

On a destructive Hailstorm in Gormi area of Bhind District on 30 October 1961

D. R. SWAMINATHAN

Meteorological Office, Nagpur

(Received 1 December 1961)

1. Introduction

According to press reports, a hailstorm of severe intensity followed by heavy down-pour of rain, hit badly about 45 villages in the area between Phopha and Gormi on the banks of the river Kurai in Bhind district of Gwalior Division in Madhya Pradesh, at 1630 IST on 30 October 1961. In that destructive hailstorm which lashed for about one hour, hailstones of the size of small pebbles were reported to have killed 12 persons and injured 97 seriously, while 700 to 1000 heads of cattle were also reported to have perished. Further the storm was reported to have caused extensive damage to standing Kharif crops over an area of about 4000 acres and the loss was estimated to be about rupees 20 lakhs. Fig. 1 shows the topography of Gormi area and its surroundings. The affected area is on the border between the Jamuna river basin in the east and the hills of west Uttar Pradesh in west and north.

Hailstorms were also reported from Tarana and Mehidpur of Ujjain district between 1600 and 1700 IST on 1 November 1961 but no great damage was reported at these places.

These hailstorms occurred in association with an active western disturbance which lay over north Rajasthan and neighbourhood on 30 October 1961 and moved away eastwards across Western Himalayas on 2 November. The synoptic situations that preceded the storms were examined and the results are given here,

2. Low and high level synoptic situations

The upper winds and stream line pattern at 1500 m a.s.l. and 900m a.s.l. at 0000 GMT on 30 October 1961 and 1 November 1961 are shown in Figs. 2 and 3 respectively. The former shows a western disturbance as an upper air trough, while the latter indicates at rough in the easterlies. And both these situations are favourable for lower tropospheric convergence.

The winds and flow pattern in the upper troposphere at 1200 GMT on the above dates are shown in Figs. 4 and 5. A well marked trough in the prevailing westerlies with an embedded 'Jet maximum' may be seen in these figures. These flow patterns are associated with pronounced divergence as pointed out by Koteswaram and Srinivasan (1958). The weather remarks that are marked in the above figures indicate that on 30 October 1961 the area of convective activity and precipitation is confined to the left exit of the 'Jet maximum' while on 1 November 1961 it is confined to its right entrance.

From the vertical time-section of winds over Gwalior shown in Fig. 6, it may be seen that a deep trough extending from 2.1 to 9.0 km passed over Gwalior between 1200 GMT on 31 October and 1200 GMT on 1 November 1961.

Dew point temperatures recorded at Gwalior Observatory at all the synoptic hours during the period 29 October to

TABLE 1
Dew point temperatures (°C) at Gwalior Observatory

Time (GMT)	29 Oct	30 Oct	31 Oct	1 Nov	2 Nov
0000	14	15	17	18	15
0300	15	16	16	19	14
0600	15	18	15	17	11
1200	18	17	17	18	12
1800	16	15	19	18	14
2100	15	17	19	16	14

2 November are given in Table 1. The high values of dew point temperatures between 30 October to 1 November show that the lower tropospheric winds were laden with adequate moisture on these dates.

3. Conclusion

It is, therefore, concluded that the superposition of upper divergence associated with the trough in the westerlies with an embedded jet maximum over the convergence associated with lower tropospheric troughs with adequate moisture content has resulted in vigorous localised convective activity over the area on 30 October and 1 November 1961.

REFERENCE

Koteswaram P. and Srinivasan, V.

1958 *Indian J. Met. Geophys.*, **9**, 4, pp. 301-312.

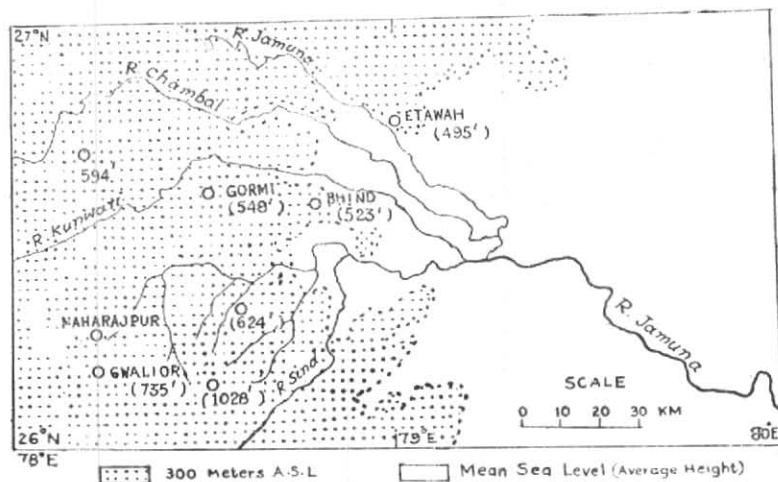


Fig. 1. Topography of Bhind and surroundings

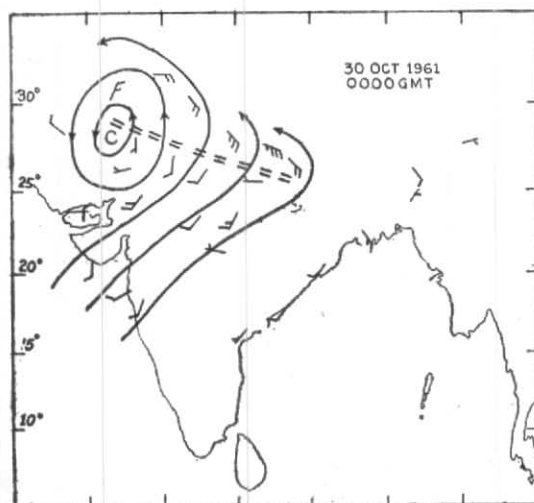


Fig. 2. At 1500m a.s.l.

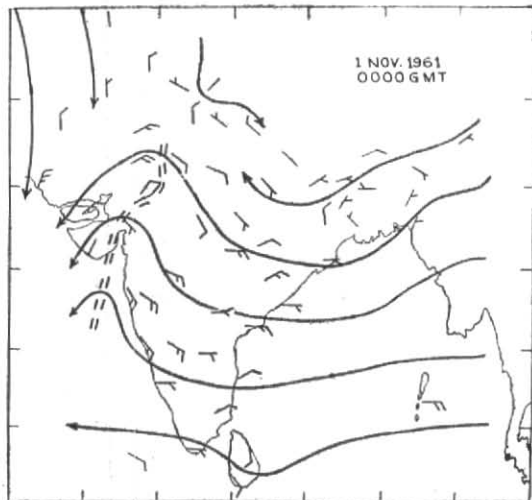


Fig. 3. At 900m a.s.l.

Upper winds and stream lines

== = Trough line

— Stream line

C—Cyclone

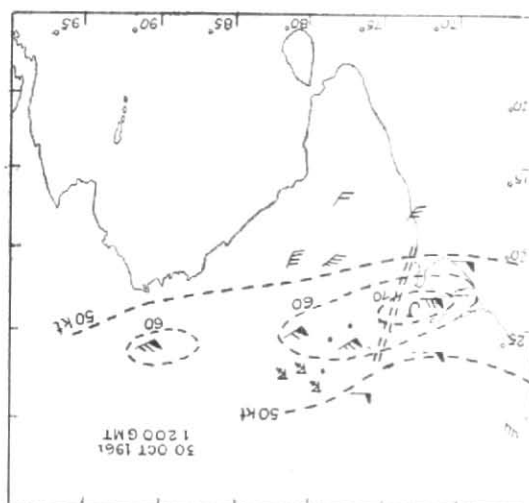


Fig. 4, 30 Oct 1961

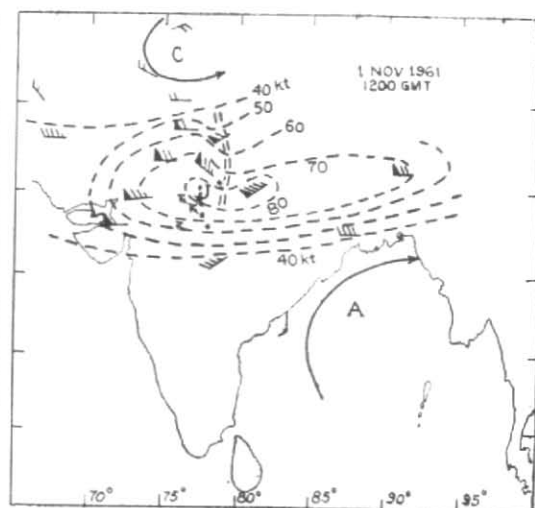


Fig. 5, 1 Nov 1961

- Stream line
 J—Jet max.
 --- Isotachs
 C—Cyclone
 = = = Trough line
 A—Anticyclone
- Weather remarks reported during 24 hours ending 0300 GMT of succeeding date

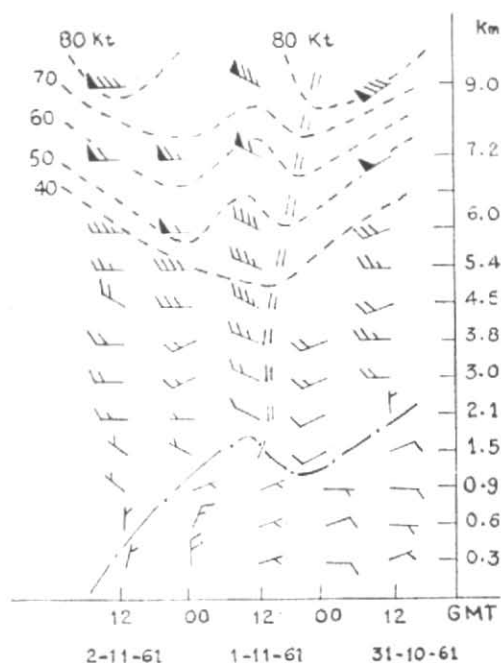


Fig. 6. Vertical time-section of winds over Gwalior during 31 October to 2 November 1961

— . . . — Line of separation between easterlies and westerlies