

Projected Changes in Heavy Precipitation over North America in CMIP5 Climate Model Simulations

Anthony DeAngelis (Department of Environmental Sciences) and Anthony Broccoli (Department of Environmental Sciences)

Coupled atmosphere-ocean climate models from the Coupled Model Intercomparison Project Phase V (CMIP5) are used to study projected changes in heavy to extreme daily precipitation over North America between the late 20th century and late 21st century under the RCP8.5 emissions scenario. Results show that heavy precipitation increases over much of North America between the late 20th and 21st centuries, with generally larger increases at higher latitudes and near the Atlantic and Pacific coasts. During summer, increases in heavy precipitation are confined to very high latitudes, while only small changes in heavy precipitation occur elsewhere. Heavy precipitation decreases in intensity and frequency over some low latitude regions during certain seasons. We also investigate local changes in the distribution of daily precipitation events and the inter-model variability of such changes in the CMIP5 simulations. Furthermore, we investigate the sensitivity of extreme precipitation to surface warming to see if projected increases in extreme precipitation are governed by atmospheric water vapor constraints. A composite analysis of the atmospheric circulation associated with extreme precipitation events is also used to see if changes in the large scale atmospheric dynamics are associated with changes in extreme precipitation at specific locations.