



Assessing the effect of observed climate change on potential evapotranspiration: A comparison of different models

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Potential evapotranspiration models are very often part of hydrological catchment models to calculate potential evapotranspiration (PET) which then is used to estimate actual evapotranspiration considering the soil moisture status. As many different approaches exist, the question arises in which way the choice of the PET model affects the impact of climate change on the calculated water balance? In the presented study, 18 different PET models were compared with respect to their sensitivity to observed climate change. Long-term climate data of six German climate stations were used to identify changes in the climate data itself and changes in the calculated PET. The results show that all investigated PET models are sensitive to trends in climate data. However, it is also shown that all models show different sensitivities to trends in climate data. The sensitivities to climate trends are as different for similar PET models of the same model type (e.g. the aerodynamic concept, radiation or temperature based approaches and combination equations) as they are within a group of models of different model types. Therefore it can be concluded that PET models should be carefully selected for climate change impact studies if they are part of hydrological models. They should be validated in a regional context before they are applied within a climate change study despite the poor availability of PET measurements.