

Variability of Monsoon Onset in India and Different Modes of Climate Variation (1951-2017)

*Atul Saini¹, Netrananda Sahu^{1,2}

1. Department of Geography, University of Delhi, 2. Disaster Prevention Research Institute, Kyoto University

Monsoon in India plays a major role to play in the survival of the agricultural ecosystem and therefore variability in the amount of rainfall received is a matter of joy or sorrow to different sub-regions in the country. *In the present study, we analyzed the Monsoon onset dates at the sub-regional level in India by identifying the onset date of Monsoon using the objective methodology.* The objective method used to identify the Monsoon onset used NCAR reanalyzed data (2.5° × 2.5°) for zonal wind, meridional wind, geopotential height precipitable water and total cloud cover is used and high-resolution rainfall data (0.25° × 0.25°) obtained from India Meteorological Department. Monsoon onset phenomena are very dynamic and synoptic events play a very important role in changing the general nature of Monsoon onset date in the sub-regions of India, therefore the role of interannual climate variations in certain years is also discussed in detail to justify the connection between climate variation mode and Monsoon onset in India. Monsoon onset behavior in different climate modes is found varying for different regions in India but the majority of the region are found in harmony with the general trend of the Monsoon onset pattern of India. During the considered time period (1951-2017) for study, the region in and around SR15 (Rajasthan province) is found highly susceptible to the Monsoon onset. Results show that the SR17 (Bihar and Jharkhand region) in India is highly prone to early onset during the flood years. We found the late-onset pattern is almost homogenously spread at a pan-India level during El Niño, Drought and Negative IOD and early onset pattern during La Niña and Flood event years. Provinces in North India, which are part of SR19 are found in the influence of El Niño events and therefore in more than 70% of cases, the late onset of more than 5 days is observed in these regions. The intensity of the anomaly of Monsoon onset dates has also been discussed sub-region wise and the probability of the Monsoon onset date for different sub-regions in India is explained in detail, which will definitely be a help for the agronomists, policymakers and planners.

Keywords: Monsoon Onset, El Niño, La Niña, ±IOD, Flood and Drought, Sub-regions

