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H41H-01**The Importance of Geological Uncertainty for Flow and Transport Modelling***** Refsgaard, J***jcr@geus.dk**Geological Survey of Denmark and Greenland (GEUS), Øster Voldgade 10, Copenhagen, DK-1350, Denmark***Højberg, A L***alh@geus.dk**Geological Survey of Denmark and Greenland (GEUS), Øster Voldgade 10, Copenhagen, DK-1350, Denmark***Troldborg, L***ltr@geus.dk**Geological Survey of Denmark and Greenland (GEUS), Øster Voldgade 10, Copenhagen, DK-1350, Denmark***Sonneborg, T O***tso@geus.dk**Geological Survey of Denmark and Greenland (GEUS), Øster Voldgade 10, Copenhagen, DK-1350, Denmark*

The impact of geological uncertainty has during the past decade been studied extensively in Denmark by establishing alternative conceptual models, each representing a plausible geological interpretation, and use these multiple conceptual models to construct multiple groundwater models of the same area. Four published case studies will be reviewed. The cases comprise groundwater modelling for areas ranging from 300 km² to 1000 km² with various types of glacial geological settings including multi aquifer systems and buried valleys. The modelling studies have included simulations and uncertainty assessments of groundwater head, groundwater recharge, location of well capture zones, groundwater age and concentrations of environmental tracers. All studies had multiple geological models, while one study compared the impacts of conceptual uncertainty versus parameter uncertainty using the Monte Carlo approach, and another study compared deterministic geological models with stochastic realisations generated by TPROGS. A trivial finding from the studies is that possible errors in a conceptual model (wrong geological interpretation) can be compensated through the calibration with respect to simulations of variables for which data are used in the calibration. However, once extrapolation beyond the calibration base is attempted, different conceptual model formulations result in significantly different results. A key conclusion from the studies is that uncertainties in the conceptual model become of increasing importance, when predictive simulations consider data types that are extrapolated from the data types used for calibration. Examples from the four cases will be shown and a discussion of the future perspectives will be given.

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