



Analysis of 21st century droughts from multiple global hydrological and land surface models

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Global hydrological (GHMs) and land surface models (LSMs) have been developed over the last decade to explore changes in the 21st century global water cycle. In the EU-FP6 project WATCH a number of these models have been inter-compared for the 20th century (2nd part) using a new re-analysis dataset (WATCH Forcing Data). Next the models were fed with forcing data for the 21st century (downscaled, bias-corrected output from 3 GCMs and the A2 and B1 scenarios). The GHMs and LSMs were run for the land points from the globe at a resolution of 0.5 degrees. In this study spatio-temporal characteristics of future hydrological droughts derived from a number of GHMs and LSMs have been analyzed and inter-compared. Droughts in monthly gridded runoff have been identified by using a monthly variable threshold. The non-contiguous drought area (NCDA) method was applied for calculation of the temporal evolution of the area in drought, and the contiguous drought area (CDA) method for recognition of spatial drought events. Results for the control period (1970-2000) and the future (2070-2100) were compared to assess the impact of projected climate change. In addition to the exploration of drought in runoff, we compared locations and extent of so-called dry areas (areas with zero flow in 80% of the time). Initial results show important changes of droughts under the A2 scenario in the periods analyzed with an increase in dry areas and increase in the number of drought events.