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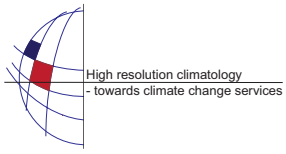

Rossby Wave Breaking and Large-scale Flow Modulations in Conjunction with the Madden-Julian Oscillation

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The Madden-Julian oscillation (MJO) is the dominant source of intraseasonal variability in the tropics. Its impacts, however, are felt on a global scale: significant anomalies in the non-tropical flow field and tropopause-level wave breaking have been diagnosed in observational data. Given the complexity of wave-mean flow interactions, however, it is difficult to determine the precise dynamical mechanisms that result in the observed flow and wave breaking anomalies.

This study involves a symbiosis of ECWMF Re-Analysis data and idealized numerical simulations to better understand the dynamical processes at work. The former is used to diagnose the observed variability, while the latter is designed to study the system in a simplified, controllable setting.

For the idealized simulations, the ECMWF dynamical core is run in a Held-Suarez setup (with orography) to mimic a realistic climatological state. Upon this basic state, a bogus MJO is introduced via a diabatic term in the thermodynamic equation. In this way, it is hoped the impact of the migratory tropical heating can be somewhat isolated and a subsequent comparison between the observational and model results will lend considerable insight into the response of the non-tropical atmosphere to an evolving MJO event.