

EGU25-13822, updated on 20 Feb 2026  
<https://doi.org/10.5194/egusphere-egu25-13822>  
EGU General Assembly 2025  
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## Normal mode interactions in the Madden Julian Oscillation envelope

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The Madden Julian Oscillation (MJO) is the dominant element of the atmospheric variability in the tropics on intraseasonal zonal timescales. The MJO manifests itself as a slowly eastward propagating envelope coupling large scale circulation and convection. Despite recent progress in the understanding of the MJO, a comprehensive theory of the MJO is still missing, partly due to its complexity associated with moist physics and nonlinearity.

Here, we use a normal mode decomposition of atmospheric reanalysis datasets to show that the MJO can be understood in terms of a superposition of interacting Rossby, Kelvin and inertio-gravity modes. We discuss the nature of the interaction between these modes, which can be either linear, due to large-scale variations in the moisture, or simply due to the inherent nonlinearity of the equations of the atmosphere.