

Special Seminar

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Visiting from the University of Oklahoma

**Assessment of the Relationship between the QBO
and Organized Modes of Tropical Convection**

Hosted by Eric Maloney

**2 p.m. Thursday, Aug. 8
ATS 101**

Internal atmospheric variability within the tropical troposphere and stratosphere such as the Quasi-Biennial Oscillation (QBO) and the Madden Julian Oscillation (MJO) are known to provide predictability on seasonal to sub-seasonal timescales. Previous studies have shown that the Madden-Julian Oscillation (MJO) convective activity increases when QBO wind becomes easterlies in the lower stratosphere during boreal winter, but the physical mechanism behind their relationship is not well understood. To provide further insights on the MJO-QBO relationship, this study tests whether the relationship between the QBO and MJO extends to other modes of organized tropical convection. Our analysis shows that the QBO does not have any significant relationship with other modes of variability such as convectively coupled equatorial waves (CCEWs). These results highlight that any hypothesis on physical or dynamical mechanisms of the relationship between the QBO and MJO must be able to explain the singularity of their relationship and its seasonal dependence. This study suggests that top-heaviness of vertical velocity associated with the MJO is important for its relationship with the QBO. The MJO has the most top-heavy profile of vertical velocity during the boreal winter. The top-heaviness of the MJO vertical velocity supports the importance of the radiative destabilization mechanism by which the MJO responds to QBO-induced changes in the upper tropospheric static stability.

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