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How do families of MCSs organize in time and space?

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Mesoscale convective systems (MCSs), long-lived clusters of convective cells spanning more than 100 km in diameter, are known to be the dominant source of rainfall in the tropics, and the longest-lived clusters are shown to be largely responsible for tropical extreme precipitation. These systems are known to be organized and maintained by the atmospheric characteristics needed for deep convection (moisture, instability, and lift), and the presence of vertical wind shear, which, however, tends to be very weak in the tropics. (1) MCS-like structures are also shown to "spontaneously"emerge, in idealized cloud-resolving simulations that only include a diurnally oscillating surface temperature, hinting at different organizational mechanisms than the ones mentioned above. (2) In these specific simulations, the MCSs also show a negatively correlated day-to-day spatial "checkerboard"pattern.

We here aim to investigate the patterns of MCSs emerging in observational (satellite infrared) data over the tropics. To shed light on the temporal evolution of potential MCS networks, we use a database of tracked MCSs (3), and try to identify "families"of MCSs that occur in spatial proximity to one other. In this work-in-progress we look for answers to the following questions: Do the MCS families tend toward a more organized state in time?; Can we find any resemblance of the aforementioned simulated patterns?; Can we find any indication of a "preferred"size and distance between MCSs within a family, and is there a difference over land versus over the ocean? By answering these questions we hope to obtain a better understanding of the emergence of long-term clustering in the tropics and its related extreme rainfall.

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