On the Forecasting of Nor’wester s in Gangetic West Bengal

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ABSTRACT. A comparative study has been made of the upper air data based on radiosonde ascents at Calcutta and Allahabad, in relation to two distinct classes of days, namely, those of widespread nor’wester s of the pre-monsoon season over Gangetic West Bengal and those altogether free from such storms. It is seen that the most important contributory factors to the genesis of well developed nor’westers are, increased humidity resulting in suitable distribution of wet bulb temperatures in the first two kilometres and cyclonic convergence in the lower moist air field to provide the initial impulse for upward convection, and that the advection of colder air at higher levels is not an essential criterion.

A nomogram using dry bulb and dew point temperature values at 850-mb level in the morning has been suggested to serve as an empirical, but quite a useful, tool for the forecasting of nor’westers over Gangetic West Bengal during the pre-monsoon season.

1. Introduction
The problem of issuing timely warnings about nor’westers in Bengal and adjacent areas during the pre-monsoon season has received careful attention of meteorologists in India for a long time. A number of workers have made a detailed study of this subject and suggested techniques to enable one to locate in time the genesis of these storms and forecast their future progress or movements. In this paper an attempt is made to judge the relative importance of the temperature and humidity distribution at lower levels and the kinetics of air flow in these layers when compared to the temperature conditions prevailing at 700-mb level and above as suggested in some recent studies, in the forecasting of nor’westers.

2. Analysis of radiosonde data of Calcutta in relation to nor’wester s over the area under study
Incidence of thunderstorms at nine meteorological observatories (Calcutta, Dum Dum, Krishnagar, Berhampur, Asansol, Burdwan, Midnapore, Contai and Saugar Island) in Gangetic West Bengal and three other observatories, i.e., Balsore, Jamshedpur and Naya Dumka lying very close to the western border of Gangetic West Bengal have been considered for purpose of this study. Occasions on which 50 per cent or more of these 12 stations reported thunderstorms have been classified as widespread nor’wester days, while the term non-nor’wester days applies to those occasions when none of these stations had a thunderstorm. The vertical structure of the atmosphere over Calcutta as represented by the dry bulb and dew point temperatures at various levels for the two classes of days, namely, those of widespread nor’westers and with no nor’wester respectively, has been studied in some detail. The period examined is April and May, the two main nor’wester months, during the six years 1948 to 1953. In all, during this period, there were 98 days of widespread nor’westers and 133 non-nor’wester days. As it is hardly possible to discuss all the cases individually, the averages of dry bulb and dew point temperatures have been worked out for the various standard pressure levels, separately for the two classes of days in each of these two months during the six years under study. Incidentally, this process of averaging also helps to eliminate possible errors of observation on individual days and makes the comparison more effective. The averages based on ascents at 0300 and 1500 Z of the day are shown in Tables 1 and 2 respectively. As no evening ascent data are available for Calcutta for the year 1948, Table 2 gives data for five years only. Also,