

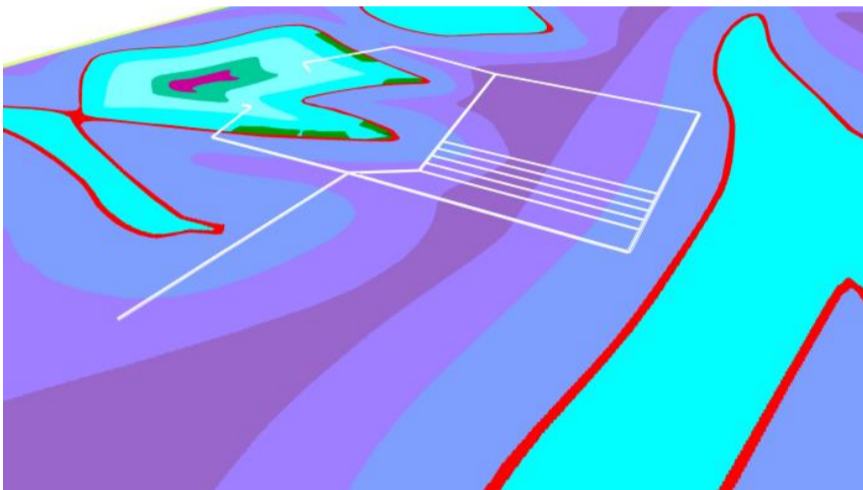
# Modelling and Visualizing Coupled THM Processes in a Virtual Underground Laboratory – The VIRTUS Demonstrator

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The virtual underground laboratory (VIRTUS) is developed in the frame of a joint project of

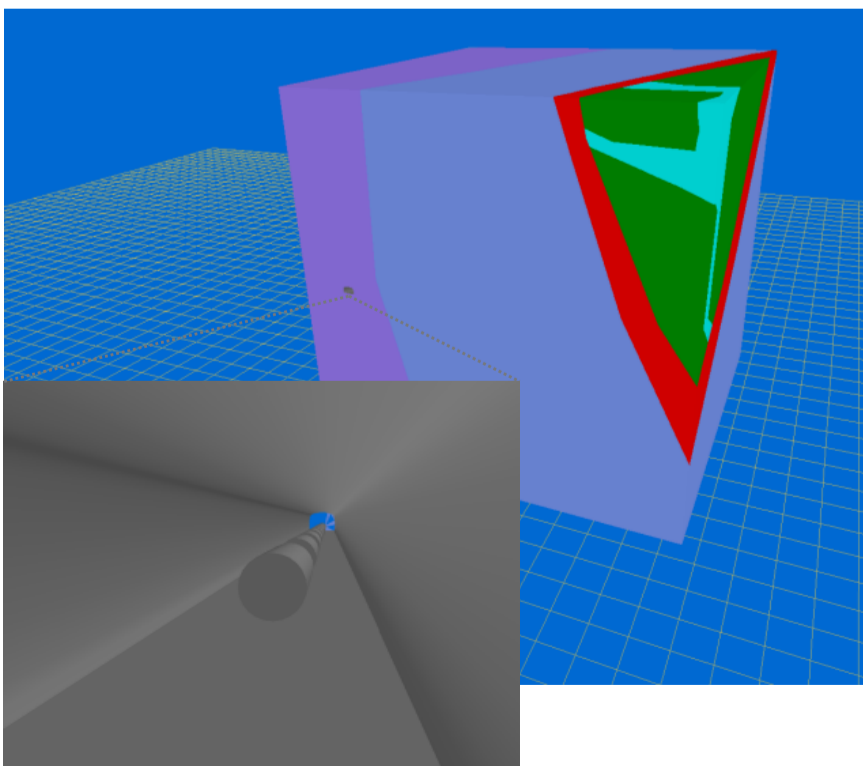
- the Gesellschaft für Anlagen- und Reaktorsicherheit (GRS),
- the Federal Institute for Geosciences and Natural Resources (BGR),
- the DBE Technology GmbH (DBE TEC), and
- the Fraunhofer Institut für Fabrikbetrieb und – automatisierung (IFF).

The VIRTUS project is financed by the Federal Ministry of Economics and Technology (BMWi) under contract 02E10890.



## Visualisation of geologic models and result data of numerical simulations

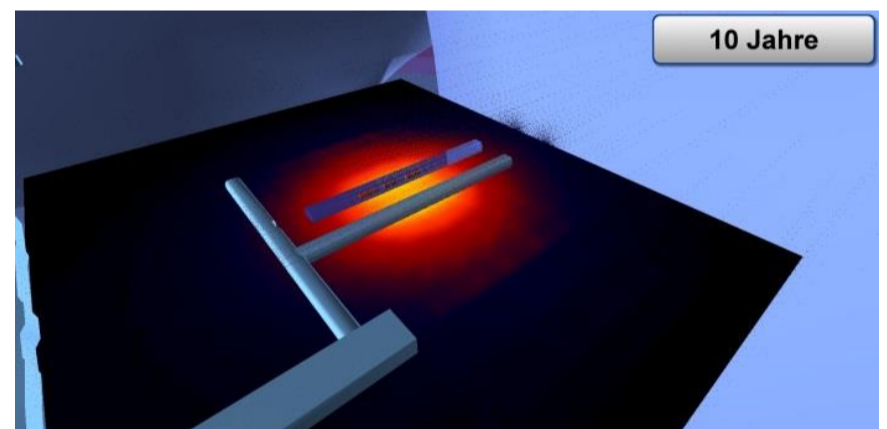
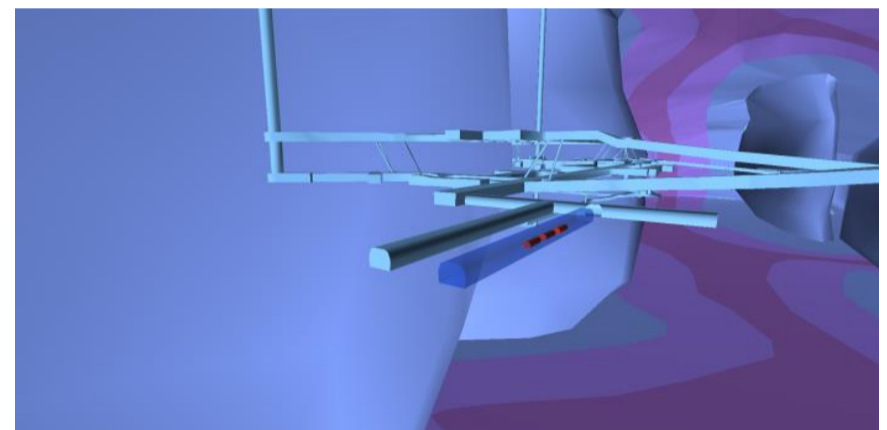
- Import of geologic models
- powerful editing functions for the creation of mine structures
- export of the resulting models to process-level codes, where they are used as input for model simulations on the coupled thermal-hydraulic-mechanical behaviour of the system
- Visualization of simulation results in VIRTUS in context with the underlying geology



## Application

For a given repository or underground laboratory site, VIRTUS will facilitate

- design of meaningful experiments,
- comparison of simulation outcomes and data,
- benchmark exercises,
- comparison of simulation variants (optimisation),
- evaluation of simulation results to make sure that safety criteria are met,
- design of an actual repository structure in a given geology,
- presentation of repository research to the public.



VIRTUS' capabilities to quickly generate virtual mine structures and provide models for numerical simulations as well as its visualisation means will make it a useful tool

- for institutions involved in design and implementation of a repository
- for research organizations
- for regulators

## Prospects

- Current phase of the VIRTUS project: October 2010 – April 2014
- Intended to develop the VIRTUS platform to a web-based public instrument in the future
- Currently restricted to use in rock salt formations, further use in other potential host rocks is planned

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