

## Letters To The Editor

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### USE OF STABILITY INDEX FOR THUNDERSTORM FORECASTING AT MADRAS

Forecasting of thunderstorms—one of the greatest hazards in aviation—with the aid of tephigrams has been attempted by many authors.

Showalter (1953) has given a method of the use of Stability Index for thunderstorm forecasting.

In this note, an attempt has been made to find out as to how far this method is useful in the forecasting of thunderstorms at Madras. From the tephigrams of Madras for the years 1952 and 1954, the stability index is worked out for every day. The radiosonde ascents during these two years were taken at 1500 GMT. Now, from the pocket registers for Meenambakkam for these two years, the occurrence of thunderstorms or the development of cumulonimbus clouds with lightning etc, with the times of occurrence and the duration, were noted down against the respective days. The number of occasions when the stability index had different values from  $-4$  to  $+4$  are shown in the second row of Table 1. The number of occasions of these when there were thunderstorms (or at least development of cumulonimbus clouds and lightning) within 24 hours is shown in the third row. In the fourth row, the occasions of the occurrence of thunderstorms etc (third row) are expressed as a percentage of the occasions with the particular stability index value. Thus of the three cases with the stability index  $-4$ , there were thunderstorms on two occasions within the next 24 hours, *i.e.*, on 67 per cent of the occasions etc.

This of course presumes, that the characteristics of the atmosphere remains without much modifications during this interval. However much be the limitations of these assumptions, it is at once clear from the last row of the table, that the stability index method offers an extremely simple and easily

TABLE 1

Stability Index	-4	-3	-2	-1	0	1	2	3	4	Total and more
No. of occasions	3	13	21	27	26	31	57	51	272	501
No. with thunderstorms etc	2	7	13	14	10	4	15	11	21	97
Percentage	67	54	62	52	38	13	26	21	7	..

understood tool for the quick assessment of the thunderstorm possibilities. When the stability index is  $+4$  and more, the chances of thunderstorm possibility is only 7 per cent. When it is between  $+3$  and  $+1$ , the possibility is only 21 per cent on the average. When the stability index is negative, the possibility increases from 38 per cent when it is zero to 67 per cent when it is  $-4$ . On an average, the possibility when the index is between  $-1$  and  $-4$  is about 56 per cent.

The determination of the stability index is very simple, unlike other methods of analysing the tephigram, or the determination of the Precipitation Index etc. Here, only the thunderstorms and the development of the thunderclouds have been taken into consideration and not the other type of precipitation. In spite of the simplicity of the method, it is highly significant, though not a perfect forecast tool. This is an objective method and must be used with judgement with the usual interpolations and extrapolations made for advective changes, and would be of much aid along with the synoptic charts, in the forecasting of thunderstorms.

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#### REFERENCE

- Showalter, A. K. 1953 *Bull. Amer. met. Soc.*,  
34, 6, p. 250.