

551. 524. 36 (548.23)

A STUDY OF THE SEVERE HEAT WAVE OF MAY 1980 IN COASTAL ANDHRA PRADESH

1. In the past a study of severe heat waves over India including Andhra Pradesh was made by Raghavan (1966). However, a detailed study of the heat wave in coastal Andhra Pradesh has not been made so far.

During hot weather season a station is said to have experienced severe heat wave condition when the maximum temperature of the station is above normal by 8°C or more as per the classification followed in the India meteorological Department.

1.1. May is the hottest month of the year in Andhra Pradesh. The average maximum temperatures along the coast are lower than those of inland area. This is due to the cooling effect brought about by sea breeze which sets in at the coastal places in the forenoon or early afternoon. When the sea breeze is delayed, higher maximum temperatures are recorded at the coastal stations and if it does not set in, the coastal stations experience very high maximum temperatures like the inland stations, and many a time experience severe heat wave conditions.

Coastal Andhra Pradesh from Kakinada to Ongole experienced severe heat wave conditions during the period 19-26 May 1980. The synoptic situations responsible for causing the severe heat wave over coastal Andhra Pradesh are examined in this paper.

2. The daily maximum temperatures along with their departure from normal for the coastal stations Kakinada, Machilipatnam and Ongole from 19-26 May 1980 are given in Table 1.

2.1. It will be seen from the above table that severe heat wave was experienced at Kakinada on the 19th, at Machilipatnam on the 20th, 21st, 23rd, 24th and 25th and at Ongole from 19th to 26th. It was noticed from the changes in surface wind direction, dry temperature and relative humidity, on

the days of severe heat wave, sea breeze had not set in at the stations till at least 1400 hrs (IST) at Kakinada on the 19th at Machilipatnam on the 20th, 21st and 25th and at Ongole on the 21st, 23rd and 26th May. The sea breeze did not set in at all at Machilipatnam on the 23rd and 24th at Ongole on the 20th, 22nd, 24th and 25th May.

3. The synoptic systems which were found to be responsible for late or non-onset of sea breeze leading to severe heat wave condition at the three coastal stations were examined from day to day weather charts. These are summarised below :

- (i) Surface trough line passing through station from morning till evening — Machilipatnam and Ongole on the 23rd.
- (ii) Surface trough line moving across station from inland position in the morning to offshore position in the evening — Machilipatnam and Ongole on the 20th.
- (iii) Surface low pressure area or trough lying off coast from morning till evening — Ongole on the 21st, 22nd and 26th.
- (iv) Low level upper air trough in the morning moving from inland position to offshore by noon — Ongole on the 19th.
- (v) Surface low pressure area lying in the morning to the north of the station — Machilipatnam on the 21st.
- (vi) Low level upper air Cyclonic circulation lying in the morning to the north of the station and surface trough lying of coast in the evening — Machilipatnam and Ongole on the 24th and 25th.

4. The causative factor for the above abnormal synoptic situations preventing the normal formation of thermal low in the land area adjoining Andhra Coast leading to delayed or non-onset of sea breeze is examined.

4.1. The morning (0300 UTC) surface pressure departure charts showed the eastward movement of a low which lay over Karnataka on the 16th to central parts of coastal

TABLE 1
Daily maximum temperature (°C) along with departures from normal (°C) shown in brackets

Station	Date (May 1980)							
	19	20	21	22	23	24	25	26
Kakinada	45 (8)	44 (7)	36 (-1)	38 (1)	41 (4)	39 (2)	38 (1)	36 (-1)
Machilipatnam	43 (6)	45 (8)	45 (8)	41 (4)	46 (9)	45 (8)	46 (9)	37 (0)
Ongole	47 (9)	46 (8)	46 (8)	46 (8)	47 (9)	47 (9)	46 (8)	46 (8)

Andhra Pradesh on the 17th. It persisted in about the same area till the 26th. This low later moved westwards to Telangana on the 27th and to Karnataka on the 28th. Thus the westerly wave which came to central parts of the coastal Andhra Pradesh on the 17th started the severe heat wave in coastal Andhra Pradesh and its persistence there till the 26th prolonged the severe heat wave till the 26th. Only when an easterly wave moved away westwards on the 27th, did the severe heat wave subside.

Reference

Raghavan, K., 1966, "A climatological study of severe heat waves in India".
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2 August 1993, Modified 23 June 1998
