

# **The Influence of Madden-Julian Oscillation on the Characteristics of African Easterly Waves**

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## **Abstract**

The impact of Madden-Julian Oscillation (MJO) on the characteristics of African easterly waves (AEWs) in summer (July-September) during 1979-2014 is investigated. Real-time Multivariate MJO index (RMM) is used as the proxy to track MJO activity. Consistent with previous findings, convection over West Africa is enhanced during RMM phase 8 and 1-3 and suppressed during RMM phase 5-7. The wave activity evaluated as 2-10-day filtered eddy kinetic energy (EKE) shows enhanced activity during RMM phase 1-3 and suppressed during 5-7. Associated with the enhanced convection and circulation of the MJO, the African easterly jet strengthens during RMM phase 8, 1 and 2, which provides more unstable environment for AEW growth.

A simple algorithm based on 700 hPa relative vorticity is developed to track the AEWs. Of all the identified 611 waves, 53% occur in active MJO phases. In particular, RMM phase 2 and 5 makes up 17% and 15%, after the leading 22% of RMM phase 1. The AEW categories in terms of intensity demonstrates that more intense waves tend to occur during RMM phase 1,2, and 4 while more weak waves during the other RMM phases. More detailed probability distribution (PDF) of intensity shows that while PDF remains similar in both MJO-active and MJO-inactive periods, the PDF varies considerably across different RMM phases. The mechanism of how the MJO modulates the number and intensity in each RMM phases requires further investigation.