

Impact of Synoptic scale events on Intraseasonal Oscillations in rainfall during the Indian Summer Monsoon

B.K.BASU¹

¹NCMRWF, A-50 Institutional Area, NOIDA, U.P., INDIA-201307

For the purpose of rainfall statistics, Indian summer monsoon season is assumed to be of a fixed length of 122 days between 1 June and 30 September. Within this period of four months there are large variations in the precipitation patterns both in space and time. Even the all India averaged rainfall shows large fluctuations in magnitude indicating large amplitude of the intraseasonal oscillations (ISO). The ISO, however, is not consistent in phase across the years and a long term (30 year) average shows only a smooth trend in rainfall.

The presence of a monsoon trough - a part of the inter tropical convergence zone (ITCZ) throughout the season and its north-south oscillation in position, leads to a substantial part of the daily precipitation. Epochs of enhanced precipitation are, however, associated with the presence of synoptic scale systems like lows, depressions and even cyclones forming close to the monsoon trough and moving along it. The extent of the impact of these synoptic systems giving rise to localized enhanced precipitation on the ISO is the aim of the present study.

It was conjectured in the past [1] that more than one-third of the seasonal precipitation during the monsoon season is associated with monsoon depressions and hence the ISO is also governed by the number of these synoptic systems. Recently two successive years (2003, 2004) of good and poor (more than 9% deficit) rainfall had same number (3) of depressions in the whole season. This led us to examine the number of depression formed in the past ten summer monsoon seasons and also the relationship between the number of depressions and the phase and magnitude of ISO. The seasonal total rainfall anomalies were -3%, 2%, 2% [2] during 1995, 1996, 1997 respectively indicating that the occurrence of largest number of depressions in 1997 did not lead to largest seasonal total.

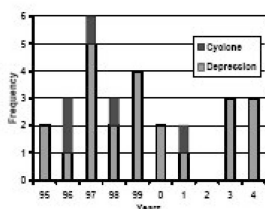


Figure 1. Number of cyclones and depressions formed in last ten summer monsoon seasons.

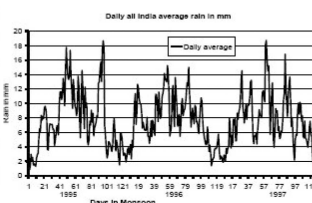


Figure 2. Daily all India rainfall in 1995 to 1997

References

- [1] Y.P.Rao, Southwest Monsoon, Meteorological monograph on Synoptic Meteorology, No. 1, p337 (1976).
- [2] India Met. Dept. Climatological Diagnostic Bulletin of India, No. 34, p15 (2004).