Super regional groundwater flow modelling of Eastern Småland– Conceptual background and plans for numerical simulations. - Lars O. Ericsson

An ongoing project, financed by SKB, comprises numerical modelling of groundwater flow for a large-regional model which covers several drainage basins in Eastern Småland using available hydrogeological data on hydraulic properties, processes and boundary conditions. The modelling of flow paths, flow rates etc will be based on simulated present-day flow conditions, and the main purpose is to examine how the natural flow pattern may develop depending on different assumptions on, but reasonable site specific, hydrogeological conditions. The Geological structural model of possible deformation zones and rock type model, is based on recent (2005) interpretations of SGU (Swedish Geological Survey). These interpretations will be the base for the geometrical framework for the regional groundwater flow model of the bedrock. Distribution of Quaternary deposits is also based on SGU information and water divides and watercourse data is based on data from SMHI (Swedish Meteorological and Hydrological Institute).

The main objectives are to:

- Evaluate conceptual simplifications and model uncertainties coupled to super-regional groundwater flow modelling.
- Perform an in-depth and unprejudiced analysis of super-regional flow conditions in Eastern Småland.

Assessments of the *uncertainties related to the recharge and discharge pattern and the groundwater flow paths* are the main tasks. Concerning the hydraulic properties and other hydrogeological conditions, the role of the assumptions made by the modellers should be commented and, if possible, tested by sensitivity analysis.

The main objective implies a testing of different conceptual conditions:

- *geometrical alternatives* in the structural geology, dykes, rock domains
- *variants in boundary conditions*, and
- *parameter uncertainties* (i.e., uncertainties in the hydraulic property assignment).

The modelling has two main parts: 1) Freshwater simulations – steady state - A number of base cases are defined with an increased complexity for each base case. 2) Density dependent simulations - Transient simulation of some cases, starting after last glaciation.