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Mesoscale Convective Systems life cycle characteristics from METEOSAT and precipitating estimates derived from TRMM over the monsoon regions

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Our knowledge of the life cycle of the monsoonal convective systems, from a physical point of view (rainfall distribution, latent heating and radiation cooling rate vertical distribution, water transport, shear etc...), mainly arises from individual observational campaigns heavily based on ground radar observations. While this large body of observations enabled the creation of conceptual models of tropical system life cycle, it nevertheless does not reach any statistically significant integrated perspective yet.
For this study, the monsoon convective systems are identified and tracked through a new algorithm called TOOCAN and based on a 3-dimensional segmentation (image + time) of the geostationary IR imagery. This new technique improves the characterization of the evolution of the cold cloud shield associated with convective systems during their life cycle but does not conclude on the evolution of their precipitating structures.
In order to solve this problem, the precipitating estimates derived from microwave measurements on board TRMM are collocated in space and time with the MCS cloud shield. A composite of precipitations along the life cycle of organized cloud systems can then be computed.
The analysis is restricted to the monsoon region and months of the period 2002-2004 and makes use of both METEOSAT-7 at the nominal position and METEOSAT-5 over the Indian Ocean.
The results show that the life cycle of convective systems can be described by three phases: initiation, maturity and dissipation. This conceptual model of MCS is robust over the entire study area. However, the scale factors of this idealized model, display complex regional variability.