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CGD Seminar Series

Atmospheric rivers in a changing climate: characteristics and uncertainties from the Atmospheric River Tracking Method Intercomparison Project (ARTMIP)

Ashley Payne

University of Michigan

Date: Tuesday 12 October 2021

Time: 11am – 12pm MT

For Zoom information, please contact Tracy Baker tbaker@ucar.edu

For live stream information, visit the CGD Seminar Webpage

ABSTRACT

The Atmospheric River Tracking Method Intercomparison Project (ARTMIP) is an international collaborative effort to understand and quantify the uncertainties in atmospheric river (AR) science based on the use of different methods for identifying and tracking ARs. Many AR detection techniques are currently employed for a number of purposes, and the literature reports a wide range of conclusions based on these techniques. The goals of the recently completed first phase of ARTMIP, Tier 1, were to quantify differences in AR metrics, such as frequency and seasonality, intensity, duration, and precipitation attributable to ARs through the application of all algorithms to MERRA-2 reanalysis. The second phase of the project, Tier 2, will focus on addressing specific science questions, such as sensitivity to reanalysis product and climate change topics, that may benefit from the application of an ensemble approach.

We present results from the first of a series of Tier 2 projects. In this study, we use an ensemble of AR labels from a large number of detection algorithms applied to high resolution (0.25-degree, 3-hrly) climate change simulations from the International CLIVAR C20C+ Detection and Attribution Project. Changes in the character and variability of ARs are explored in two climates: (1) the historical period (1979 - 2005) and (2) end-of-the-century RCP 8.5 (2079 - 2099); specifically addressing the role of changes in the large-scale circulation in shifting the patterns of landfall and implications for precipitation extremes. We will also discuss the development of metrics to quantify changes in the characteristics of ARs across various methodologies in future climate scenarios. We explore the role of algorithm restrictiveness and significance for AR-related responses to warming.