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SUMMER THUNDERSTORMS AT CALCUTTA

In order to arrive at an objective method of forecasting summer thunderstorms at Calcutta, the importance of two probable predictors has been examined. One of these is the Stability Index (S.I.) as proposed by Showalter (1953) and the other one is the mean of the relative humidities (mean R.H.) at standard pressure levels between 850 and 500 mb (Chalker 1948).

The stability indices and the corresponding mean relative humidities at Calcutta around 2000 IST on each day of April 1955 and March, April and May 1956 have been computed. Out of the four months' data, 104 cases could only be considered. With the help of the Weather Diaries of the Meteorological Office at Dum Dum, cases of occurrences (before time of radiosonde observation and at or after time of observation) and non-occurrences have been separated. Applying the graphical method discussed by Petterssen (1956) for local forecast studies, the results of this investigation have been evaluated.

In Fig. 1, with S.I. and mean R.H. as the two co-ordinates, the cases of occurrences and non-occurrences have been plotted. The figure could be divided into two main regions (as shown) one of which is defined by mean R.H. $<$ 55 per cent and/or S.I. $\geqslant$ —1 and the other one in which mean R.H. $\geqslant$ 55 per cent and S.I. $<$ —1.

Considering first the former area, there is only one occurrence (at or after time of observation) out of a total number of 72 cases in this area. Thus this part of the figure appears to be mainly preferred by non-occurrences. There are, of course, some cases of occurrences (before time) in this region as should be
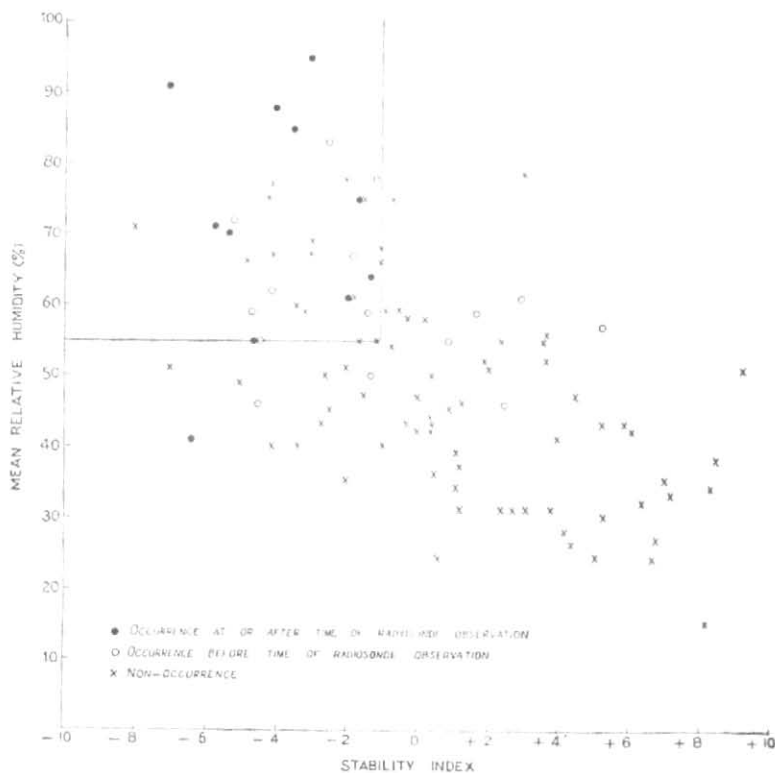

Fig. 1

expected. Because, after the occurrence of a thunderstorm, the atmosphere over the station concerned becomes more stable and less humid.

In the other part of the figure are to be found 10 out of the total 11 occurrences (at or after time). This clearly shows that this is a preferred region for occurrences (at or after time) and the conditions as defined by the co-ordinates of S.I. and mean R.H. in this region are very important for the occurrence of a thunderstorm at or after the time of observation. It may also be pointed out that when we consider regions of the diagram in which mean R.H. is greater and S.I. lesser than the limits considered above, the proportion of occurrences to non-occurrences increases, until finally we have all occurrences (at or after time) in the area where mean R.H. >80 per cent and S.I. ⩽ —3.

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