

# Evolution and Impacts of Extreme MJO Events

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The Madden-Julian Oscillation (MJO) is an eastward equatorially propagating mode with a strong influence on the precipitation in the tropics on sub-seasonal timescales. Although, several studies have widely analysed the MJO, its activation and evolution is not fully understood.

The purpose of this study is to analyze the statistical features of extreme (strongest and weakest) MJO events.

In this study an event takes place when the index amplitude exceeds a threshold. With this, we define the observables of an event; these are, the maximum amplitude, duration and size, which is the sum of the amplitudes along the duration of an event.

We use extreme-value theory to fit the generalized pareto distribution (GPD) to the different distributions of observables and we compare the results to fit a simple power-law tail and other heavy-tailed distributions. In particular, we compare the performance of several advanced extreme-value tools to find the threshold over which the GPD holds. Once extreme events are defined we study their evolution and impact based on the phase of initiation.