P23 Future changes of precipitation, temperature and evapotranspiration for the Continental United States.

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Climate change affects the environment and hence, the quality of natural resources. Rainfall, temperature and evapotranspiration are major parameters of the climate state that affects the environment (Kundu et al. 2017). Apart from these, extreme precipitation intensities have increased in all regions of the Continental United States (ConUS) and are expected to further increase with warming at scaling rates of about 7% per degree Celsius (Trenberth et al. 2003). This increase could result in significantly greater flash flood hazards (Prein et al. 2016).

In the present work, we use the Pseudo Global Warming (PGW) method to create forcing data representative of the future climate for the period from 2070 to 2090 (under RCP8.5 and RCP4.5) scenarios. A current climate simulation for the ten-year period (2008 to 2017) is performed using forcing data from GFS. We perturb the lateral boundary conditions derived from GFS with high-end scenario (RCP8.5) CCSM4 data (http://rda.ucar.edu/datasets/ds316.1/). The PGW method in combination with spectral nudging, avoids the introduction of internal climate variability that could otherwise substantially influence climate change analyses of decadal-long simulations. It still allows the model to adjust for potential inconsistencies from domain-internal climate change forcing.

All simulations are performed with the Weather Research and Forecasting (WRF-ARW) model using a horizontal grid spacing of 12 km covering ConUS. The modulation of precipitation, temperature and evapotranspiration from the current climate to the future climate time periods is analyzed and presented. The impact and variation in these parameters due to climate change might have an impact on water resources and would help in future planning and management.

References

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