ABSTRACT:

This talk will formulate uncertainties in regional climate projections as a two-axis problem: (1) time axis, and (2) space axis. I will show that uncertainties on the time axis are significantly greater than uncertainties on the space axis. I will present results from 19 CMIP5 climate models (comprising a total of 96 ensemble members), for long-term temperature trends at global and regional scales. For detailed investigation of regional climate uncertainties, I will introduce the concept of long-term persistence (LTP), typically known as ‘Hurst Phenomenon’ in the hydrology.

I will examine the “warming hole” in the eastern United States as a specific example of regional climate uncertainties. We find that the observed negative temperature trend in the eastern United States is not a statistically significant trend, and it is a part of LTP phenomenon. We also found that the observed temperature trend variability (30-years running trend) in the eastern United States is significantly correlated with the North-Atlantic Multi-decadal Oscillations (AMO) over the 20th century.

The role of natural climate variability is further examined within the context of climate change. We find that a linear combination of AMO (from observations) and the multi-model/ensemble median climate change signal (from CMIP5 models) provides a better explanation of observed temperature trends in the eastern United States than any of the individual CMIP5 climate simulations, the CMIP5 median, or an AMO only model. Finally, I will put forward ideas as to how this analysis could be helpful in reducing uncertainties in the 21st century climate projections at regional scales.

Seminars are live webcast: http://www.fin.ucar.edu/it/mms/ml-live.htm

* Refreshments are served before seminar. *

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