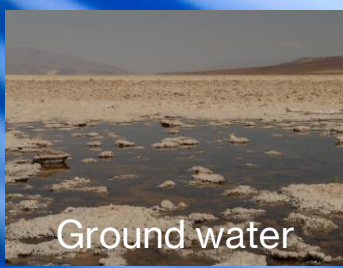**AT THE FOREFRONT OF MODELLING**
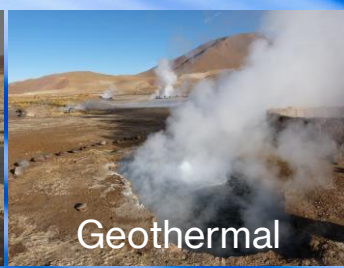
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Company Overview

environment and engineering
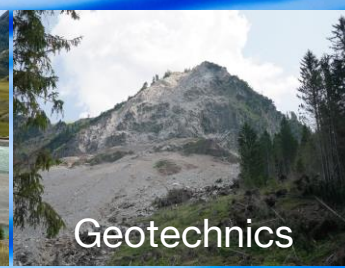
Ground water | Geothermal | Surface water | Geotechnics | Software | Training

Company overview

➤ **Privately owned**

- Founded: 2017
- CEO: Dr. Andrés Alcolea (20 years exp.)
- Office: Winterthur, Switzerland
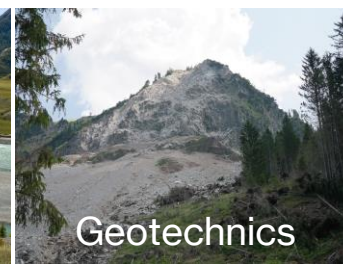
Tösstalstrasse 23
CH-8400 Winterthur
Switzerland
+41(0) 52 212 21 70
www.hydrogeomodels.ch
info@hydrogeomodels.ch

➤ **Scope of services:**

Environmental and civil engineering

- Ground water and contaminated aquifers
- Shallow and deep geothermal
- Surface water and flood prevention
- Geotechnical engineering
- Software development
- Training

Ground water   Geothermal   Surface water   Geotechnics   Software   Training

Ground water and contaminated aquifers
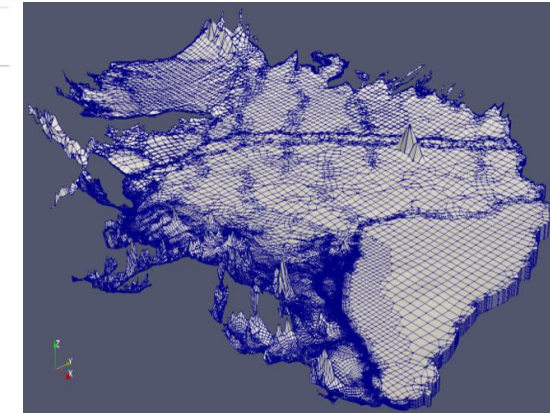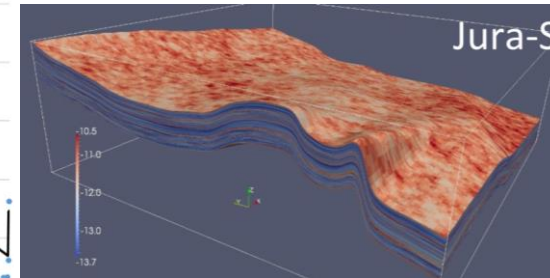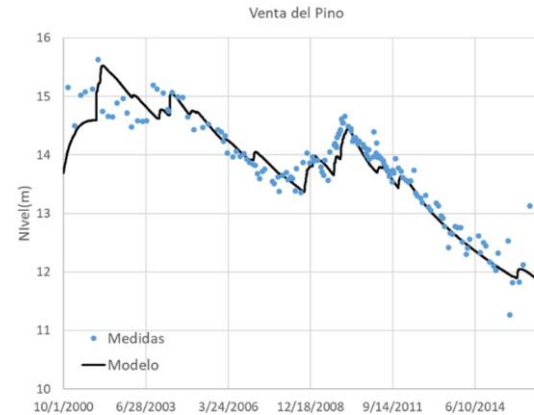
- Model construction:
  - Conceptual modelling
  - Geostatistical interpretation of data
  - GIS, 3D geological modelling
  - Steady state initial conditions
  - Transient boundary conditions
  - Potential sources of contamination

- Stochastic calibration:
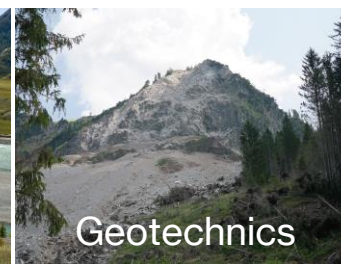 - Online model updates
  - Plausible fits of model parameters

- Backtracking/forecasting:
  - Identification of contamination sources
  - Impact of new wells/catchment zones
  - Design of pumping/observation networks
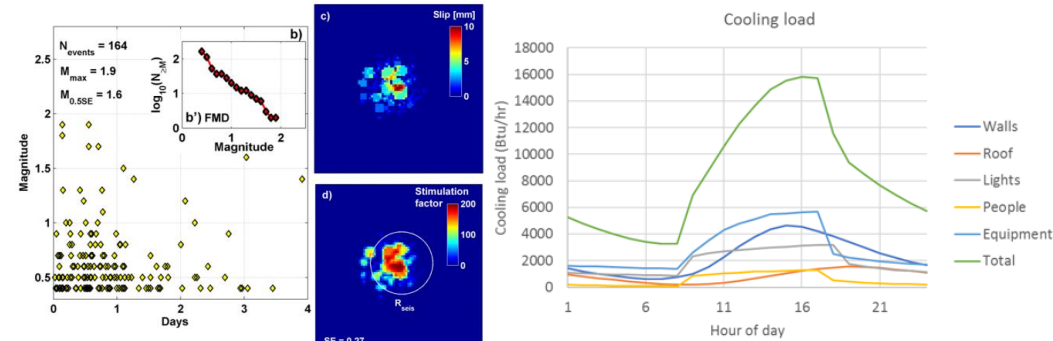 - Contaminant migration paths

Venta del Pino

Jura-S

log10K(m/s)

Reference projects:

- Calibration of a regional scale aquifer in Cartagena (Spain).
- Stochastic modelling of a coastal aquifer (Spain).
- Design of a well field for a desalination plant (Oman).
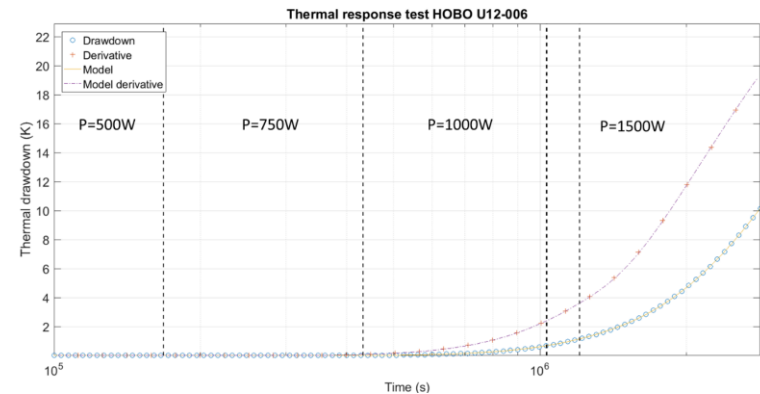- An experimental geochemical barrier at Aznalcollar (Spain).

Ground water   Geothermal   Surface water   Geotechnics   Software   Training

Shallow and deep geothermal

- ➢ Shallow geothermal:
    - ▪ Real time interpretation of thermal tests
    - ▪ 3D density driven calibrated models
    - ▪ Evaluation of geothermal potential
    - ▪ Design of heat pumps and probes
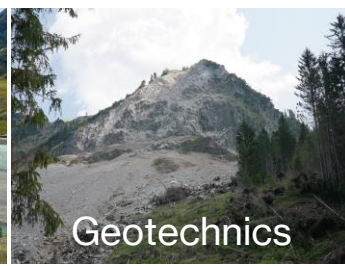   - ▪ Environmental impact of heat pumps

- ➢ Deep geothermal:
    - ▪ Conceptual modelling
    - ▪ Fracture models
    - ▪ Evaluation of induced seismicity
    - ▪ Analysis of in-situ stress state
    - ▪ Optimum design of deep wells
    - ▪ Hydrofracking/hydraulic stimulation
    - ▪ Optimum design of power plants
    - ▪ Economic evaluation of deep geothermal

Reference projects:

- • Design of geothermal heat pumps (Spain).
- • Real time interpretation of thermal response tests (Argentina).
- • Seismic risk. Design of Enhanced Geothermal Systems (Switzerland).
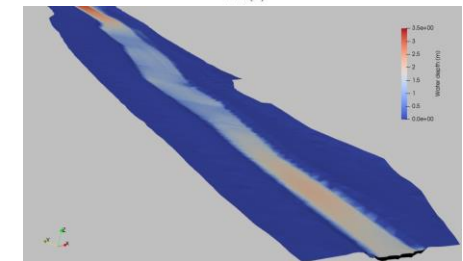- • Thermo-hydro-mechanical modelling (Switzerland).

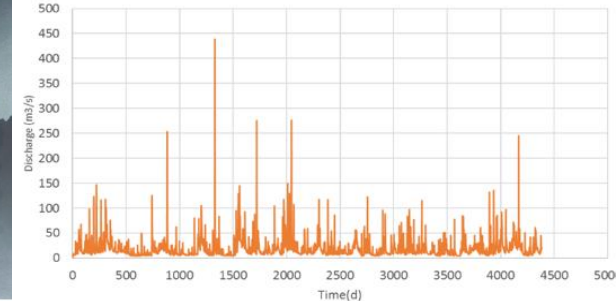Ground water | **Geothermal** | Surface water | Geotechnics | Software | Training
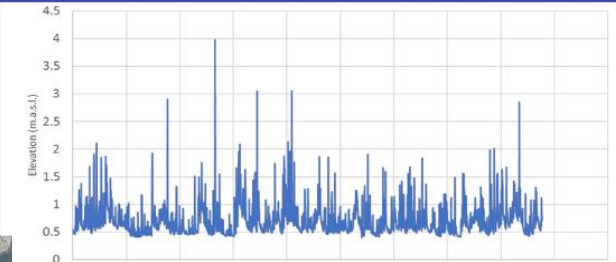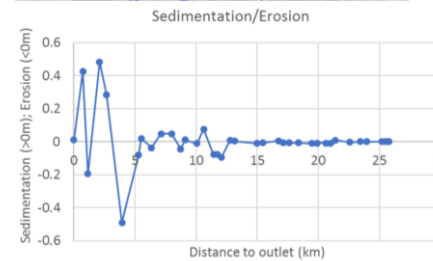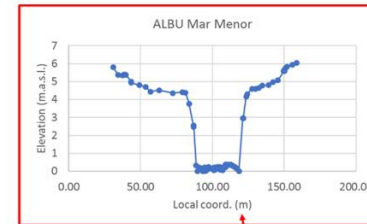
Surface water

- ➤ Modelling:
  - 1D, 2D, 3D discharge inverse modelling
  - Sediment and debris transport
  - 3D morphological modelling
  - River revitalization
  - Sustainable management

- ➤ Forecasting:
  - Impact of dam break
  - Flood modelling
  - Design of correction measures
  - Hazard maps
  - Real time modelling
  - Early alarm systems

Reference projects:

- Flood routing at Rambla del Albujón (Spain).
- Sedimentation / erosion of Rambla del Albujón (Spain).
- 3D flow and sediment transport at Rambla del Albujón (Spain).

Ground water   Geothermal   **Surface water**   Geotechnics   Software   Training

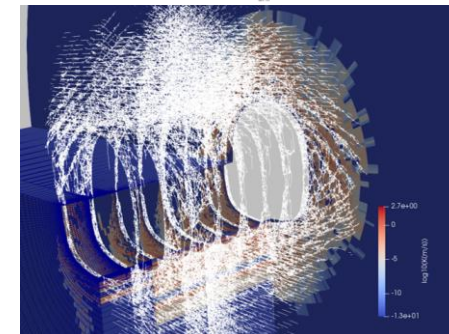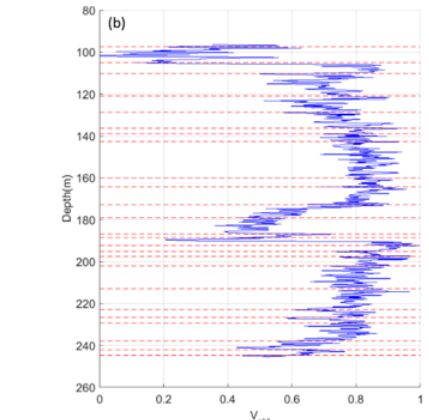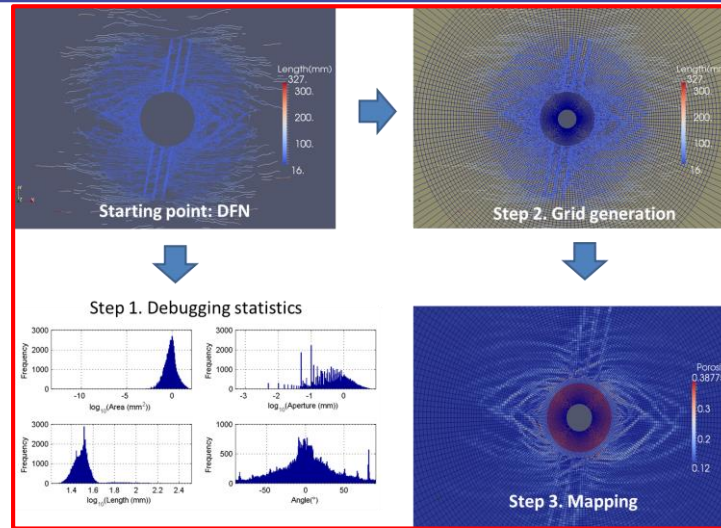# Geothechnical engineering/geomechanics

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➤ Modelling:
- Interpretation of well logs
- Well completion design
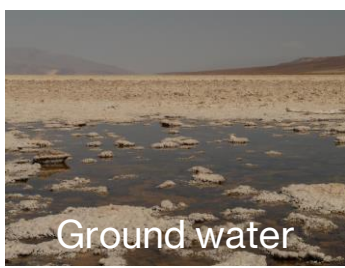- Design of monitoring networks
- Sedimentological analysis

➤ Forecasting:
- 3D THM modelling
- Excavation Damage Zone
- Stimulation of deep reservoirs
- 3D Discrete Fracture Networks
- Seismic hazard analysis

Reference projects:
- Hydromechanical modelling of the EDZ (Switzerland).
- Storage of Radioactive Waste (Switzerland).
- Automatic interpretation of well-logs (Switzerland/Germany).
- Seismic risk & Enhanced Geothermal Systems (Switzerland/South Korea).
- Thermo-hydro-mechanical modelling of hydrostimulation (Switzerland/South Korea).
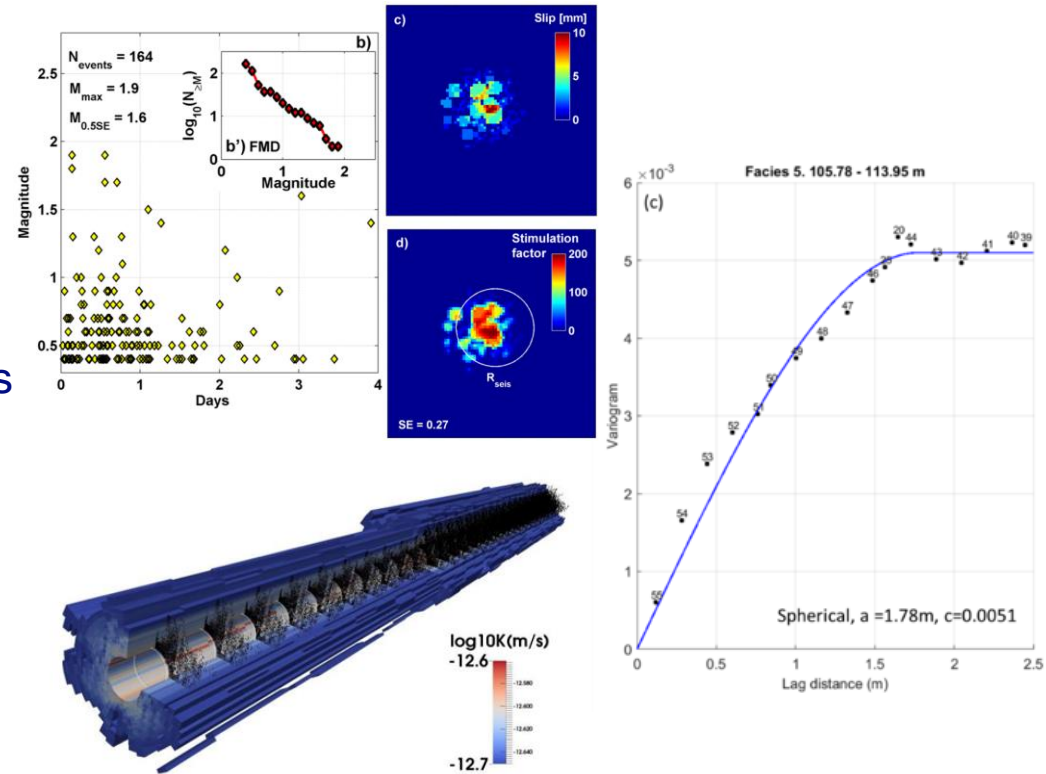
Ground water   Geothermal   Surface water   **Geotechnics**   Software   Training

Software development

➢ Tailored software:
- ▪ Geostatistical data analysis
- ▪ Real time modelling/forecasting
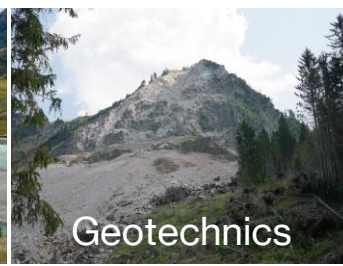- ▪ Real time interpretation of THM tests

➢ Applications:

- ▪ Coupled modelling of physical processes
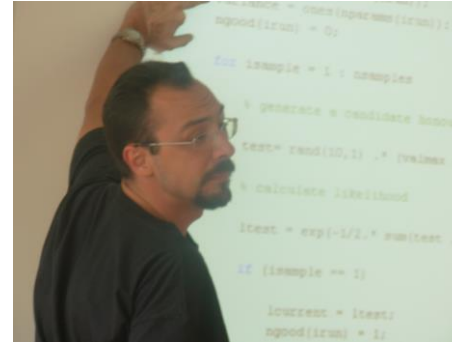- ▪ Optimum management of databases
- ▪ Real time control

Reference projects:
- ▪ THM modelling of radioactive nuclear waste storage.
- ▪ Software coupling.
- ▪ Automatic interpretation of well-logs.

Ground water   Geothermal   Surface water   Geotechnics   **Software**   Training

Basic courses:

- Hydrogeology
- Numerical modelling in hydrogeology
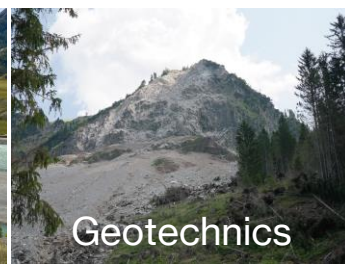- Hydro/thermo/tracer tests
- Geostatistics in environmental sciences

Advanced topics:

- Advanced hydrogeology
- Numerical methods
- Stochastic inverse modelling
- Advanced geostatistics
- 3D THM modelling

Last editions:
- Inverse problem. From theory to applications.
- Model calibration and uncertainty analysis using PEST.
- International Master in geological and mining engineering.
- International Master in hydrogeology and resource management in mining.
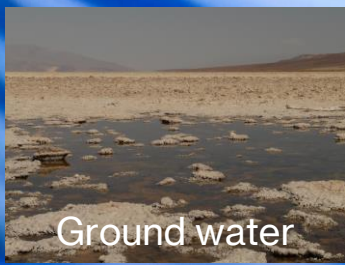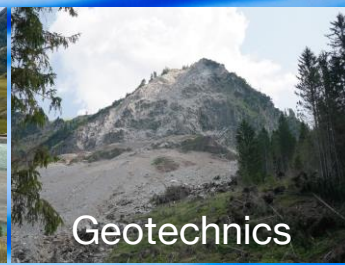- Advanced study course. Automatic interpretation of pumping tests.

Ground water   Geothermal   Surface water   Geotechnics   Software   **Training**

AT THE FOREFRONT OF MODELLING

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Company Overview

environment and engineering

THANK YOU FOR YOUR ATTENTION

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