

# Challenges and possibilities of supercomputing in numerical modelling of mine water management problems

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Mine water management recently faces numerous challenges related to increasing pressure on environmentally friendly mine operation including closure and post-closure phases. Advances in exploration techniques enables to collect big data sets and their full utilization is facilitated by the application of mathematical methods.

FEFLOW code, which is an integral part of Mine Water Management system developed by DHI, represents an option. As such, extensive numerical simulations based on the combination of the transport of dissolved substances in groundwater, their interaction with the rock environment and the evaluation of the key parameters of the envisaged scenarios, including the optimization according to the criteria, must be solved.

To solve these tasks, the implementation of the FEFLOW, PhreeqC and BeoPEST systems into the supercomputing environment was done within the research project PARETRAN “Parallelized reactive transport model of pollution dissipation in groundwater” (Technological Agency of the Czech Republic, No. TH02030840) using supercomputer at VSB-Technical University of Ostrava (IT4Innovations, National Supercomputing Center). The poster presents partial preliminary results of calibration and sensitivity analysis of the selected parameters. Attention is focused on the study of the scaling of the degree of parallelization in relation to the total calculation times.