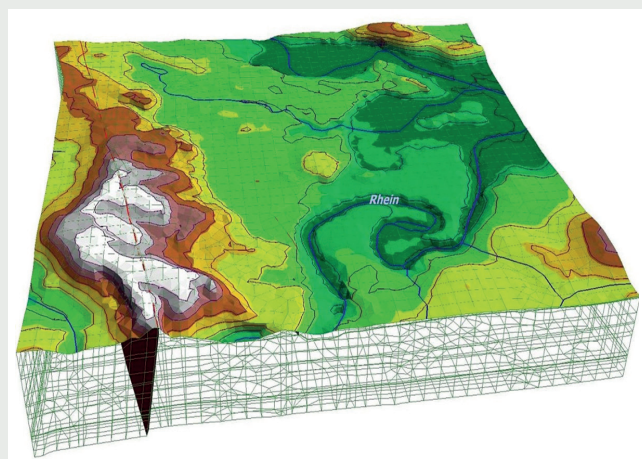


We are experts in numerical flow modelling.  
Our services are divided into four areas that are closely connected.

Groundwater is one of the most abundant fresh water sources. A proper quantification and protection is therefore essential. Numerical models allow reliable qualitative and quantitative assessments and hence a sustainable management of this valuable resource.

## Groundwater use and management

- Model setup, steady-state and transient calibration and validation
- Pumping test interpretation
- Optimisation of groundwater management and sustainable usage
- Optimum design of monitoring networks
- Calculation of well catchment areas and protection zones
- Real time and online models with data assimilation



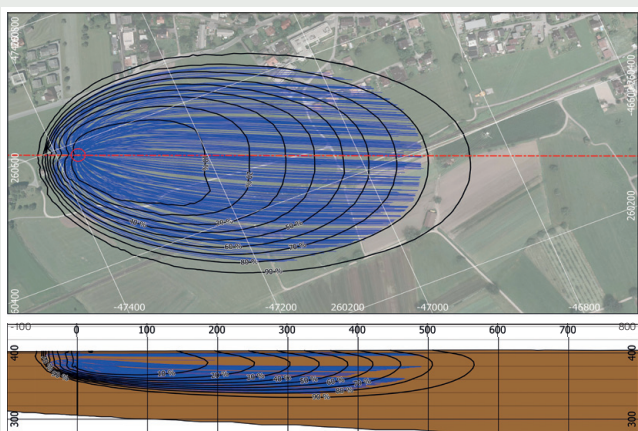
3D-Net regional model Weinland, Canton Zürich, Switzerland

## Groundwater structures

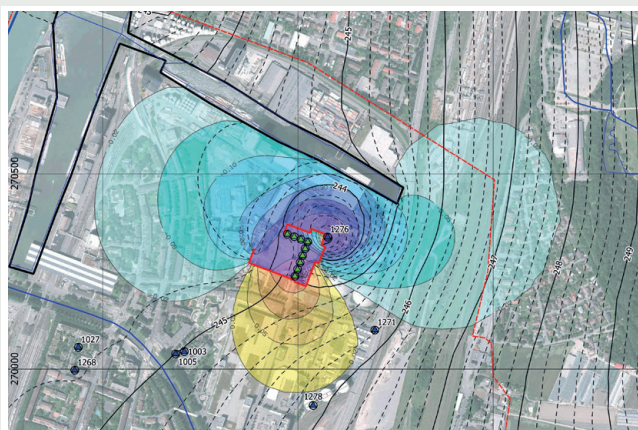
- Effects of constructions (e.g. tunnels, foundations, dewatering excavations) and corrective measures development
- Impact of river revitalization projects and influence of flood detention basins
- Design of drainage systems

## Transport modelling

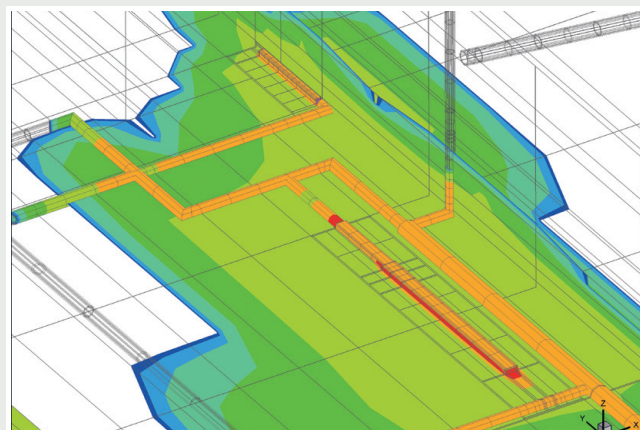
- Propagation of pollutants
- 3D-multiphase multicomponent flow models
- Heat transport modelling



3D calculation well catchment areas, Land Vorarlberg, Austria

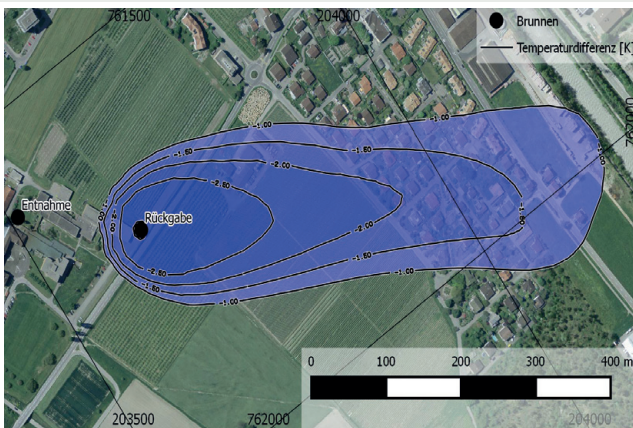


Groundwater level changes due to a well of the sewage plant Basel, Canton Basel Stadt, Switzerland

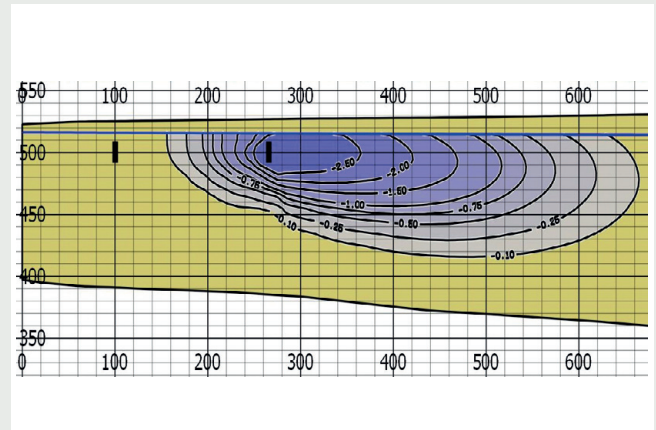


Propagation of nuclear pollutants, probabilistic test model, NAGRA, Switzerland

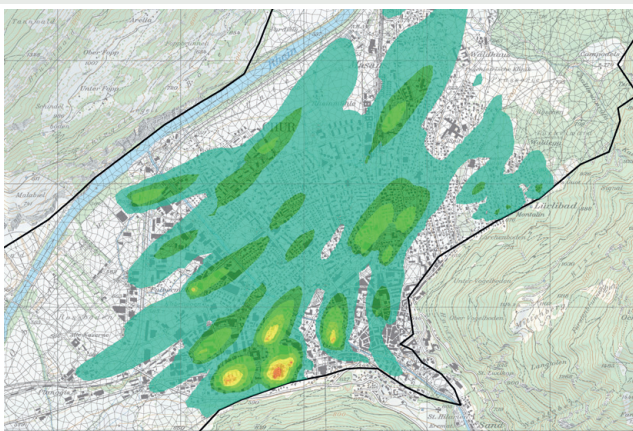
Geothermal energy is an important source of heat for industrial and domestic purposes. To guarantee a sensible and sustainable use of geothermal systems, a correct prior estimation of their effects using numerical models is required.



Change in groundwater temperature in horizontal direction in Landquart, Canton Graubünden, Switzerland



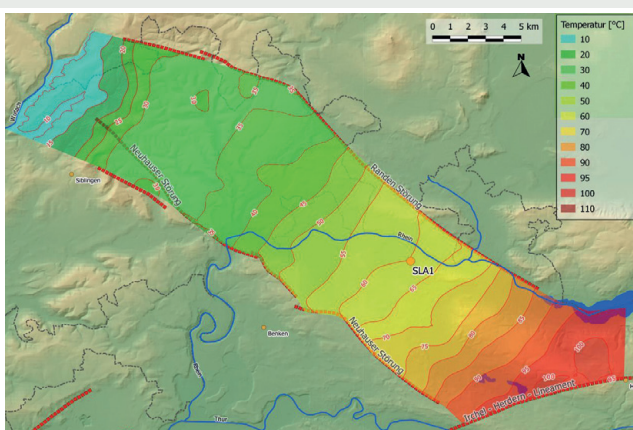
Change in groundwater temperature in vertical direction in Landquart, Canton Graubünden, Switzerland



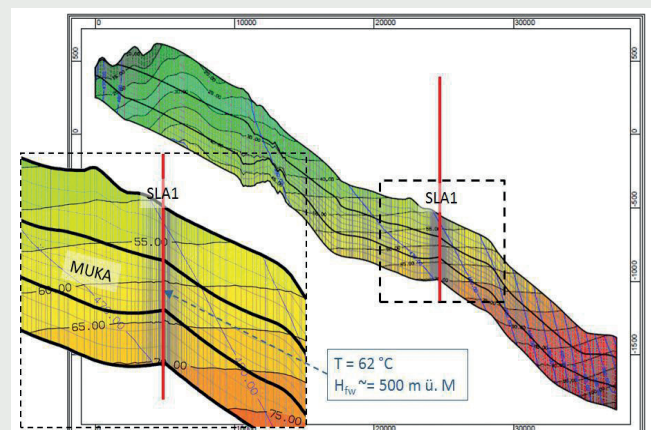
Estimation of geothermal potential of the Aquifers in Chur, Canton Graubünden, Switzerland

## Thermal use of the underground

- ▶ Hydrogeological and geothermal effects due to groundwater heat pumps
- ▶ Geothermal effects due to heat drillings
- ▶ Process optimisation to reduce geothermal effects
- ▶ Assessment of geothermal potential
- ▶ Compilation of vulnerability maps



Horizontal temperature distribution in Schlattingen, Canton Thurgau and Schaffhausen, Switzerland

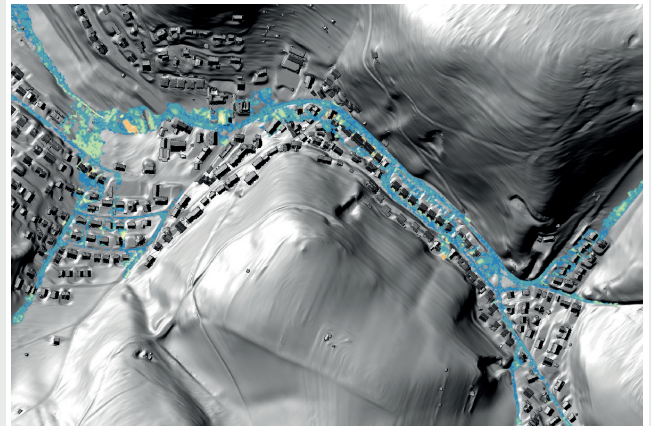


Vertical temperature distribution in Schlattingen, Canton Thurgau and Schaffhausen, Switzerland

A future increase in natural hazards can be expected due to scientifically proven climate change. With our methods we are able to correctly predict these events and timely develop sustainable solutions.

## Flood control and hydraulic engineering

- 1D/2D/3D discharge modelling
- 1D/2D/3D sediment transport in rivers and morphologic development
- Coupled discharge modelling (1D/2D/3D)
- Development of integral flood-control-concepts
- Calibration, optimisation and inverse modelling
- Real-time online models
- Web-applications



Calculation of surface runoff in Riehen, Canton Basel-Stadt, Switzerland



Flood hazard maps after measures in Rontal, Canton Luzern, Switzerland

## Hazard and risk analysis

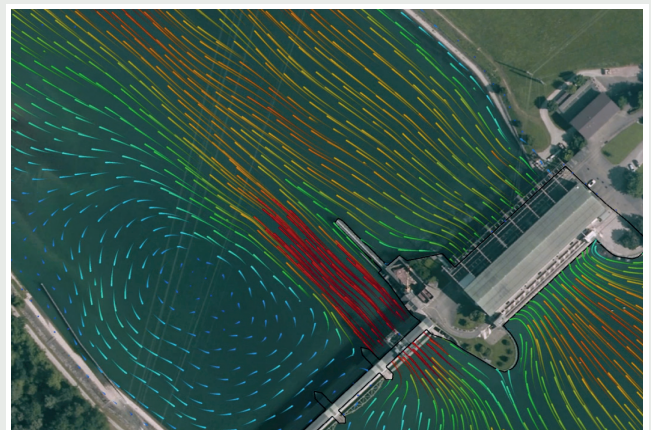
- 1D/2D flood calculations
- 1D/2D/3D flood wave modelling
- Flood hazard maps

## Hydrology

- Rainfall-runoff simulation
- River catchment area modelling
- Effect analysis of water storage basin

## Hydropower

- Hydropeaking
- Bed load transport
- Fish migration facilities
- Optimisation of operation, facility management
- Hydraulic calculations for weir control

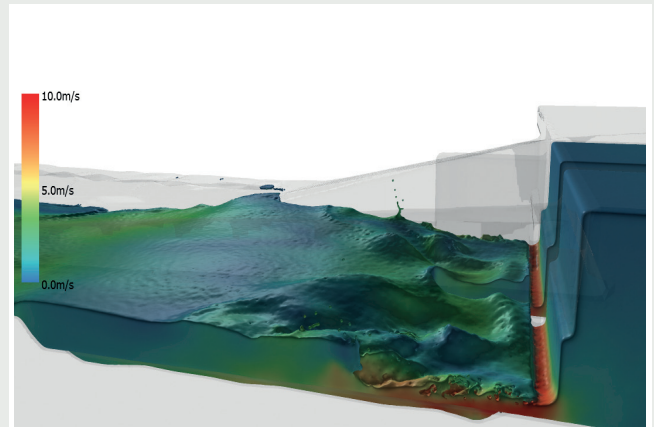


2D Simulation of the hydropower plant Klingnau, Canton Aargau, Switzerland

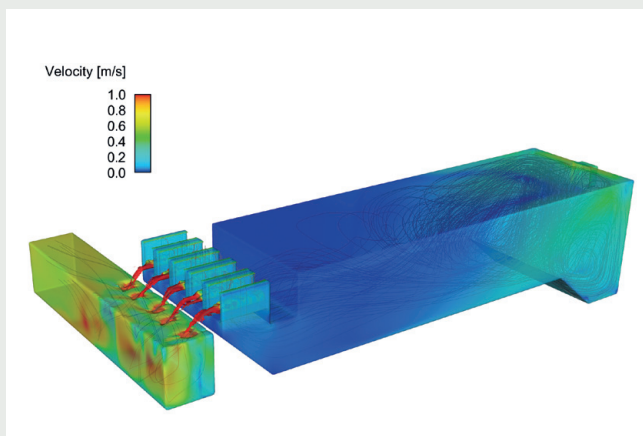
We are able to understand complex physical processes with our 3D simulations covering gas supply, aeration, agitators, scrapers, suspended sediment load, particles, moving objects, pumps, air entrainment, multiphase- and density current and to find optimal solutions. A hydrodynamic optimisation forms power reserve and a maximisation of the benefit of investment.

## Hydraulic engineering

- Flood preventive measures
- Log jams
- 2D/3D coupled river hydraulics
- Sediment transport
- Culverts, tunnels
- Bottom outlets
- Flood spillway
- Fish passes
- Thermal usage of lake and river water



3D Simulation of culvert of controlled water storage basin, Canton Aargau, Switzerland



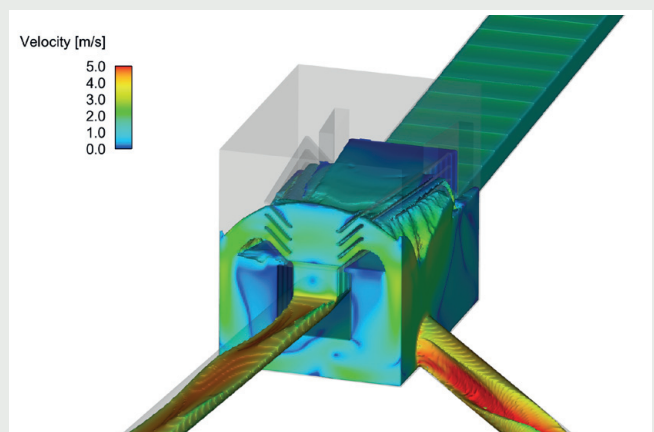
3D Simulation of sand trap of the wastewater treatment plant Beggen in Luxemburg City

## Waste water treatment

- Draining channels
- Rakes
- Sand trap and grease trap
- Primary- and secondary sedimentation tanks
- Activation tanks
- Digester
- Reactors (e.g. Ozone, PAK)
- Hydraulic verification of special structures

## Urban water supply and sanitation

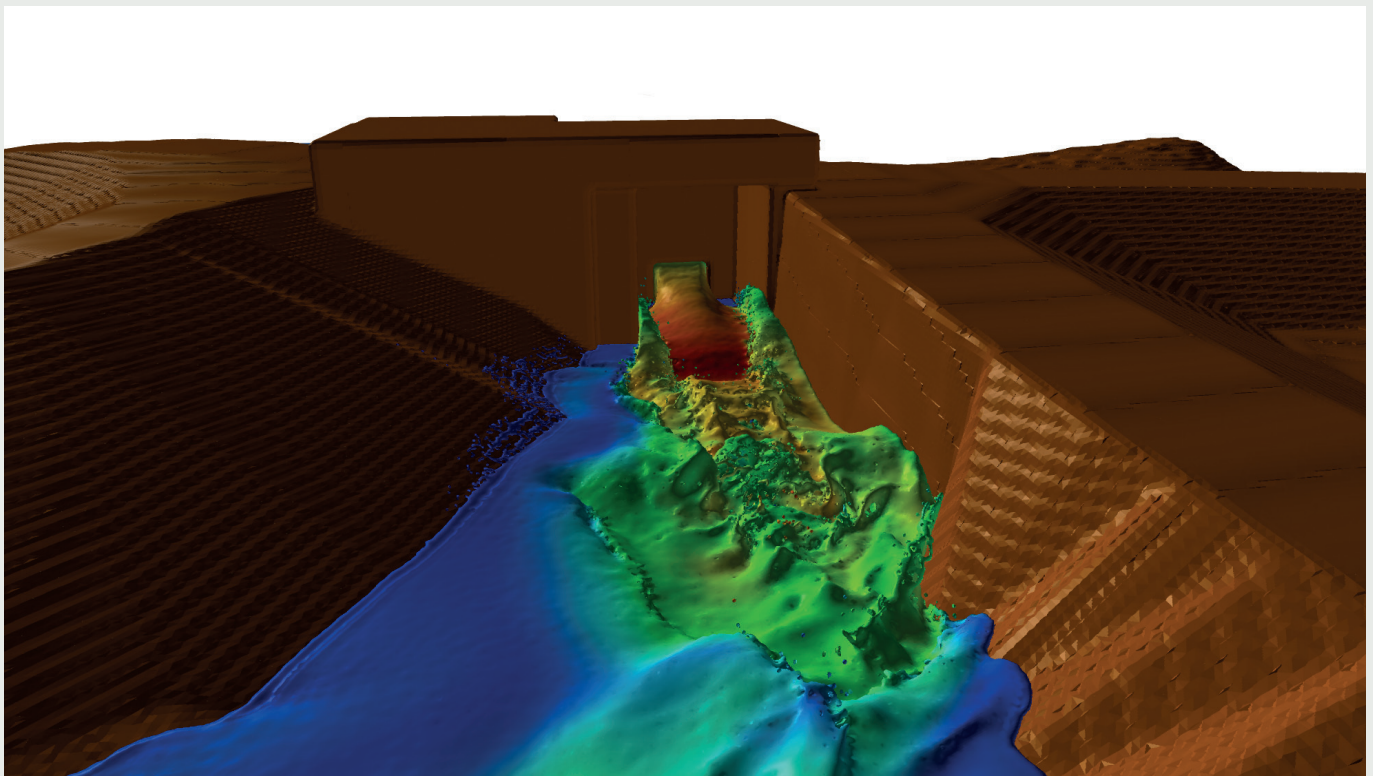
- Flood preventive measures
- Flood detention basins
- Sewage water systems
- Junctions
- Drop structures



3D Simulation of flood relief in Kaiseraugst, Canton Aargau, Switzerland

After decades of research and consultancy work at the ETH Zurich's Laboratory of Hydraulics, Hydrology and Glaciology (VAW), Dr. Jürg Trösch and Dr. Uli Kuhlmann founded TK CONSULT AG in Zurich in 1995.

The current managing director Steffen Corbe and his team of ambitious, experienced civil engineers, environmental engineers and environmental scientists shows great experience from more than 1000 engineer projects. Thanks to intensive knowledge transfer with ETH Zurich and other universities, we are constantly adapting our methods to the current state of research. The profound knowledge in multiple programming languages as well as the development of our own software applications allow to generate customer-specific solutions. Our well-established knowledge as well as our passion for our profession make us a reliable partner, nationally and globally. Our clients range from municipalities, cantons and the federal government to industries, power plant operators and engineering companies.



*3D Simulation of an uncontrolled water storage basin, Canton Zurich, Switzerland*

**Contact us and together we find an economic, creative  
and suitable solution for your tasks.**