

Letters to the Editor

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HEAVY RAINFALL OVER NAGPUR ON 27 JULY 1960 AND THE ASSOCIATED VERTICAL CURRENTS

The city of Nagpur had one of its heaviest showers in recent years when six inches of rain was recorded in less than as many hours on the morning of 27 July 1960. The low lying areas and streets and lanes were inundated and at many places conveyances stopped completely and the pedestrians had to wade through knee-deep water on the roads. The showers were so brisk that the flowing water at many places caused noticeable erosion. The erosion was particularly heavy in the fields around the city and at places it caused damage to the crops that had just sprouted. The water level in the Ambazari lake of the city registered a sudden rise because of these heavy showers and it was 1 foot short of the overflow mark on the evening of 27 July 1960.

In this note an attempt has been made to examine the meteorological situation under which this heavy downpour occurred over Nagpur. The vertical currents associated with the heavy rainfall on 27 July 1960 have also been estimated.

On the 1730 IST surface chart of 26 July an elongated low pressure area lying over northeast Madhya Pradesh and adjoining parts of Bihar and Orissa in the morning was split up into two low pressure areas—one over north Orissa and the other over northeast Madhya Pradesh. The associated upper air cyclonic circulation extended upto 4.5 km above sea level. On this day, light rain or drizzle started in the afternoon and the rainfall recorded at Nagpur airport was 3.7 cm, during 24 hours ending 0830 IST of 27 July 1960.

The 0830 IST surface chart of 27 July 1960 showed that the low pressure area extended from northeast Rajasthan to south Orissa. The associated upper air cyclonic circulation was well-marked and extended upto 4.5 km above sea level. The 1730 IST surface isobaric chart of 27 July 1960 showed the morning's low pressure area over north Madhya Pradesh.

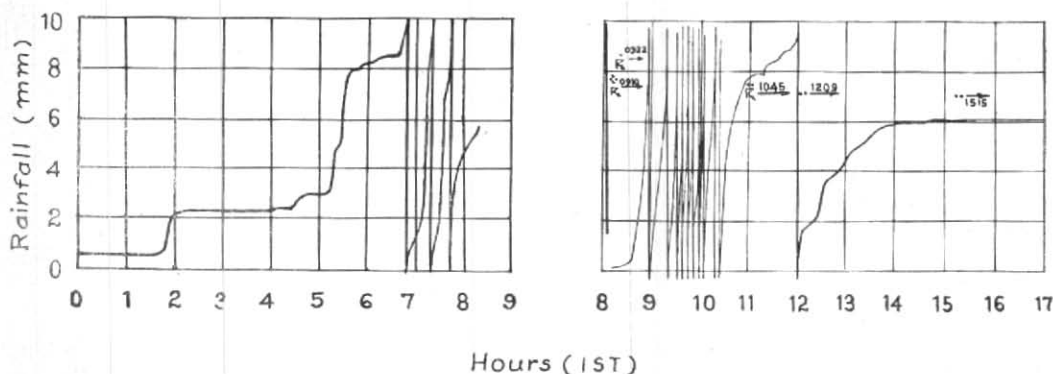
On 27 July 1960 there was slight rain from 0150 to 0240 IST. Rain again started at 0340 IST and continued till 1515 hrs. the rainfall being heavy from 0640 to 1045 IST.

There was thunder from 0920 to 1200 IST. The heaviest fall was between 0900 and 1000 IST. The rainfall recorded at Nagpur airport was 12.8 cm (5.03 inches) at 1730 IST of the 27th. The stations round about Nagpur also recorded heavy falls by the evening of 27th. The rainfall recorded at Nagpur and other neighbouring stations during the past 24 hours ending 0830 IST of 28 July 1960 is given below—

Nagpur (Airport) :	12.8 cm (5.0 inches)
Nagpur (City) :	4.6 cm (1.8 inches)
Betul :	14.5 cm (5.7 inches)
Bhopal :	7.2 cm (2.8 inches)

Intensity of precipitation during heavy rain and the associated vertical currents—From Sil's formula (Sil 1950) used in the previous paper of the author (Kundu 1959), the mean vertical currents during four spells of this heavy rainfall were computed and are shown in Table 1.

From the radiosonde ascents at 1630 IST on 26 July and 0530 IST on 27th which were



Relevant portions of S. R. raingauge records of Nagpur airport on 27 July 1960

the latest ascents available before the heavy downpour in the morning of 27th, the values of r were obtained. Though the values of r were different for different layers, e.g., 900-800 mb, 800-700 mb and 700-600 mb etc in the two cases, the sum of the values of r , i.e., Σr comes out to be almost the same, e.g., 69.3 mm hr⁻¹ and 69.6 mm hr⁻¹ respectively for the above two ascents. As the observatory at Nagpur has got no automatic rainfall intensity recorder, the maximum value of V_z could not be calculated for each spell.

It is found that the heavy downpour on the morning of 27 July 1960 consisted of one shower only of four different spells as shown in Table 1 but the intensity of rainfall was variable from period to period, the maximum being 63.0 mm hr⁻¹ between 0900-1000 IST corresponding to vertical currents of 91 cm sec⁻¹ and the minimum 11.8 mm hr⁻¹ between 0800-0900 IST corresponding to vertical currents of 17 cm sec⁻¹.

Comparing the heavy rainfall over Delhi studied earlier (Kundu 1959) with the present

TABLE 1

	Period of rainfall (IST)	Mean vertical currents (cm sec ⁻¹)
1st spell	0700-0800	34
2nd spell	0800-0900	17
3rd spell	0900-1000	91
4th spell	1000-1100	49

heavy fall over Nagpur, it is found that in the former case the high vertical currents of 3.4 m sec⁻¹ were of much higher order (about 4 times more intense) than those in the latter case.

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REFERENCES

- Kundu, T. K. 1959 *Indian J. Met. Geophys.*, 10, 4, pp. 454-456.
 Sil, J. M. 1950 *Ibid.*, 1, 1, pp. 52-58.