UNCERTAINTY ASSESSMENT OF EXISTING 3D GEOLOGICAL MODELS

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Uncertainty assessment is an important part of the 3D geological modelling process regardless if the output of the modelling is a cognitive model or a stochastic model. Reuse of existing 3D geological models is common; however, an uncertainty assessment may not have been carried out or lost.

A procedure for evaluating the uncertainty of existing geological or hydrostratigraphic models is presented. The need for such a procedure emanates from work on uncertainty assessment of the National Water Resources Model for Denmark, the "DK model". The hydro¬stra¬tigraphic model, used by the DK-model is constituted by multiple models made by different consultants during the Danish groundwater mapping campaign. Due to differences in economy, prioritization, modeller skills, amount and quality of data, geological complexity etc., the quality of the models varies significantly. Therefore, a procedure assigning point-specific uncertainties to each layer in this hydrostratigraphic model is developed, where all the relevant sources of information about the subsurface available at the modelling time are considered.

The main sources of information are the national databases for geological and hydrological information, Jupiter, and geophysical data, GERDA. Furthermore, information on model and borehole quality have been incorporated to guide the uncertainty evaluation.

Simple quality assessment of the lithological borehole information and depth dependencies are used quantifying borehole standard deviations whereas resolution, footprint and penetration depth estimate of available geophysical data are used quantifying standard deviations of each type of geophysical data. The lateral extent of the information from a given source of information will be controlled by the geological complexity at the given position.

The point-specific uncertainties will be used to define an interval, where the models might differ from the original static model and subsequently produce an ensample of geostatistical realizations within the estimated standard deviations.