

# Variations in Vertical Structure of the MJO Associated with the QBO

Harry H. HENDON<sup>1</sup>, Abhik SANTRA<sup>2</sup>

<sup>1</sup> *Bureau of Meteorology, Melbourne, Australia*

<sup>2</sup> *Monash University, Clayton, Australia*

The MJO during boreal winter is stronger and propagates eastward farther into the western Pacific during the easterly phase of QBO. The mechanism by which the QBO acts to modulate the MJO has yet to be revealed. Using atmospheric reanalyses for 1980-2012, we show that the positive tropospheric temperature anomaly driven by MJO-convection extends deeper into the troposphere on its western flank during the easterly phase of the QBO. The overriding cold cap at the tropopause is also stronger. These temperature anomalies combine to destabilize the upper troposphere more in-phase with MJO-convection, thus acting to destabilize deep convection. This enhanced destabilization is promoted by the negative temperature anomaly at the tropopause during the easterly phase of the QBO. These findings can account for the enhanced strength and eastward extension of the MJO during the easterly phase of the QBO, but await confirmation by theoretical and modelling studies that can isolate these effects.

Key words: MJO, QBO