

Changes in MJO propagation speed across different tropical regions

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The Madden-Julian Oscillation (MJO) is a crucial atmospheric phenomenon characterized by large-scale, eastward-propagating disturbances in the tropical atmosphere. It profoundly influences global climate and weather patterns and serves as a key source of predictability for subseasonal forecasts. In particular, the propagation speed of the MJO is a critical parameter that impacts the timing and intensity of its effects. Variability in this speed can alter the MJO's interaction with other climate components, thereby affecting weather patterns. Therefore, it is essential to investigate the variability of MJO propagation speed.

In this study, we aim to examine the changes in MJO propagation speed across three primary regions (Indian Ocean, Maritime Continent, western Pacific) where the MJO propagates and compare these changes over two different period (P1: 1979–1998, P2: 2003–2022). Additionally, we will investigate the mechanisms behind MJO speed variations and explore potential future changes in propagation speed using reanalysis data and model outputs. By addressing these questions, this study can contribute to enhance the predictability and accuracy of climate models in representing the MJO.

Key words: Madden-Julian Oscillation (MJO), propagation speed, vertical structure