

**Interannual variability of northeast monsoon rainfall over south peninsular
India: Teleconnections and Long range Prediction**

P. Kumar, K.R.Kumar, M. Rajeevan and A.A. Munot
Indian Institute of Tropical Meteorology (IITM), Pune, India
pankaj@tropmet.res.in

The northeast monsoon of Southeast Asia, which is also known as the winter monsoon, is an important source of water for south peninsular India and Sri Lanka during October-December. While the summer monsoon accounts for most of the annual rainfall over a large part of India, the southeast peninsular Indian region falls under a rain-shadow area during this season. Therefore, this region critically depends on the northeast monsoon to supplement the inadequate summer monsoon rainfall. Indeed, in the Tamil Nadu state which is at the core of the northeast monsoon region of India, nearly 50% of the annual rainfall is received during the northeast monsoon season. While the Indian summer monsoon, its variability, teleconnections and prediction have been extensively studied, relatively less attention has so far been paid to the interannual variability of the northeast monsoon. Seasonal prediction of northeast monsoon rainfall, particularly over the core regions of Tamil Nadu and Kerala, has considerable application for decision making in agriculture and water resource sectors. This paper attempts to make a systematic analysis of this aspect of the South Asian monsoon system, with the ultimate aim of developing an empirical seasonal prediction scheme that can provide advance information to the regions affected.

The circulation features during the northeast monsoon season over India develop as a complete reversal from the summer pattern, facilitating low-level air flow from the north towards the Indian Ocean. The associated northeasterlies traversing the Bay of Bengal and entering the southeastern peninsular India and the neighbouring Sri Lanka give rise to copious winter rains. In view of the limited reach of the northeast monsoon over the country, a contiguous region of Indian northeast monsoon region has been delineated, and homogeneous monthly rainfall data sets prepared for analysis of variability and teleconnections, for the period 1941-2000. The area-weighted average Indian North-East Monsoon Rainfall (INEMR) has a long-term mean of 300 mm and standard deviation of 80 mm, accounting for about 26% of the annual rainfall. Various aspects of the spatio-temporal variability of INEMR as well as its possible links with the preceding summer monsoon will be discussed in the paper. In order to systematically investigate the regional/global teleconnections of the seasonal anomalies of INEMR, global data sets of the NCEP/NCAR reanalysis have been used for the period 1958-2000, for several surface as well as upper-air parameters. Based on the spatial patterns of correlation between INEMR and the global parameters, the nature of teleconnections of INEMR has been examined. A set of predictors has then been identified, and the relevant indices prepared, for use in the empirical seasonal forecasting of INEMR. Starting from a large comprehensive predictor set, a stepwise multiple regression approach has been followed to derive a regression model with optimal variance explained and statistical significance. The skill of the model on a small independent data set has also been examined.

Tuesday I (Talk)