



## Assessment of Trends of Drought in China from CMIP5

Xiaoli Yang, Liliang Ren, Yi Liu, Mingwei Ma, Xuerong Cheng, Shanhu Jiang, and Fei Yuan

Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai University, China (yangxl@hhu.edu.cn)

Droughts are becoming the most expensive natural disasters in China and have exerted serious impacts on local economic development and ecological environment. With the global warming, the frequency and density of drought are showing increasing over China. The fifth phase of the Coupled Model Intercomparison Project (CMIP5) shows that the temperature will increase about  $0.7^{\circ}\text{C}/10$  annual and the area-averaged annual mean precipitation will be increasing under highest RCP scenarios. The main objective of this study is to evaluate the drought trends with the estimation of the Palmer Drought Severity Index (PDSI) and Soil Moisture Index (SMI) in the future over China. In order to do this, the downscaled precipitation and temperature time series from CMIP5 are used as input forcing data of the Variable Infiltration Capacity (VIC) model. The Change trends and temporal-spatial characteristics of the simulation results from the CMIP5 models and VIC model are analyzed over seven climate regions as well as at whole country level. The trends of drought in 21st century over China based on the PDSI is analyzed with the output of CMIP5 models from 1950 to 2099. The SMI is estimated from the VIC soil moisture simulation with a spatial resolution of  $0.5^{\circ}\times 0.5^{\circ}$  from 1950 to 2099, which is forced by the statistics downscaled output of CMIP5 models. The Mann-Kendall (MK) method is used to analyzing the trends of drought occurrence in seven climate regions and whole China. The results show that the drought will be more seriously in the 21st century than that in 20th century over the whole China with the increasing of temperature. Furthermore, most areas of China will become drier in 21st century based on the analysis results of PDSI and SMI. Especially, southwest of China is projected to experience more severe drought in the future than any other part of China.