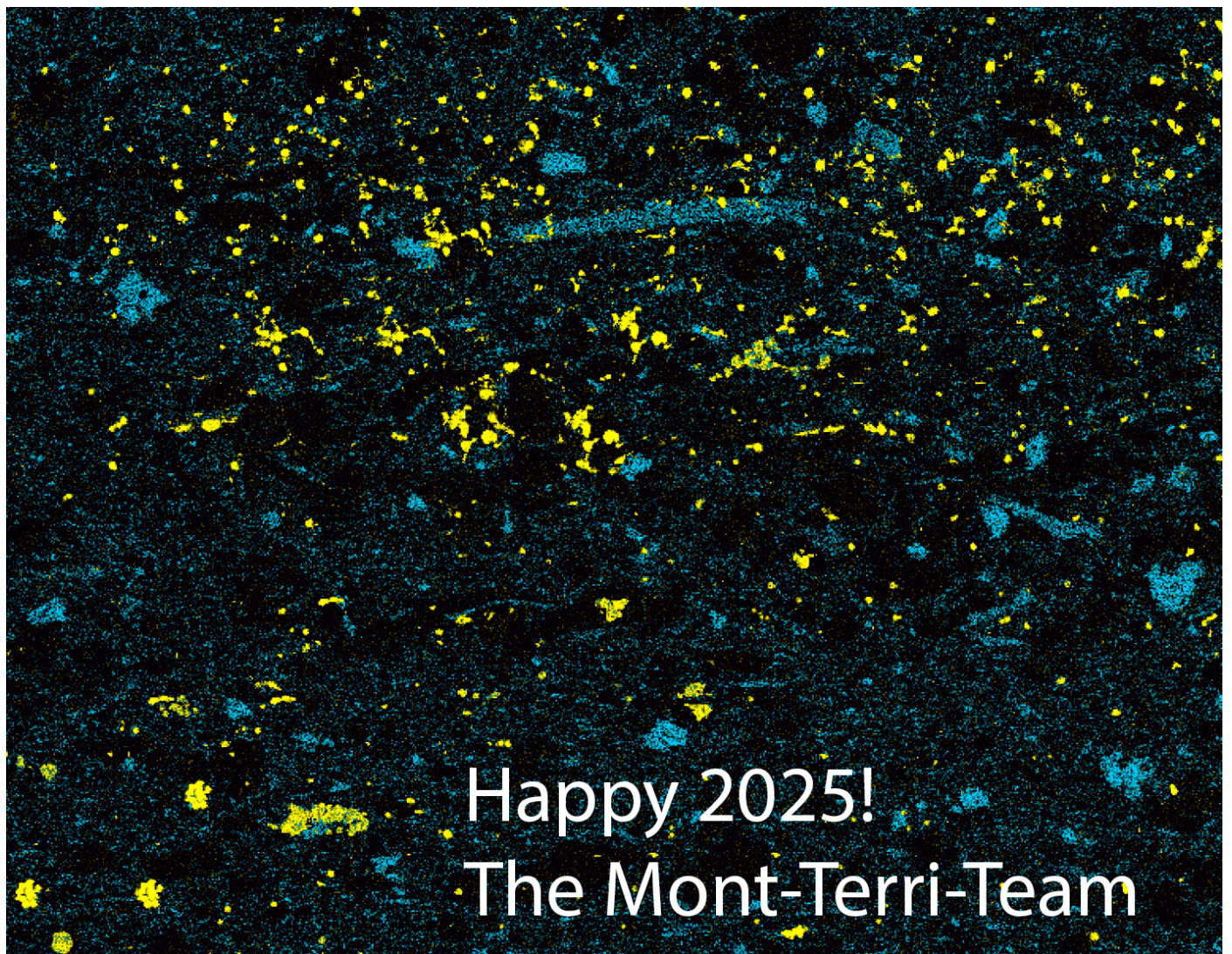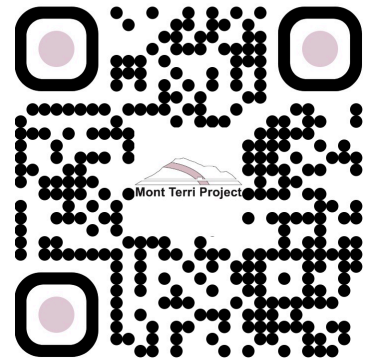# Mont Terri Project
# Underground Rock Laboratory

**Report period: December 9–22, 2024**

Assembled and edited by swisstopo, St-Ursanne



Happy 2025!
The Mont-Terri-Team

**Spotlight of the week:** The Mont Terri Team thanks you all for a successful and productive year and wishes you a peaceful holiday and a happy New Year! (The image „Milky Way in Opalinus Clay" is inspired by the element distribution maps of a carbonate nodule from the Sandy Facies. K (blue), P (green), S (yellow) and Na (pink). Collage by Abdelouhabi & Schefer, swisstopo).

## Important note

- The lab will be closed for the winter break from December 21 to January 5. We maintain a standby intervention service. Enjoy the winter break, we are looking forward to seing you next year!

# BIM (Mont Terri Building Information Modeling) experiment

- From Monday to Thursday, December 16–19, P. Mosler and O. Woock (TU Darmstadt) tested various Augmented Reality (AR) applications in the Sandwich niche, CL niche and Gallery 18. Tests included AR georeferencing strategies and visualisations of boreholes, tunnel support measures, research and laboratory infrastructure objects such as cabinets and controllers, and gallery metering. Also the virtual display of metadata and media files were explored (**Figure 1**).

# CL (CO2LPIE-CO2 Long-Term Periodic Injection) experiment

- On Wednesday, December 11, T. Theurillat (swisstopo) replaced the gas cylinder attached to the experiment.
- On Wednesday, December 18, D. Jaeggi (swisstopo) connected a pressure distributor to the constant head injection equipment. With this distributor a constant injection pressure of 15 bar is maintained on all four boreholes BCL-5, 6, 7 and 8. This operation helps in faster saturation and hydraulic equilibration of the pore pressure intervals at the end of the four installed MMMS.
- On Wednesday, December 18, M. Ziegler (swisstopo) moved the seismic DAS from PF-A to CL to continue the active seismic transmission monitoring.

# DR-C (Diffusion in a Thermal Gradient) experiment

- On Tuesday, December 17, Y. Lettry (Solexperts) increased the heating temperature for BDR-C1 up to 62.5 °C.

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

- On Friday, December 13, U. Mäder (RWC) and R. Wüst (Nagra) measured pH and took samples #9 from both circulation cabinets. They also cleaned the lines in DR-E1, changed the filter and switched the EC-sensor offline (**Figure 2**).

# FE-G (Monitoring the Gas Composition within the FE Experiment) experiment

- On Tuesday, December 17, Y. Lettry (Solexperts) replaced the circulation pump of FE-G circulation module and performed tightness tests.

# FE-M (Long-Term Monitoring of the Full-Scale Emplacement Experiment) experiment

- On Thursday, December 19, S. Schefer (swisstopo) restarted the UPS and the computer of the Neubrex installation.

# PF-A (Progressive Evolution of Structurally-Controlled Overbreaks: Long-term monitoring, hydromechanical simulation and rock testing) experiment

- On Tuesday, December 17, S. Schefer (swisstopo) measured the control points for the photogrammetry inside BPF-7.
- On Tuesday, December 17, M. Ziegler (swisstopo) performed a photogrammetric survey of BPF-7.
- On Tuesday, December 17, M. Ziegler (swisstopo) conducted another active seismic transmission survey.

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

- On Wednesday, December 11, T. Theurillat (swisstopo) refilled the HPT of BSW-A1 and replaced the gas cylinder attached to BSW-A2.

## Visits

| Day | Date | Group Name | Group Size | Visitors Guide |
|---|---|---|---|---|
| Mon | 9.12.2024 | **Centre St-François, Delémont** | 16 | R. Nicol (swisstopo) |
| Mon | 9.12.2024 | **Gymnasium Thun** | 21 | H. Sager (Nagra) |
| Fri | 13.12.2024 | **ETH Zürich, IGT** | 10 | D. Jaeggi (swisstopo) |
| Fri | 13.12.2024 | **RCJU, Services Des Infrastructures, Section Des Constructions Routières** | 17 | R. Nicol (swisstopo) T. Beuchat (RCJU) |
| Wed | 18.12.2024 | **Hochschule Luzern, HSLU** | 13 | H. Sager (Nagra) |

# Figures



**Figure 1: BIM:**     Pascal and Ole investigated how well the visual markers and zone targets used throughout Mont Terri are suitable for augmented reality tracking. In their applications developed for Android smartphones and the Meta Quest 3, certain components of the Mont Terri Building Information Model can be blended with the real environment (S. Schefer, swisstopo).



**Figure 2: DR-E:**     pH calibration on DR-E2 (S. Schefer, swisstopo).