

# CGD Seminar Series

## What should we expect for the future of North American hydroclimate?

Isla Simpson

NCAR

**Date:** Tuesday, 8 February 2022

**Time:** 11am – 12pm

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*For live stream information, visit the*

*CGD Seminar Webpage*

### ABSTRACT

A critical question to address as the planet warms under anthropogenic greenhouse gas emissions is, how is regional hydroclimate going to change? The US southwest has already experienced considerable aridification since the turn of the century and was plunged into exceptional drought conditions over the course of 2020 and is yet to recover. Such long-term trends punctuated by extreme events bring to the fore the importance of understanding the role of anthropogenic climate change in observed changes and in quantifying how anthropogenic climate change is expected to alter regional hydroclimate in the future. In order to address this problem using Earth System Model (ESM) projections, we must accurately simulate both atmospheric circulation projections and local land-atmosphere coupling processes with fidelity. This presentation will begin with an assessment of the drought conditions of 2020 and quantify the role of anthropogenic climate change in this event, together with our current state of understanding of future projections for the region. It will then explore the origins of inter-model spread and uncertainty in two important aspects of North American hydroclimate change. The first is the wintertime projections for the large-scale atmospheric circulation which impact on precipitation. It will be shown that advances in the modelled representation of the large-scale circulation have reduced our uncertainty and altered our hydroclimate projections, in-line with expectations. The second is an apparent discrepancy between modelled and observed historical trends in atmospheric vapor pressure which, while still to be fully understood, leads us to question the fidelity of our modelled representation of land-atmosphere coupling processes and motivates a need for rapid improvement in our understanding of this issue so that we can have faith in future hydroclimate projections provided by ESMs.

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