Geophysical Research Abstracts
Vol. 16, EGU2014-10411, 2014
EGU General Assembly 2014
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Hydrological model uncertainties in climate chance impact studies

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Rainfall runoff models are widely used in modelling possible impacts of climate change on the hydrology of a certain area. While the uncertainties of climate models are well known – and can be quite large – not many studies focus on the variability produced by hydrological models used in climate change studies.
In our study we model possible effects of climate change on the potential of hydropower in alpine European regions. For this purpose we use a simple hydrological model that uses only temperature and precipitation on a daily basis to reproduce the water balance in those areas. Being a semi-lumped model, only five parameters are needed. Potential evaporation is calculated using the Thornthwaite method, while processes regarding snow and ice are taken into account by a temperature index model.
Monte Carlo runs are used to produce a variety of parameter sets leading to good model results. The uncertainties in the discharge caused by these parameter sets then are analysed using simple statistical methods aiming on the potential of hydropower in that areas neglecting the uncertainties of three climate models used (arpege/aladin, remo/ECHAM5 and regcm3/ECHAM5).