IMPACTS OF CLIMATE CHANGE ON DROUGHT IN MEUSE BASIN

A NEW METHOD TO ASSESS THE IMPACTS OF CLIMATE CHANGE ON DROUGHT BASED ON OUTPUT OF REGIONAL CLIMATE MODELS

Climate changes will likely affect drought. The occurrence of drought and its severity are mainly influenced by precipitation and evapotranspiration. It is expected that climate change will affect these variables. Since drought is a phenomenon that can affect the environment and industrialized and economically well-off regions like Europe, it is important to assess the possible changes in drought. However the magnitude of climate change is uncertain and therefore the impacts of climate change on drought as well. Different climate models will produce a different result, contributing to the uncertainty in the analysis. Different emission scenarios will result in different impacts on drought. All climate models were run with the same emission scenario and therefore the uncertainty in the impact analysis is underestimated.

The Standardized Precipitation Index (SPI) is applied to identify drought at multiple time scales and therefore different types of drought are assessed. In this research meteorological, agricultural and hydrological drought is taken into account. All drought indicators combined will reveal the number of drought events and their characteristics. Furthermore the spatial and temporal variability is assessed. The quality of the climate models to simulate drought is assessed by comparing the simulated value of multiple drought indicators with the observed value. Based on the error a weighted average is constructed to create a best estimate of the projected impact of climate change for two future periods in the 21st century in the Meuse basin. Figure 1 shows one of the drought indicators for the impact analysis. The weighted average shows for each time scale an increase in the number of drought events. The individual projections show the range and thus partly the uncertainty in the weighted average.

Overall it seems that the RCMs have difficulty in simulating the observed drought. Furthermore it seems that a more temporal variable climate than observed is simulated. The impact analysis showed that it is likely that for all time scales there is an increase in the number of drought events and an increase in duration, deficit and intensity of these events. Furthermore the spatial extent of these events will increase as well. The magnitude of these impacts is large (more than 10%) for the end of the 21st century large impacts of climate change on drought in the Meuse basin are projected.

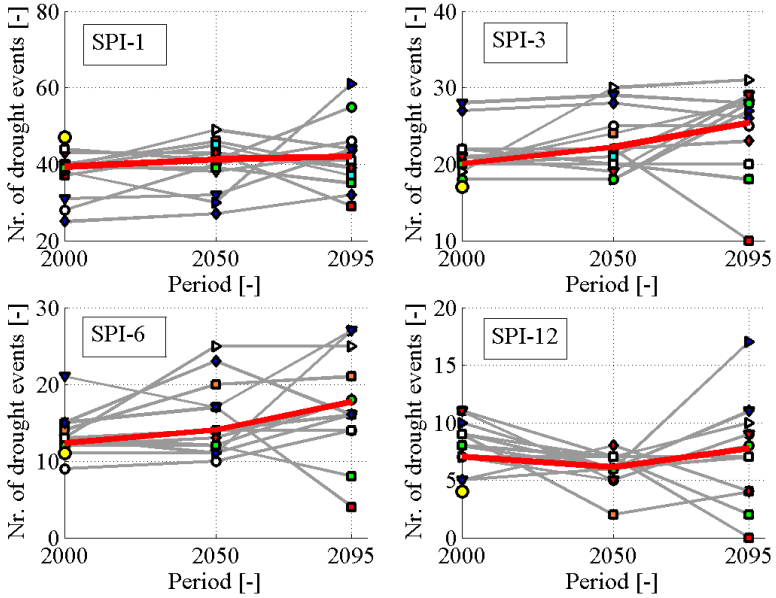

Figure 1: For different time scales the number of drought events in the basin is shown for the historical period and two future periods. The yellow dot shows the observed value. The red line shows the weighted average, the other symbols show the projections of different climate models.

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