



Storm morphology of precipitation extremes triggered by synoptic scale low pressure systems: A multi-scale convection affair

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Synoptic-scale convective elements (lows, Depression & Deep Depression collectively called monsoon low Pressure systems; LPSs) embedded within monsoon trough (MT) are the major rain-bearing systems in the core monsoon zone of India. LPSs are associated with multi-scale convective cloud systems in MT region on spatio-temporal scales ranging from storm scales to matured mesoscale convective systems (MCSs). For seasonal accumulated rainfall perspective LPSs are of utmost importance as those contribute major rain fraction but embedded convective storms (CSs) on local scales in the pathway of LPSs precipitate heavily and may cause threat for livelihood. Therefore, our aim is to examine the CSs characteristics associated with the high precipitation events triggered by synoptic LPSs and their interaction with synoptic environment.

Data set developed by Herly and Boos (2015) have been used for Monsoon LPSs. Further, IMD daily gridded rainfall have been used for identification of localized high precipitation events in the radar domain. S-band doppler weather radar observations from a MT region is used for CSs. A Lagrangian-based objective cell-tracking method, Thunderstorm Identification, Tracking, Analysis, and Nowcasting (TITAN), is invoked to volumetric reflectivity measurements to identify and track CSs in space and time. The convective storms identified using the 35-dBZ threshold in TITAN are represented by a two-dimensional envelope after projecting their three-dimensional volume onto the surface. The geometrical properties and intensity of CS such as area, echo top height, maximum intensity, duration, velocity, and direction of propagation are derived by fitting an ellipse defined by its center, orientation, and major/minor radius. ERA5 reanalysis products taken from ECMWF have been used as the representative field variables of synoptic environment.

The salient findings from this work will be presented in the final proceeding of the conference.