Letters to the Editor

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UNUSUALLY LOW NIGHT TEMPERATURE
AT NAGPUR IN NOVEMBER 1970

1. The lowest temperature of 7.0°C in the last five decades for the month of November was recorded at Nagpur Airport on 29 November 1970. Earlier lowest record for Nagpur was 6.7°C on 30 November 1912.

On 29 November, the minimum temperature fell by 3°C, from previous day’s value. The thermograph registered a fall of temperature of approximately 2.5°C, in about 15 minutes time between 0630 to 0645 IST (about an hour before usual sunrise time) on that day. Surface wind which was NW/Sk mph 2-5 hours earlier, became almost calm at about 0630 IST and continued to be so till 0700 IST. Such a drop in temperature within such a short time and that too ahead of the usual sunrise time is rather unusual. The attendant surface and upper air features which led to cold wave conditions at Nagpur on 29 November 1970 are discussed in the following paragraphs.

2. A well-marked low pressure system lay on 29 November over southwest Bay off Tamil Nadu-Sri Lanka coasts. Also, a deep depression which moved westwards from southeast Arabian Sea lay over southwest Arabian Sea off Somalia on 29th. These were causing an incursion of cold and dry northerly to northeastern currents at lower levels accentuating the anticyclonic cell over central India.

3.2. Vertical time-section of Nagpur — In the vertical time-section chart of Nagpur, the above trough could be clearly seen on 29th extending from upper troposphere to 700-mb level. Jet maximum passed over the station on 28th around 230 mb. As could be seen from the departures, markedly cold air was present in mid-tropospheric levels between 28 to 30 November with maximum depth and intensity on 29th morning. —9°C was the temperature departure at 500 mb on this day. There was also another layer of cold air in the lower troposphere with —9°C departures at 850-mb level on 29th. With the passage of the trough to the east of Nagpur, the depth of cold air from ground to 500-mb level began to shrink and was ultimately replaced by warmer air on 1 December.

Temperature changes in upper air during the period 26 November to 1 December are shown in Fig. 1. Marked fall in temperature (~—6°C) in mid-troposphere level (500 mb and 400 mb on 28 and 29 November) followed by marked rise (~—5°C) on 30th morning may be seen clearly although the temperature fall at lower levels was not significant.

3.3. Surface pressure and dew point temperature — The highest value of sea level pressure in the spell was recorded at 00 GMT of 29 November. The lowest value of dew point temperature of 2°C at the surface was also recorded in the early morning of 29th.

From the progression of 5°C dew point isopleth on sea level chart (0300 GMT) between 26 to 29 November (diagrams not reproduced) it could be seen that the cold and dry air from north which penetrated west Madhya Pradesh and Vidarbha on 27-28 November extended further into east Madhya Pradesh and north coastal Andhra Pradesh on 29th. Occurrence of very low dew point temperatures at the surface and also relatively low mixing ratio at 850/700 mb on 29 November was suggestive that air over Nagpur was very dry with the passage of the trough resulting in low night temperature. This is in accordance with the findings of Rao and Srinivasan (1969).

4. From the foregoing paragraphs, it would appear that the sudden drop in night temperature on 29 November reaching almost lowest recorded value for the month may be accounted for to the
marked incursion of cold and dry north to north-easterly currents at lower levels over central India, accentuating the anticyclonic cell over the area, aided by the passage of the upper air trough which was an additional important factor in increasing the advection of cold air.

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REFERENCE


A DUSTSTORM OVER CHANDIGARH ON 1 NOVEMBER 1971

1. Widespread thunderstorm, preceded at some places by duststorms and associated with strong surface squalls, occurred over an area extending from Jammu to Ambala in northwest India on 1 November 1971. Chandigarh in particular, experienced a duststorm reducing visibility to 500 metres associated with northwesterly surface squall of 50 kt at 2115 hr on that date. The duststorm was followed by long duration of thunderstorm activity which continued till the early hours of the following day.

Although post monsoon thunderstorms are quite common in Punjab, in general and Chandigarh, in particular, a duststorm with squall of 50 kt is rather unusual occurrence. During the preceding nine years (1962-70) for which records are available no duststorm with such wind speed ever occurred over Chandigarh in the post monsoon season. In order to study the widespread and intense dust/thunderstorm activity the synoptic situations have been studied with a special emphasis on horizontal velocity divergence and the advection of temperature over Punjab and its close vicinity. The results of the same are discussed in this note.

2. Synoptic situation

The significant synoptic situation was an extended low pressure area over Pakistan and adjoining west Rajasthan, with an upper air cyclonic circulation extending up to 2·1 km and trough aloft up to 6·0 km. In the Figs. 1(a) and 1(b) we present the flow pattern at surface and 1·5 km a.s.l.