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Disentangling warming and circulation influences on precipitation under global warming

DATE: Thursday, February 20, 2025

TIME: 11:00 AM – 12:00 PM MT (VIRTUAL)

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SUMMARY: As greenhouse gas concentrations increase, surface temperatures rise, and hydroclimate patterns, including precipitation, shift. Making confident precipitation projections is challenging due to large internal climate variability and the small spatial scales on which precipitation processes occur. Furthermore, climate models have biases in large-scale circulation variability that can lead to precipitation biases. I will discuss two methods to understand better and quantify mid-latitude precipitation change in Earth system models (ESMs) in this presentation. We statistically decompose precipitation change into its thermodynamic and dynamic contributions in the first method. In the second method, we utilize idealized ESM experiments to quantify the thermodynamic contribution alone on precipitation. We specifically ask what the impact of warming on mid-latitude precipitation change would be when the large-scale circulation is constrained to historical observations.

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