

**M.S. Defense Announcement**  
**Kirsten Mayer**  
**Monday, September 30 at 9:00 a.m.**

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September 30, 2019  
9:00 a.m.

Defense  
ATS Large Classroom (101 ATS)

Post Defense Meeting  
Riehl Conference Room (211 ACRC)

Committee:  
Elizabeth Barnes (advisor)  
Eric Maloney  
Chuck Anderson (Computer Science)

Midlatitude Prediction Skill Following QBO-MJO activity on Subseasonal to Seasonal Timescales

The Madden-Julian Oscillation (MJO) is known to force extratropical weather days-to-weeks following an MJO event through excitation of Rossby waves, also known as tropical-extratropical teleconnections. Prior research has demonstrated that this tropically forced midlatitude response can lead to increased prediction skill on subseasonal to seasonal (S2S) timescales. Furthermore, the Quasi-Biennial Oscillation (QBO) has been shown to possibly alter these teleconnections through modulation of the MJO itself and the atmospheric basic state upon which the Rossby waves propagate. This implies that the MJO-QBO relationship may affect midlatitude circulation prediction skill on S2S timescales. In this study, we quantify midlatitude circulation sensitivity and prediction skill following active MJOs and QBOs across the Northern Hemisphere on S2S timescales through an examination of the 500 hPa geopotential height field. First, a comparison of the spatial distribution of Northern Hemisphere sensitivity to the MJO during different QBO phases is performed for ERA-Interim reanalysis as well as ECMWF and NCEP hindcasts. Secondly, differences in prediction skill in ECMWF and NCEP hindcasts are quantified following MJO-QBO activity. We find that regions across the Pacific, North America and the Atlantic exhibit increased prediction skill following MJO-QBO activity, but these regions are not always collocated with the locations most sensitive to the MJO under a particular QBO state. Both hindcast systems demonstrate enhanced prediction skill 7-14 days following active MJO events during strong QBO periods compared to MJO events during neutral QBO periods.