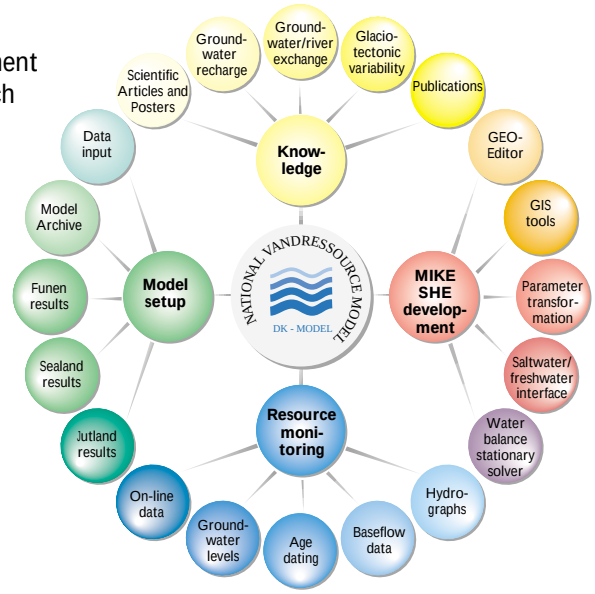
NATIONAL WATER RESOURCES MODEL (DK-MODEL)

Location: Denmark

Client: Ministry of Environment and Energy

Partners: DHI, Institute of Water and Environment
NERI, National Environmental Research Institute

Period: 1996-2000



The project has 4 main objectives:

- **Knowledge:** Understanding of the processes controlling groundwater recharge and parameter quantification. This includes a.o. a Ph.D. study in groundwater recharge processes, incorporating variability in glacio-tectonics and a better understanding of aquifer-river exchange processes.

- **Model setup:** Set-up of a physical based MIKE SHE /MIKE 11 hydrological modeling system using a grid size of 1 km^2 and a vertical discretization into 9-16 layers in order to describe groundwater recharges to both shallow and deep aquifers. The major flow processes of the entire land phase of the hydrological cycle is included.

- **Resource monitoring:** Reorganization and optimization of the national groundwater level monitoring network with 12 new on-line station and 35 stations equipped with dataloggers.

- **MIKE SHE development:** Further development, implementation and testing of the MIKE SHE system. Four new models will be developed for MIKE SHE: a geoeditor for preprocessing of 3-D geological models based on well-log data and geophysical data, new GIS tools including an unsaturated zone editor (UZ editor), a finite element solver for MIKE SHE in order to allow further discretizations of calculation network along rivers and groundwater abstraction wells, and a salt-water/freshwater modul by implementing HST3D.

Description

Previously, it was thought that the groundwater supplies in Denmark were well protected from pollution due to the depth of the groundwater reservoirs and the thickness of overlying clays. However, the weaknesses of this philosophy have during recent years been heavily exposed, primarily caused by the detection of an increasing amount of contaminants like pesticides in groundwater. The limitations that the increasing contaminant load sets on the exploitation of the groundwater resources put at the same time additional focus on the size and distribution of the resources. The Department of Hydrology therefore was contracted by the Minestry of Environment and Energy to develop and apply a water resources model for the entire country (45,000 km^2) during the period 1996-2000. Furthermore the idea is, by combining the DK-model with results from the groundwater level monitoring network, to integrate the monitoring of resources in the groundwater quality monitoring program, in order to assess the Danish water resources with respect to quantity, quality and protection.

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