

# CGD SEMINAR



**DATE:** Tuesday 25 February, 2020

**TIME:** 11 am – 12 pm

**LOCATION:** NCAR, Table Mesa Drive  
Main Seminar Room

**TITLE:** Two aspects of precipitation simulated in two very different MIPs

**SPEAKER:** Angeline Pendergrass, NCAR

Precipitation is tightly coupled with atmospheric circulation, the land surface and biosphere, the cryosphere and the ocean. Extreme wet and dry precipitation events are key drivers of climate impacts. But modeling precipitation is hard because of the many scales it spans, from droplets to the Earth's energy budget, and beyond; and also, because of the many processes that must be represented, whether implicitly or explicitly, to simulate it accurately. Climate scientists want to understand precipitation to capture variability of the aspects of the climate system to which it is coupled. Society wants to know what drives the precipitation they see and what precipitation will be like in the future so people can decide whether and how to deal with it.

In this talk I will share results from two ongoing projects. First: the response of global-mean precipitation, also called hydrologic sensitivity, to increasing carbon dioxide in CMIP6. Previous work has argued that global-mean precipitation change is linked to equilibrium climate sensitivity. Some CMIP6 models have higher climate sensitivity than any CMIP5 models did. Does hydrologic sensitivity change as well? If so, how? And, what can we say about why? We will also revisit two emergent constraints for global-mean precipitation change that were identified in CMIP5, which argued that global mean precipitation should be lower than projected by climate models. Treating CMIP6 as an out of sample test, we will see how robust these emergent constraints are.

While it is appealing to understand the relatively fundamental connection between global warming and precipitation change, we don't live in the global mean. So it's also important to try and understand the mutual influences between precipitation and atmospheric circulation that are more relevant on regional scales. The second project I will discuss focuses on one of the Earth's most prominent precipitation phenomena: the Inter-Tropical Convergence Zone (ITCZ) - specifically, its width. Recent work has extensively examined the location of the ITCZ, and how it can vary and change with warming. But model projections of global warming indicate a decrease in the width of the ITCZ with warming, and observations show that this is already occurring in some basins. An informal model inter comparison project is working to improve our understanding of the effects of changing ITCZ width: ITCZ-MIP. In this MIP, we have developed a protocol to force the width of the ITCZ to change. I will discuss protocol development and preliminary results from a first set of simulations.

**Live webcast:** <https://www.ucar.edu/live>

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