

Hydrological flood design in Sweden – Climate change and inherent uncertainties

JOHAN ANDRÉASSON, STEN BERGSTRÖM, JONAS GERMAN & KRISTOFFER HALLBERG

Swedish Meteorological and Hydrological Institute, SE-601 76 Norrköping, Sweden
johan.andreasson@smhi.se

Abstract A study on the inherent uncertainties in the Swedish guidelines for hydrological flood design, generated by method-specific conditions as compared to different climate signals, has been carried out for the Swedish hydropower industry. The range of method-specific uncertainties covers a variety of conditions. Climate change was considered by use of an ensemble of 16 regional climate scenarios as input to the hydrological runoff model. The results imply that the uncertainty that is caused by differences in the climate change signal is larger than the inherent uncertainties of the hydrological modelling process. The main conclusion is therefore that it really is important to consider climate change in future determinations of design floods for dams. Another conclusion is that there is a need for re-assessments of early design calculations due to advances in hydrological models and calibration schemes.

Key words climate change; dam safety; flood design; hydrological modelling; uncertainties