Characterizing Water Quality of Pit Lake through Modeling

**Introduction**
- Pit lake water quality is a problem
- Many processes and influences
- Modeling is complicated and feedback between processes is important
- An inter-disciplinary approach is needed
- A model that can account for all important processes and their feedback loops is required

**Important Processes**
- Coupled model
  - CE-QUAL-W2
    - Hydrodynamics
    - Water quality in natural lakes
- PHREEQC
  - Chemistry
- PCGEOFIM, MODMST
  - Groundwater exchange

**The Model**
- Additional modules
  - Erosion
  - Sediment release
  - Treatment

**Model Setup**
- Lake is 2D with branches
- Water quality with PHREEQC

**Applications**
- Applied to lakes in Germany and Australia
- Different tasks
  - Hydraulic conditions
  - Water quality prediction
  - Water quality treatment
  - Density driven inflows
Results

- Percentages of sources of acidity
  - Due to inflows
  - Due to internal sources

Results II

- Development of water quality over time and space

Results III

- Base capacity for different scenarios

Conclusions

- The model can account for all important processes and their feedback
- Applications at lakes at different locations yielded good results
- Useful different type of tasks
- Application for other locations and types of tasks is possible
- If necessary features may be added or modified