Gocad2OGS: Workflow to Integrate Geo-structural Information into Numerical Simulation Models

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The investigation of fluid circulation in the Thuringian syncline is one of the INFLUINS project's targets. A 3D geo-structural model including 12 stratigraphic layers and 54 fault zones is created by geologists in the first step using the Gocad software. Within the INFLUINS project a ground-water flow simulation is used to check existing hypotheses and to gain new ideas of the underground fluid flow behaviour.

We used the scientific, platform independent, open source software OpenGeoSys that implements the finite element method to solve the governing equations describing fluid flow in porous media.

The geo-structural Gocad model is not suitable for the FEM numerical analysis. Therefore it is converted into an unstructured grid satisfying all mesh quality criteria required for the ground-water flow simulation. The resulting grid is stored in an open data format given by the Visualization Toolkit (vtk).

In this work we present a workflow to convert geological structural models, created using the Gocad software, into a simulation model that is easy to use from numerical simulation software.

We tested our workflow with the 3D geo-structural model of the Thuringian syncline and were able to setup and to evaluate a hydrogeological simulation model successfully.