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Quantifying the impact of model inaccuracy in climate change impact assessment studies using an agro-hydrological model

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Abstract. Numerical simulation models are frequently applied to assess the impact of climate change on hydrology and agriculture. A common hypothesis is that unavoidable model errors are reflected in the reference situation as well as in the climate change situation so that by comparing reference to scenario model errors will level out. For a polder in The Netherlands an innovative procedure has been introduced, referred to as the Model-Scenario-Ratio (MSR), to express model inaccuracy on climate change impact assessment studies based on simulation models comparing a reference situation to a climate change situation. The SWAP (Soil Water Atmosphere Plant) model was used for the case study and the reference situation was compared to two climate change scenarios. MSR values close to 1, indicating that impact assessment is mainly a function of the scenario itself rather than of the quality of the model, were found for most indicators evaluated. A climate change scenario with enhanced drought conditions and indicators based on threshold values showed lower MSR values, indicating that model accuracy is an important component of the climate change impact assessment. It was concluded that the MSR approach can be applied easily and will lead to more robust impact assessment analyses.

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