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Understanding the precipitation characteristics associated with the sub-seasonal variability during the Indian summer monsoon.

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The Indian Summer Monsoon is pivotal in shaping the country's economy and agriculture. While serving as the primary source of annual rainfall, the summer monsoon exhibits sub-seasonal fluctuations characterized by active and break spells. These active (break) conditions can potentially lead to devastating floods (severe droughts) across the Indian subcontinent. The boreal summer intraseasonal oscillation (BSISO) is the most pronounced sub-seasonal variability in the tropics during boreal summer (Kikuchi, K., 2021). The frequency of BSISO events during boreal summer in a year determines the seasonal mean precipitation in the Indian summer monsoon region (Goswami et al., 2006). In this study, we track the precipitation features from satellite observations over the Indian summer monsoon region. The characteristics of precipitation systems, such as the area, orientation, shape, etc., for various threshold values of precipitation will be estimated. Features will be tracked for various daily precipitation thresholds from NASA global precipitation measurement (GPM) integrated multi-satellite retrievals for GPM (IMERG) data having $0.1^0 \times 0.1^0$ spatial resolution for the years 2000-2023 during monsoon season (June to September). For each detected feature, the maximum, minimum, mean precipitation, and the number of grid cells (area) will be calculated. The derived features of the precipitating system will be linked to various phases of the major monsoon sub-seasonal variability, such as boreal summer intraseasonal oscillation (BSISO). For real-time monitoring of BSISO, the indices by Lee et al. 2013 will be used. The long-term changes in the precipitation characteristics related to the BSISO will also be investigated in this study.

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