Characteristics of meso-synoptic scale convective systems associated with the MJO observed in CINDY /DYNAMO 2011.

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The present study investigates the characteristic of mesoscale convective systems and their relationship with tropical wave activities and the MJO observed in the Indian Ocean during CINDY/DYNAMO 2011. Analysis of the Doppler radar data over the Gan Island and TRMM data indicate that precipitation systems in mid-late October predominantly have a period of quasi 2 days and the low-level convective (stratiform) precipitation tend to propagate eastward (westward) in the eastern part of the maximum MJO convective signal. The development of the MCS may be attributed to the n=1 Westward inertial Gravity wave. On the other hand, the precipitation systems show a period of 4-6 days for the active phase of the MJO signal after the middle of November. Overall, the precipitation systems move with a background low-level wind and are organized by the vertical wind shear. Several squall lines are formed and propagate eastward. These precipitation system may be involved with n=0 Eastward inertial Gravity wave and Kelvin wave. The results suggest the dominant effect of moisturizing the low-middle atmosphere and momentum transport by the meso-synoptic scale precipitation systems associated with the tropical waves in the MJO phases. Moreover, downwelling ocean Rossby wave observed in October and November 2011 may bring higher SST and higher low-level humidity over the western Indian Ocean than typical La Nina years, which produces favorable condition of convective development. This is why the MJO convective activity is more enhanced over the western Indian Ocean than normal La Nina years.