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Onset, active and break monsoon conditions are important epochs of the monsoon, and they contribute significantly to the Intraseasonal variability of the monsoon. In the study, certain dynamic, thermodynamic characteristics and surface meteorological parameters of the monsoon circulation during onset and break-monsoon conditions are investigated using the National Centers for Environmental Prediction–National Center for Atmospheric Research reanalysis data sets. The statistical significance of these departures is also examined by Student's t -test at the 95% confidence level.

It is found that prior to the onset of the summer monsoon over India, a zone of flux convergence of heat and moisture is noticed over the eastern sector of the Bay of Bengal and this intensifies in the onset and post-onset periods. During onset of the monsoon over India, the horizontal flux convergence of heat and moisture, as well as diabatic heating, are enhanced over the Arabian Sea. The dynamics of the evolution processes are studied over various sectors, such as the Arabian Sea, Bay of Bengal and Indian Peninsula region and it reveals that the low-level kinetic energy, vertically integrated generation of kinetic energy and net tropospheric moisture over Arabian Sea can be used as potential predictors for the prediction of the possible onset date of the summer monsoon over the Indian Peninsula.

The results related to the break phase of monsoon clearly demonstrate a close consistency between dynamic and thermodynamic features during commencement/cessation of break situations along the monsoon trough. A stronger flux convergence of KE in the central Arabian Sea and flux divergence in the northeastern Bay of Bengal are observed during the break period, and this weakens considerably during the pre- and post-break periods. Significant changes in the diabatic heating and in the horizontal flux of heat and moisture are observed in the monsoon trough zone, the central and northwestern Bay of Bengal from pre-break to break and its revival. The reduction in the flux of moisture, horizontal flux of heat and diabatic heating are noticed in the monsoon trough zone from the pre-break to break periods.