Understanding Tropical – Extratropical Interactions and the MJO

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The Madden-Julian Oscillation provides a dominant source of intra-seasonal tropical diabatic heating which both forces remote mid-latitude responses and is in turn affected by these responses. In order to separate the MJO-forced evolving signal from mid-latitude chaos, having a conceptual framework for that signal is necessary. Since the diabatic heating is not stationary, but propagates with a variety of phase speeds, it is not clear that the established paradigm of the remote response to stationary heating is entirely appropriate, even if time lags are take into account. Recent work on the response to transient tropical heating suggests a more nuanced conceptual model.

In this talk I review observational and modeling evidence that supports both the traditional and modern approaches, and try to reconcile the two. The effects of MJO forcing on the North Atlantic boreal winters circulation regimes will be discussed, as well as its dependence on the phase speed of MJO heating. Additionally, the feedback of the subtropical and mid-latitude responses onto the MJO itself will be discussed.