Verification of model predicted precipitation over India during the summer monsoon of 1997

B.K.Basu
NCMRWF
Mausam Bhavan Complex
Lodi Road,New Delhi –110 003
INDIA

At the National Centre for Medium Range Forecasting in India a spectral model at T80 resolution is integrated everyday to produce a five-day forecast. The precipitation prediction from this model for the monsoon (1st June to 30th September) of 1997 is verified against the observed values from 1333 rain gauge stations over India. The method followed is to get the area average of observed precipitation, by the Thiessen method, for the grid boxes surrounding the 135 grid points covering India. This area average precipitation values are used for comparison with the model forecasts and standard statistical parameters are computed. Since the observed rainfall is measured as accumulated between 0300 UTC of successive days, the model forecast is accumulated between 0300-2700, 2700-5200, 5100-7500 and 7500-9900 hours of forecasts starting with 0000UTC initial conditions.

The grid box average seasonal precipitation for 1997 shows the three regions of heavy rain, namely the leeward sides of western ghat hill range along the west coast of India, the Khasi and Jayantia hills to the north of Bangladesh and eastern end of the monsoon trough adjoining the head of the Bay of Bengal. A plot of the difference between the 27-hr forecast and observed precipitation shows that the rate of forecast precipitation is higher than that observed over the rain shadow in the lee of the western ghat and also over the monsoon trough area while the forecast rain rate is less elsewhere. The total rainfall, summed over all the grid boxes, is close to observed up to the forecast length of 75hrs.

The correlation coefficient between the 27-hr forecast and the observed precipitation has a magnitude exceeding 0.4 over a large part of central India. Since precipitation is the variable most difficult to predict by numerical modelling, this value of correlation coefficient is encouraging.

The quantities like bias, false alarm rate, threat score etc. that give idea about the skill of the forecast have been computed by dividing the range of precipitation in to classes defined by the India Meteorological Department. Results show that the model predicts precipitation on more number of occasions in the light and moderate category while it under predicts events in the rather heavy, heavy and very heavy categories,
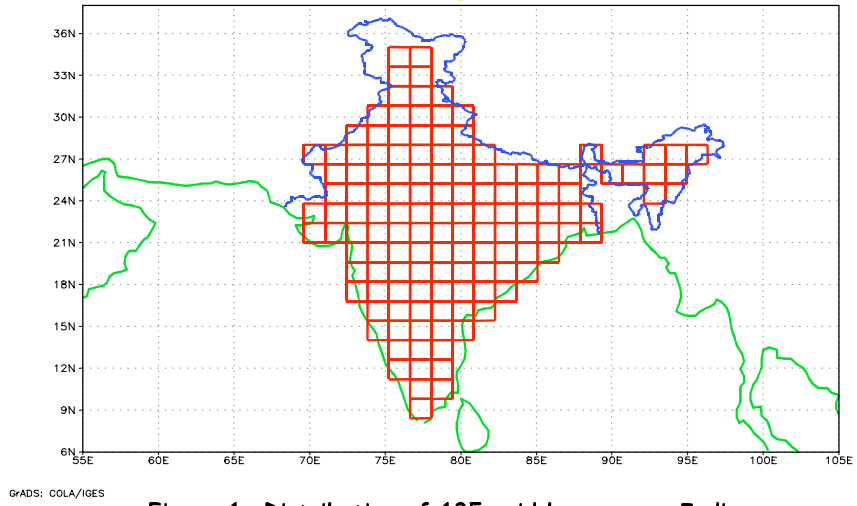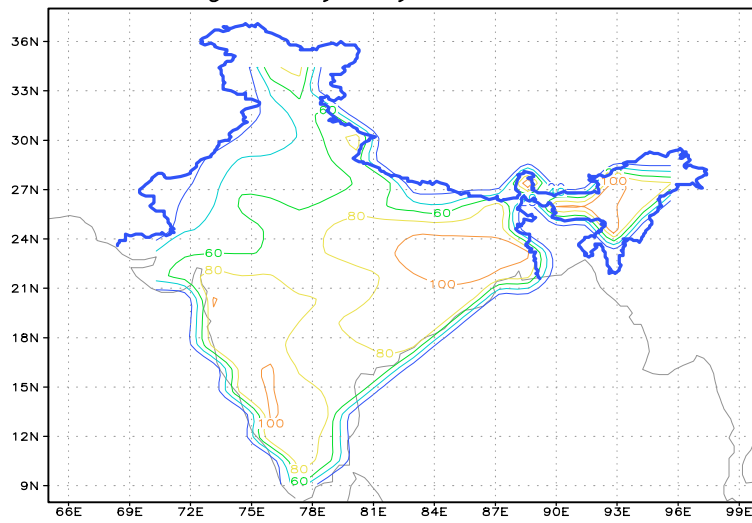
Figure 1. Distribution of 135 grid boxes over India

Gridbox average rainy days — 1997 27hr Forecast

Correlation coefficient in rain — 1997 27hr Forecast