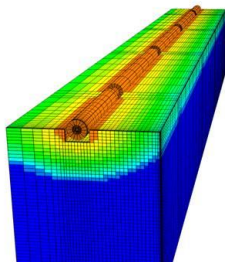


## GROUNDWATER MODELS AND SAFETY ANALYSES | TOOLS FOR SUBSURFACE RESOURCE MANAGEMENT AND THE PROTECTION OF PEOPLE AND THE ENVIRONMENT

### PRODUCTS

#### GROUNDWATER MODELS:

- Site-specific, calibrated and up-to-date models for the protection and sustainable utilization of groundwater
- Models of fluid flow, solute and energy transport for the evaluation of the current site condition and the prediction of its evolution
- Models as planning tools for impact assessments and the optimization of measures affecting groundwater resources



#### SAFETY ANALYSES:

- Operational and long-term safety assessments for radioactive waste repositories in clay, salt and granite
- Safety, repository and decommissioning concepts
- Planning options and safety appraisals for the construction, backfilling and closure of repositories (*Performance Assessment*)

#### INFORMATION SYSTEMS & SOFTWARE TOOLS:

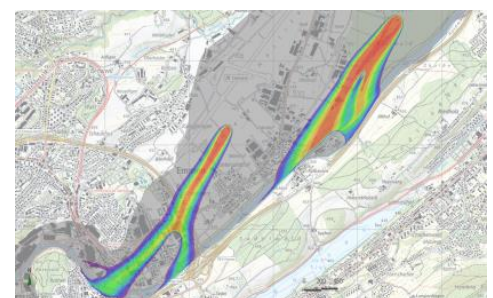
- Spatial information and management systems in 2D and 3D for large and complex data sets
- Development of and extensions for web, desktop and mobile applications
- Platform-independent visualization tools for the online presentation and evaluation of modeling results (*Electronic Result Folder*)

### YOUR ADVANTAGES

- Tailor-made solutions – through interdisciplinary collaboration of different specialists – from one source
- Investigation and appraisal of local site conditions with respect to hydrology, hydrogeology, water resource management and – where applicable – contamination
- Quantification of surface water-groundwater interactions
- Coupling of geochemical reactions and solute transport (*Reactive Transport*)
- Complex models (*THMC*): comprehensive consideration and implementation of complex and coupled interrelations between hydrodynamics, hydrogeology, geochemistry, geomechanics, solute and heat transport as well as multiphase processes
- Reliable predictions through the application of cutting-edge calibration tools and statistical methods
- Deterministic and probabilistic safety-relevant calculations and analyses (e.g. for repositories)
- Implementation and, if required, development of state-of-the-art numerical solutions
- Competent application of modern concepts and tools from the field of long-term safety assessments for radioactive waste repositories to answer manifold questions in both the nuclear and non-nuclear sector (e.g. scenario analysis, analysis of consequences)

### OUR SERVICES

- Hydrogeological site investigations for infrastructural facilities, drinking water supply and thermal utilization
- Geoscientific synthesis of field and laboratory data from borehole-logging, well tests, geophysics, geochemical analyses and monitoring
- Hydrogeological, geochemical and geothermal studies for the management and protection of underground resources as well as for the safety of people and the environment
- Predicting the impact of extreme high and low water events on people and the environment (e.g. flooding, emergency cooling systems)
- Support for the planning, licensing, monitoring and decommissioning of underground infrastructures and other facilities related to the use of underground resources
- Suitability assessments and feasibility studies
- Independent and competent expert reports, consulting services and studies for project managers, owners and authorities



Capture zones of drinking water wells in the Reuss Valley, Environment and Energy Lucerne (Background map: Federal Office of Topography)