

## **FAR-FIELD RESPONSE TO TUNNEL EXCAVATION**

### **Context and objectives**

The Mont-Terri laboratory is a unique facility where hydro-mechanical coupled processes in clay rock can be studied. Between March 2008 and May 2019, the laboratory has been extended (Ga18 gallery excavation). In response to the excavation, some instruments throughout the laboratory have shown some responses, sometime at distance of the excavation where direct effect (stress redistribution,...) is not expected. The objective of the project is to explore far-field correlations (distances greater than 25 meters) between different measurement types—such as pressure, strain, temperature, and humidity—and the excavation's stepwise progression. The aim is to identify and quantify these correlations, develop conceptual models to explain the observed behavior, and validate these models through numerical simulations for selected scenarios. The results are expected to provide valuable insights into the interactions between ongoing repository construction activities, pre-existing sealed drifts, and embedded monitoring infrastructure. Ultimately, this research may contribute to defining safety-relevant minimum separation distances between repository components to mitigate or manage such perturbations.

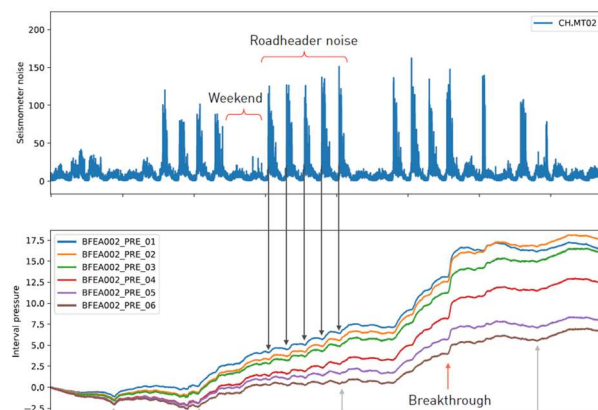
### **Methodology**

In the initial phase of the project, data recorded by various instruments during the Ga18 excavation will be reviewed and analyzed in relation to the excavation stages and relevant contextual factors, with the goal of identifying correlated response patterns. In the subsequent phase, selected responses will be examined in greater detail to explore potential mechanisms underlying the observed behavior. Finally, where appropriate, conceptual and numerical models will be developed to test the plausibility of the proposed hypotheses explaining far-field correlations.

### **Supervision and collaboration**

The project will be supervised by Prof. Dr. B. Valley (CHYN, UniNE). It will be carried out in collaboration with nagra (Schoenball Martin).

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Ga18 excavation and examples of potential correlation between excavation process and far-field signals (from Schoenball et al. 2024)