Results for the INTERFROST Benchmark
TH2 & TH3
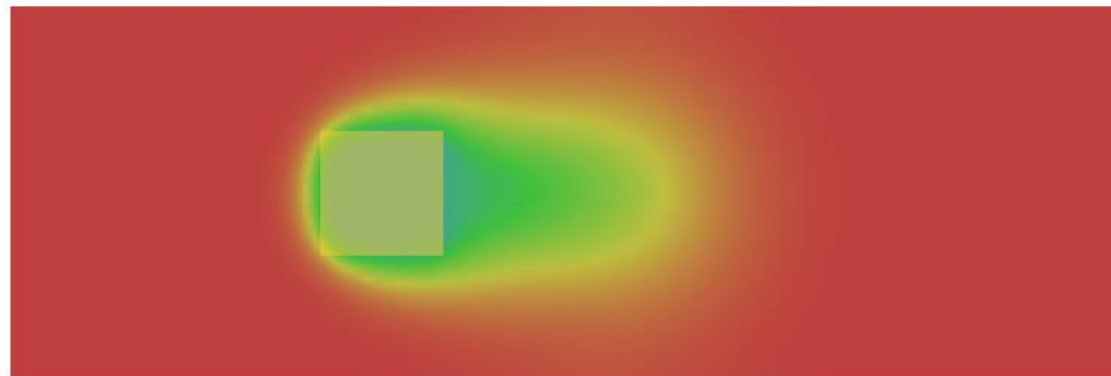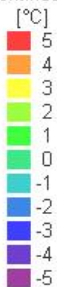
Hauke Anbergen, Wolfram Rühaak

Institute of Applied Geosciences, Department of Geothermal Science and Technology
Darmstadt Graduate School of Excellence Energy Science and Engineering
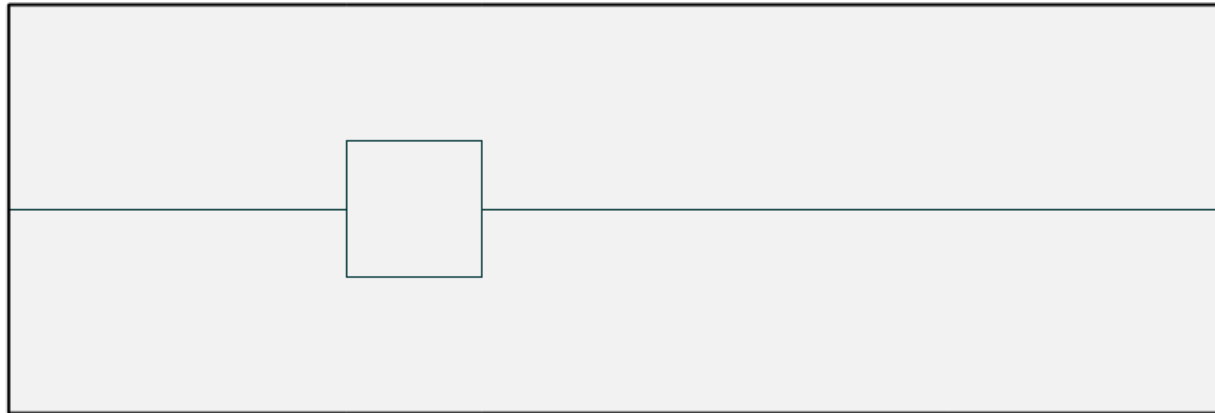
APS GmbH – Wille Geotechnik

TECHNISCHE
UNIVERSITÄT
DARMSTADT

Temperature
- Continuous -
[°C]
5
4
3
2
1
0
-1
-2
-3
-4
-5

Y
X

FEFLOW (R)

3704 elements selected
8640 [s]

0   0.15   0.3

[m]

Results TH2

- **FEFLOW 6.1**
- **Formulas from the datasheet implemented accordingly**
- **Thermo dispersion set to 0**

Results TH2, deltaH = 0.00

0.02 d

0.1 d

1 d
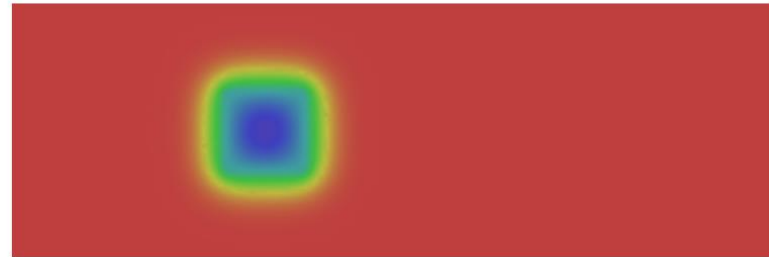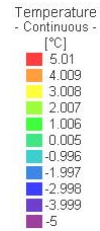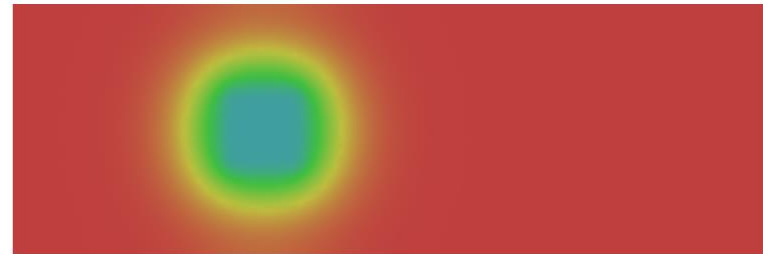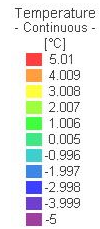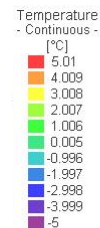
Results TH2, deltaH = 0.03

0.02 d

0.1 d

1 d
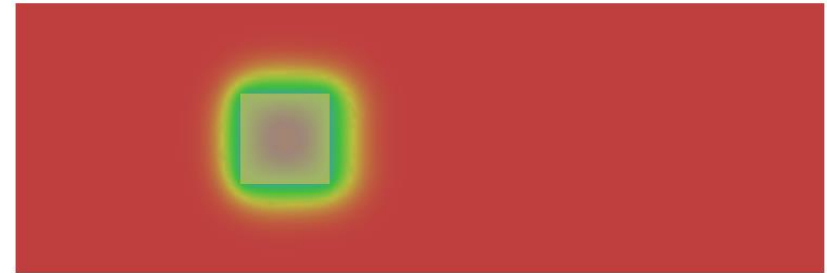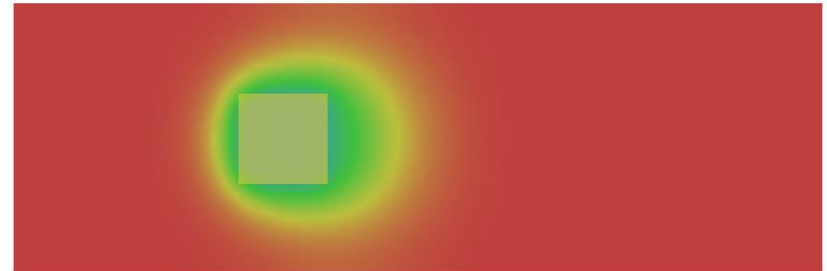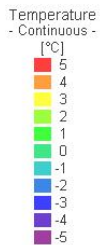
Results TH2, deltaH = 0.03
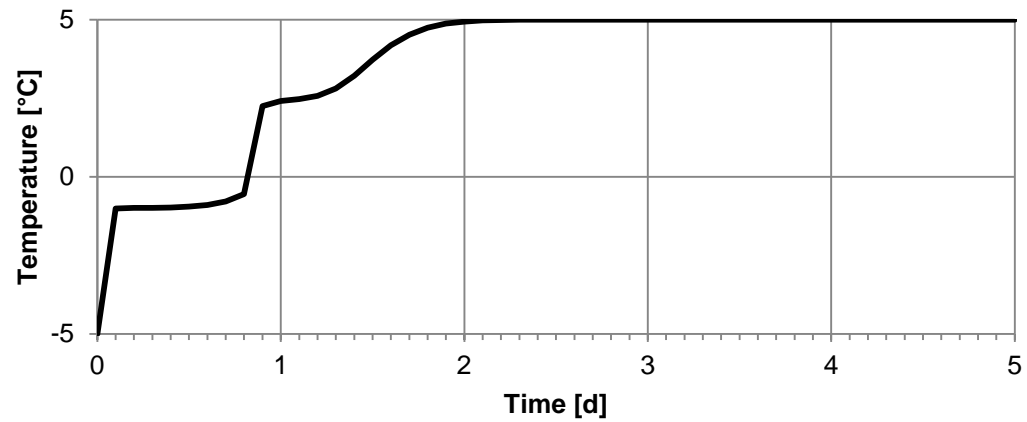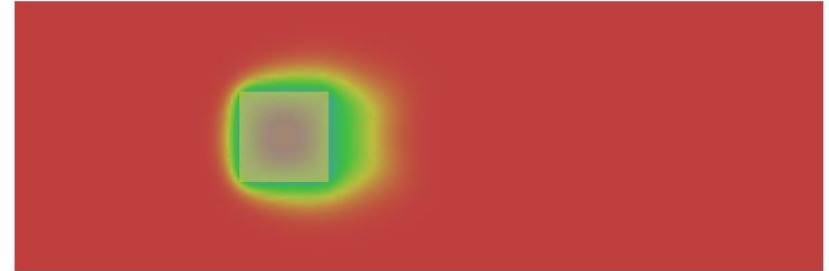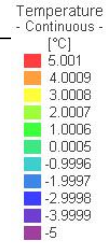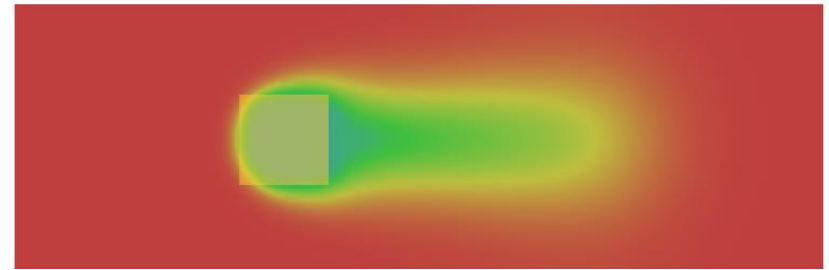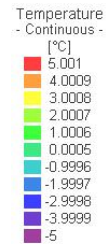
Results TH2, deltaH = 0.09

0.02 d

0.1 d

1 d
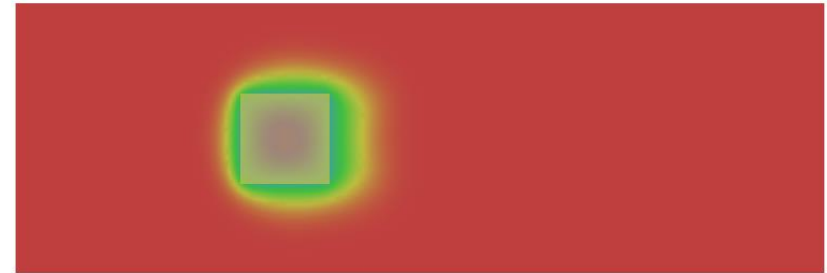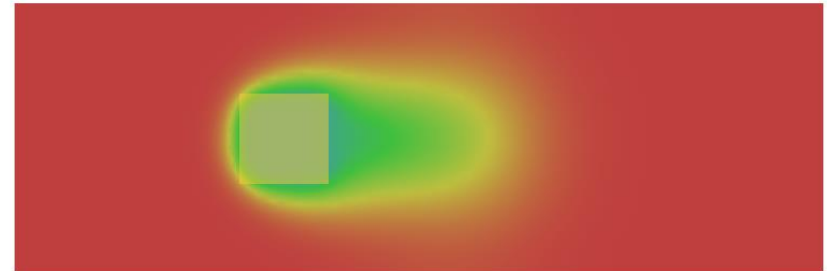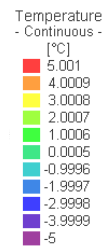
Results TH2, deltaH = 0.15

0.02 d

0.1 d

1 d

Temperature

Darcy Flux

Thermal Cond. Of Fluid
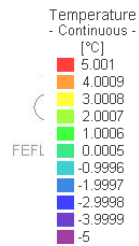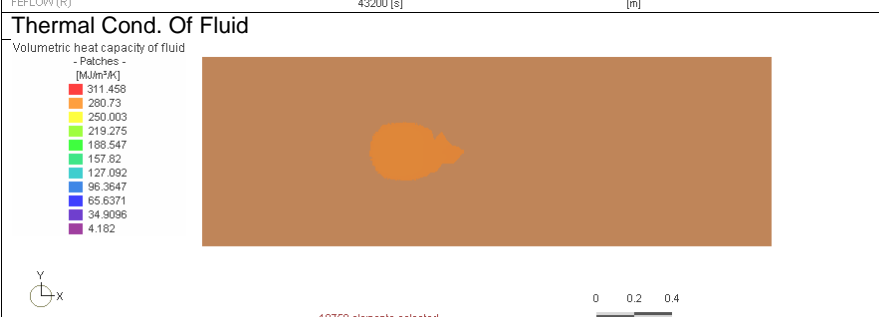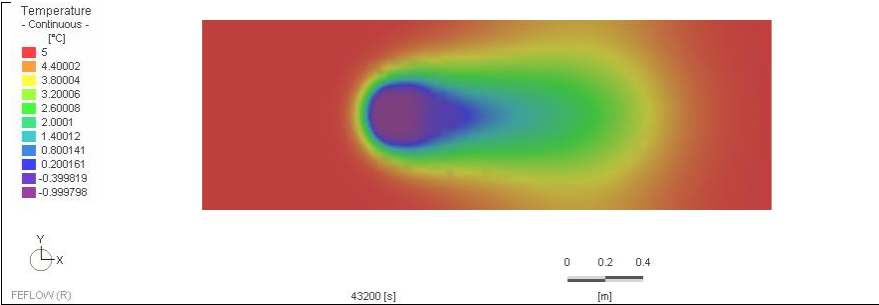
Hydraulic Head
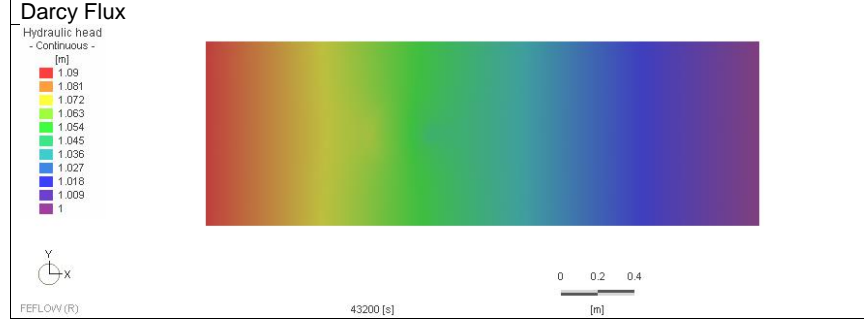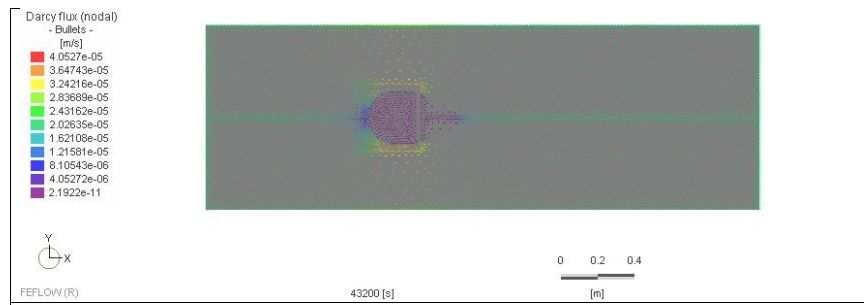
Heat Capacity of Fluid

Material properties are modified accordingly.

Hydr. Conductivity

Results TH3

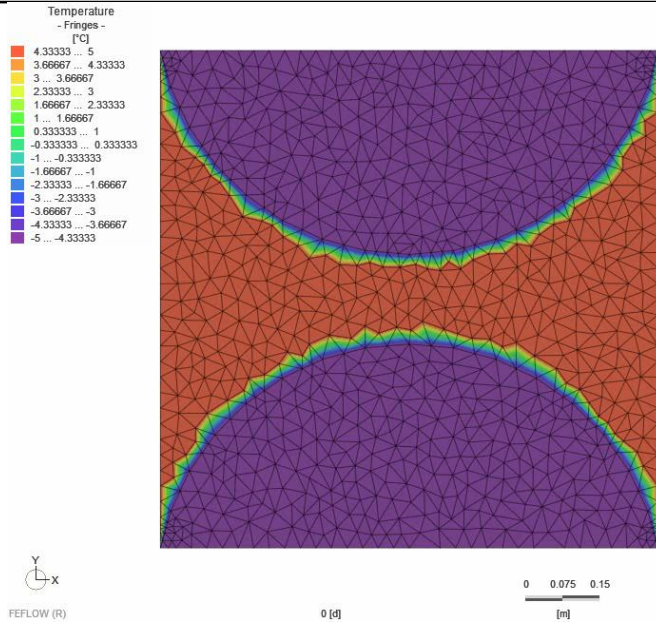- **FEFLOW 6.0 with Automatic Mesh Refinement (AMR)**
- **The IFM plug-in controls**
  - **if element is with the freezing range (here between 0 and -1 degree C) and**
  - **if the elements size is not smaller than 5E-6 m²;**
- **if so refinement is applied;**
- **otherwise derefinement maybe assigned or element size is kept**
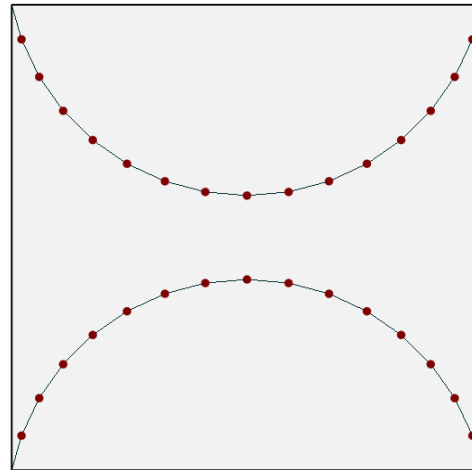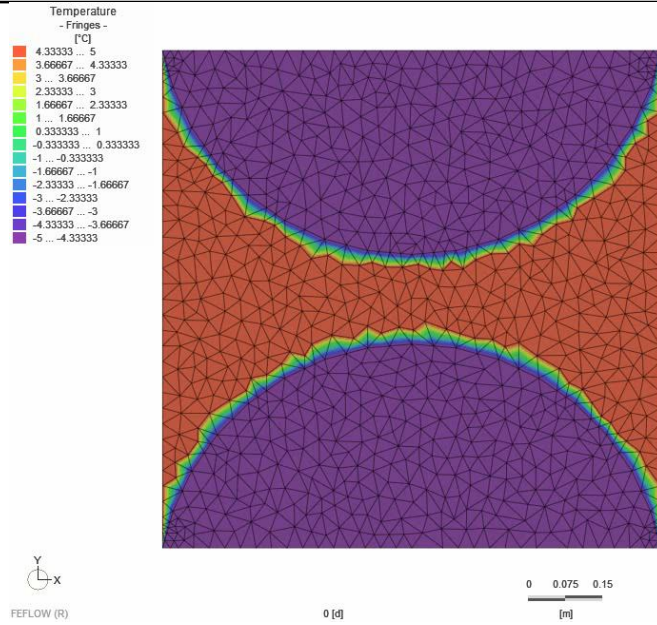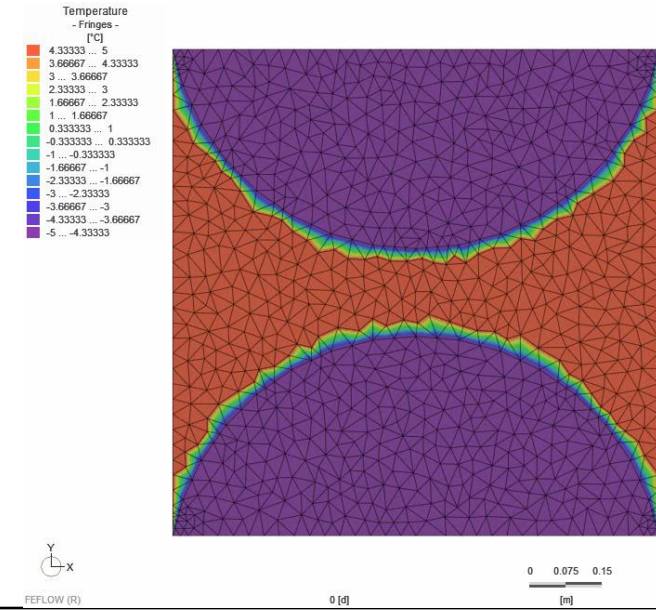

0   0.075 0.15

[m]

gradient = 0

gradient = 0.03

gradient = 0.09

gradient = 0.15