



Topology and seasonal evolution of the network of extreme precipitation over the Indian subcontinent and Sri Lanka

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The Indian Summer Monsoon (ISM) is one of the active components of the global climate system, and its behavior and variability is of great interest to climate researchers around the world. Here, we examine the topology and evolution of extreme rainfall across the Indian subcontinent by constructing a complex network of extreme rainfall events in the region for three periods - pre-monsoon (March - May), ISM (June - August), and post-monsoon (October - December). Networks are constructed using a synchronization measure between grid cells for a satellite-derived data set (TRMM) and a rain-gauge interpolated data set (APHRODITE). Through the analysis of various complex network metrics, such as degree, betweenness, and average link length, we describe typical repetitive patterns in North Pakistan, the Eastern Ghats, and the Tibetan Plateau. These patterns appear during the pre-monsoon season, evolve during the ISM, and disappear during the post-monsoon season. Our findings suggest that these are important meteorological features that deserve further attention and may be useful for the prediction of the strength and timing of the ISM.