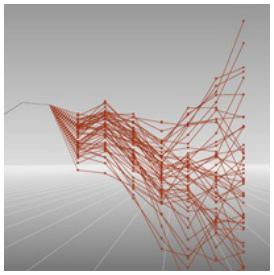

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Bridging the Gap between Weather and Climate Prediction using Multi-model Ensembles

Thursday, 5 September 2019 10:00 (50 minutes)

Skillful, useful predictions of the climate system beyond the deterministic limits of weather must be built on a basic scientific understanding of predictability and the physical processes giving rise to predictability. Rigorous evaluation of prediction systems is also necessary to understand our current prediction capabilities and identify avenues for improvement. Finally, prediction capabilities must align with what users need to make decisions regarding risk reduction and disaster preparedness, public health, energy, water management, agriculture, marine fisheries, and many other applications.

In this presentation, I discuss the use of two multi-model ensemble prediction projects to investigate questions about predictability and prediction on subseasonal (2-4 weeks) to seasonal (1-month to a year) timescales. The North American Multi-model Ensemble (NMME) and the Subseasonal Experiment (SubX) provide retrospective and real-time forecasts for monthly-to-seasonal (NMME) and subseasonal (SubX) timescales. For seasonal predictions, the NMME provides insight into how well we understand the upper limit of predictability for the El Niño Southern Oscillation, temperature, and precipitation. Results demonstrate that there are significant challenges to estimating predictability, and that a multi-model approach is needed to get a full picture of the limit of predictability. Our understanding of subseasonal prediction capabilities is less mature than for the seasonal timescale. Despite gains from using the full SubX multi-model ensemble, skill for temperature and precipitation is generally low, emphasizing the need to identify forecasts of opportunity and better understand the phenomena and processes that give rise to predictability at these timescales. The Madden-Julian Oscillation and the North Atlantic Oscillation, two sources of subseasonal predictability, are also evaluated.

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