

Research in the Mont Terri Rock laboratory: Quo vadis?

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Received 11 March 2005; received in revised form 2 April 2006; accepted 24 April 2006

Available online 13 October 2006

Abstract

During the past 10 years, the 12 Mont Terri partner organisations ANDRA, BGR, CRIEPI, ENRESA, FOWG (now SWISSTOPO), GRS, HSK, IRSN, JAEA, NAGRA, OBAYASHI and SCK-CEN have jointly carried out and financed a research programme in the Mont Terri Rock Laboratory. An important strategic question for the Mont Terri project is what type of new experiments should be carried out in the future. This question has been discussed among partner delegates, authorities, scientists, principal investigators and experiment delegates.

All experiments at Mont Terri – past, ongoing and future – can be assigned to the following three categories: (1) process and mechanism understanding in undisturbed argillaceous formations, (2) experiments related to excavation- and repository-induced perturbations and (3) experiments related to repository performance during the operational and post-closure phases. In each of these three areas, there are still open questions and hence potential experiments to be carried out in the future. A selection of key issues and questions which have not, or have only partly been addressed so far and in which the project partners, but also the safety authorities and other research organisations may be interested, are presented in the following.

The Mont Terri Rock Laboratory is positioned as a generic rock laboratory, where research and development is key: mainly developing methods for site characterisation of argillaceous formations, process understanding and demonstration of safety. Due to geological constraints, there will never be a site specific rock laboratory at Mont Terri. The added value for the 12 partners in terms of future experiments is threefold: (1) the Mont Terri project provides an international scientific platform of high reputation for research on radioactive waste disposal (=state-of-the-art research in argillaceous materials); (2) errors are explicitly allowed (=rock laboratory as a “play-ground” where experience is often gained through experimental failures); (3) the Mont Terri Rock Laboratory is open to visitors, and guided tours make a significant contribution to enhancing public acceptance, particularly with respect to local communities and critical citizens who are open to, and interested in, the technical and societal issues of radioactive waste disposal.

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Keywords: Argillaceous formations; Diffusion; Self-sealing; Repository-induced perturbations; Gas-induced flow paths; Repository performance; Pilot repository monitoring; Added value; Benefit for partners; Scientific platform

1. Evolution of the Mont Terri Project 1995–2005

1.1. The project

In the rock laboratory of the international research project Mont Terri, a total of twelve organisations from six countries are investigating jointly a Mesozoic shale

formation, the Opalinus Clay. The geographic location of the rock laboratory is shown in Fig. 1.

In the autumn of 1994, the SNHGS (Swiss National Hydrological and Geological Survey, now integrated in Swisstopo) submitted an application for an international research project to the authorities of the Canton of Jura, the owner of the Mont Terri motorway tunnel. The authorisation was granted, and in spring 1995 an initial research programme was proposed to the “Clay Club”, a working group of NEA (Nuclear Energy Agency) of the OECD. Five organisations (SNHGS, ANDRA, NAGRA, PNC

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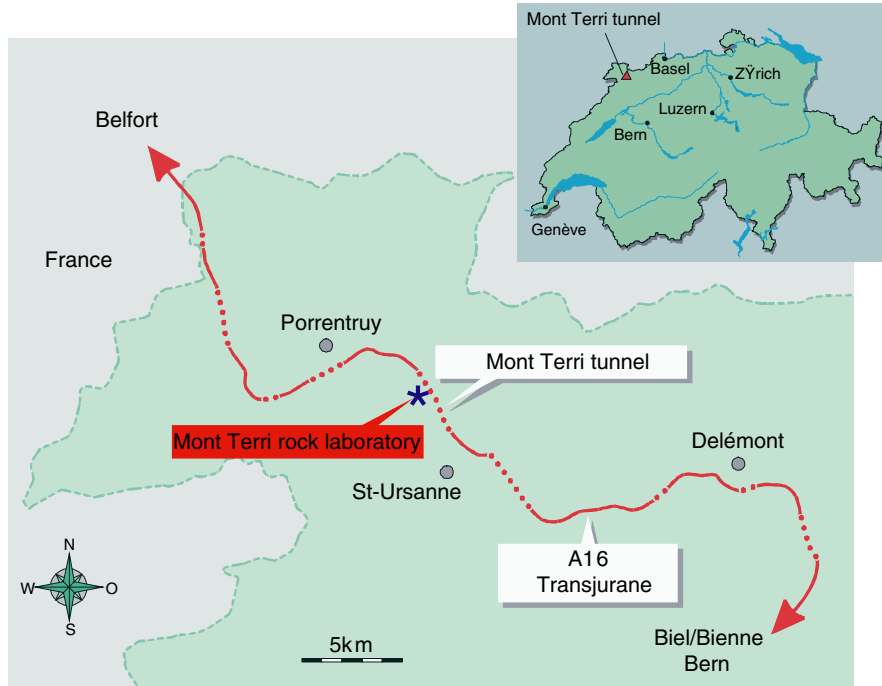


Fig. 1. Geographic location of the Mont Terri Rock Laboratory.

(now JAEA) and SCK.CEN) agreed to start a joint project. An international co-operation agreement was formulated and agreed, and excavation work began in January 1996. Between 1997 and 2003, another 7 partners have joined the project: these are BGR, CRIEPI, ENRESA, GRS, HSK, IRSN and OBAYASHI.

The partner organisations agreed that the project would have a democratic set-up. Unlike other similar projects, where one organisation is the operator of the rock laboratory and other organisations may join the project to carry out experiments, at Mont Terri all partners had the same rights and duties. The project was under the patronage of the SNHGS which was responsible for contact with the cantonal authorities and the applications for the annual authorisations. In spring 2001, a convention was signed between the Swiss Confederation, represented by FOWG (now SWISSTOPO), and the *République et Canton du Jura*. With this agreement, the project received the legal basis, and FOWG took over the direction of the project and the responsibility for the rock laboratory.

The financial investments of the partner organisations are presented in Fig. 2. Over the last 10 years, the partners have invested a total of 30.46 Mio CHF for mandates, corresponding to about 20 Mio Euros. The partitioning looks as follows: ANDRA 29%, NAGRA 26%, ENRESA 15%, BGR 9%, and the other partners the remaining 21%. Not included in these investments are the contributions from the European Commission and the Swiss Federal Office for Science and Education, and internal costs of the partners (i.e. costs for own staff such as experimental work carried out by principal investigators).

Total invested capital 1996 - 2005: 30.46 Mio CHF (For mandates)

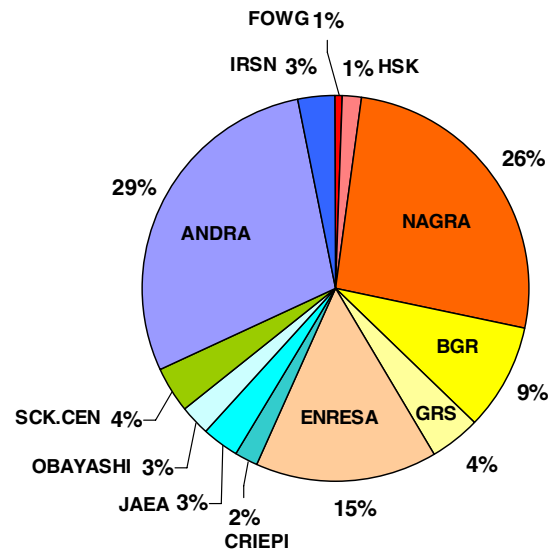


Fig. 2. Financial investments by the Mont Terri partner organisations. Not included in this partitioning are the contributions from the European Commission and the Swiss Federal Office for Science and Education.

The formation of the Opalinus Clay is a candidate host rock in Switzerland for the geological disposal of high-level radioactive waste. This formation is found in northern Switzerland and southern Germany. The Mont Terri Rock Laboratory is a generic rock laboratory and the disposal of radioactive waste is clearly excluded.

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