Geophysical Research Abstracts
Vol. 20, EGU2018-11676, 2018
EGU General Assembly 2018

Uncertainties in large-scale hydrological projections. A pan European assessment under high-end climate change.

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Hydrologic projection is one of the main challenges of the hydrologic and climate change communities, as they remain highly uncertain especially under high-end climate change [1, 2]. In the present study we examine projections of water availability and stress under high-end climate change (RCP8.5) in Europe as simulated by a land surface model. We compare several commonly used climate impact projections and examine how the methodological differences affect the projections. A set of new high-resolution GCM forced simulations [3] is compared with previous assessments based on climate data of coarser spatial resolutions and fewer ensemble members. Projections are examined for three levels of warming (+1.5, +2 and +4oC), and for three sets of climate models: (a) the ISIMIP GCMs subset of CMIP5, (b) the EURO-CORDEX subset and (c) the new high-resolution atmosphere-only simulations with prescribed SST and sea–ice concentration from a subset of the CMIP5 GCMs. We note that regional climate changes are driven predominantly by the SSTs. We also present implications on the robustness of the conclusions of studies using individual sets of projections used to assess future water availability [4].

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