

## Unexpected thunderstorms over East Uttar Pradesh on the night of 17-18 February 1960

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**ABSTRACT.** At 00 GMT of 18 February 1960, 3 out of 5 stations in east Uttar Pradesh reported thunderstorms either as "present" or as "past" weather. The synoptic situation at 12 GMT of 17 February 1960 gave little prior indication of such thunderstorm activity. A few interesting features of the synoptic situation and of the relevant tephigrams are discussed.

### 1. Introduction

The interest in this particular synoptic situation arises from the fact that weather developed suddenly in a region where a forecaster would normally not anticipate much development of weather.

The 'past' weather and rain reports at 12 GMT of 17 February 1960 shown on the synoptic chart indicates that clear weather prevailed over east Uttar Pradesh upto the evening of 17 February 1960. The tephigrams of Allahabad and Delhi at 12 GMT of 17 February 1960 are shown in Fig. 1. These would normally keep a forecaster off his guard about the weather to be expected over east Uttar Pradesh during the next 24 hours.

Curiously enough, at 00 GMT of 18 February, 3 stations (Gorakhpur, Lucknow and Kanpur) out of 5 stations, the other two being Allahabad and Varanasi, taking observations at that synoptic hour in east Uttar Pradesh, reported thunderstorms either as present or as past weather. This becomes more surprising when it is seen that the tephigram of Allahabad even at 00 GMT of 18 February (Fig. 2) continues to show what may be termed as 'dry' air.

The author attempts to give a partial explanation of the weather development but the main purpose of this note is to record facts of this synoptic situation for future guidance.

### 2. Important features of the meteorological situation

(i) On 17 February 1960, a western disturbance was moving as a trough in the westerlies across the Punjab-Kumaon hills.

(ii) At 0.9 km a.s.l., a wind discontinuity was passing through Ratlam, Satna and Gaya at 12 GMT of 17 February.

(iii) A cyclonic vortex with centre between Jhalwar and Ratlam could be seen at 0.9 km a.s.l. at 18 GMT of 17 February. This vortex persisted there till 00 GMT of 18th and then moved in an easterly direction as a feeble trough in the westerly current. It was located over northeast Madhya Pradesh at 00 GMT of 19th and over Gangetic West Bengal on 20th.

(iv) The development of this cyclonic vortex late in the evening of 17th induced relatively strong easterly flow over north-east Uttar Pradesh in place of the original light variable winds prevailing at 12 GMT of 17th in the lowest 1-km layer. This was presumably accompanied by considerable horizontal velocity convergence and vertical motion in the lowest layers.

The flow pattern at 2 and 3 km a.s.l. at 00 GMT of 18 February also showed considerable horizontal velocity convergence occurring over east Uttar Pradesh at the time of observation.

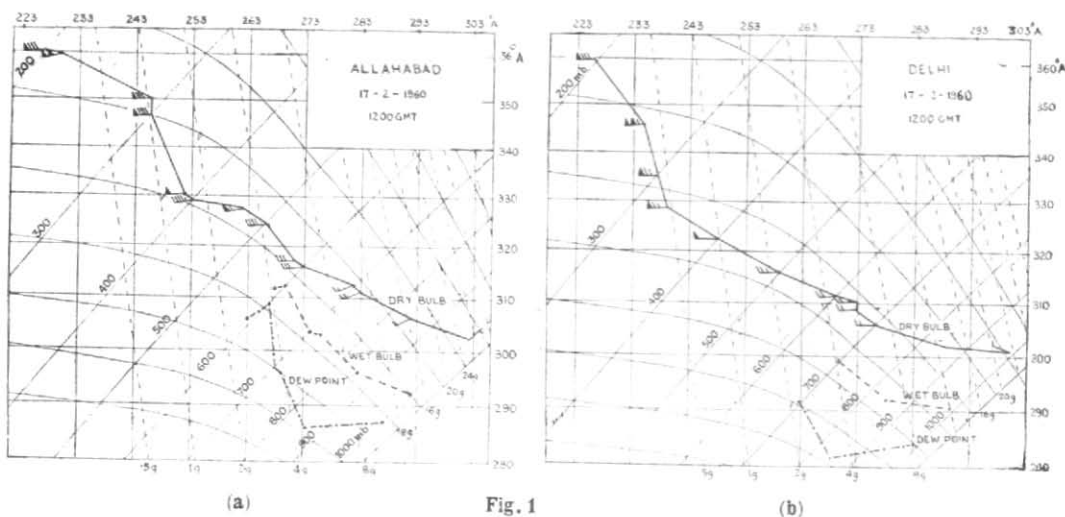


Fig. 1

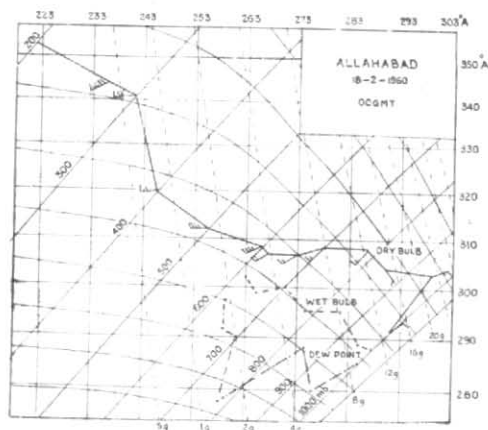


Fig. 2

It is suggested that as a result of this horizontal velocity convergence in the lower troposphere, and consequent vertical motion in the lower and middle troposphere, local thunderstorms developed in east Uttar Pradesh in spite of the relative dryness of air shown by Allahabad tephigrams in Figs. 1 (a) and 2, in the lower troposphere.

(v) To compensate for the low level horizontal velocity convergence, there must have been upper level horizontal velocity divergence, occurring simultaneously. But the flow patterns at 500 or 300-mb levels on

the evening of 17th or on the morning of 18th did not, by themselves, suggest that they were responsible for initiating upper level divergence and the development of convection. The low level convergence seems to have initiated the development.

### 3. Conclusion

Even with the tephigrams of the type reproduced in Figs. 1(a) and 2 showing relatively dry air at Allahabad, local thunderstorms may be occurring during winter season in east Uttar Pradesh and the fore-caster may be caught unawares.