

Letters to the Editor

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A STUDY OF ONSET OF SOUTHWEST MONSOON OVER ORISSA

1. A study has been undertaken to determine the normal date of onset of monsoon over Orissa with recent 15 years (1975-1989) of data and its relationship with the onset dates over Kerala. Onset dates over Kerala are taken from the paper by Despande *et al.* (1986) and from *Indian Daily Weather Reports*. Onset dates of monsoon over Orissa have been derived through an objective analysis, utilising the 24-hr daily rainfall data from 1975 to 1989.

2. After careful study of rainfall distribution over Orissa, the date of first onset of monsoon over Orissa has been fixed following the objective criteria :

(i) The rainfall occurring over Orissa earlier than onset of monsoon over Kerala shall not be associated with the southwest monsoon. Rather the monsoon may set in over Orissa only after a minimum gap of 5 days from the onset date of monsoon over Kerala.

(ii) The monsoon shall set in first over south Orissa (south interior or south coastal) or over north coastal Orissa but not over north interior Orissa first.

(iii) After giving a minimum gap of 5 days from the onset date of monsoon over Kerala, daily rainfall of different stations in Orissa have been watched.

(iv) When it is found that more than fifty per cent of stations in any sector (except north interior Orissa) reported 24-hourly rainfall of 2.5 mm or more (*i.e.*, rainfall distribution fairly wide spread or more) for two consecutive days and the actual (average) rainfall recorded in that sector is either equal to or more than the normal (average) rainfall of that sector on both the days, the monsoon is considered to have advanced over Orissa.

(v) The second day is to be taken as the first onset date of the monsoon over Orissa.

(vi) Thereafter, during the next three days the rainfall should have been reported from more than fifty per cent of stations in that sector (*i.e.*, distribution fairly widespread or more) at least for one day.

By applying above criteria the dates of onset of the monsoon over Orissa, during the period 1975-1989 are shown in Fig. 1.

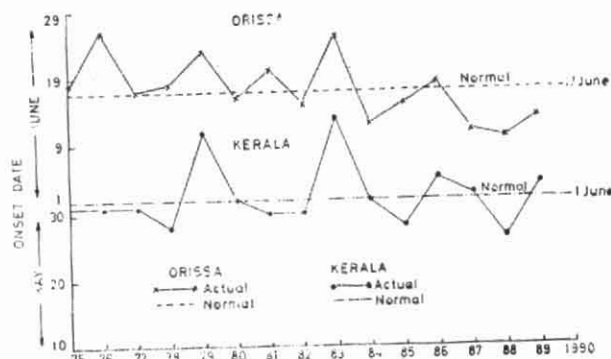


Fig. 1. Dates of onset of southwest monsoon over Kerala during 1975-1989

3. The mean onset date over Kerala is 1 June with the standard deviation of 5 days. Based on 84 years data Despande *et al.* (1986) have shown that the mean onset over Kerala is 1 June and the standard deviation is 7 days.

From a study of the frequency distribution of onset dates over Orissa in 5 days intervals starting from 1 June gives mean onset date over Orissa as 17 June with standard deviation of 5 days. The earliest onset of monsoon was 10 June in 1988 and latest on 26 June 1976. Onset dates prior to 13 June are considered as early onset (*i.e.*, mean onset date 17 June—*one* standard deviation), 13 June to 21 June are considered as normal onset dates and later than 21 June are considered as late onset dates for Orissa (*i.e.*, mean onset date 17 June + *one* standard deviation). It is noted that on 3, *i.e.*, 20% occasions onset of monsoon was early, on 9, *i.e.*, 60% occasions onset of monsoon was normal and on 3, *i.e.*, 20% occasions the onset was late over Orissa.

The phase difference criteria over Kerala and Orissa are as follows :

(i) *Early onset* — Onset prior to 26 May over Kerala and prior to 13 June over Orissa.

(ii) *Normal onset* — Onset between 26 May and 7 June over Kerala and between 13 June and 21 June over Orissa.

(iii) *Late onset* — Onset later than 7 June over Kerala and later than 21 June over Orissa.

TABLE 1

Frequency of main synoptic situations that brought in southwest monsoon over Orissa

S. No.	Main synoptic situations bringing monsoon over Orissa	Year	Percentage of year
1.	Depression/deep depression over Bay of Bengal or adjoining land areas	1975, 1979, 1981, 1983, 1988, 1989 =6 years	40%
2.	Low pressure area in Bay of Bengal or adjoining land areas	1976, 1977, 1978, 1980, 1985, 1987 =6 years	40%
3.	Other systems such as :		
(i)	Trough of low pressure on sea level	1982 =1 yr	
(ii)	Upper air trough in the lower tropospheric levels	1984 =1 yr	20%
(iii)	Upper air cycir in the lower/middle tropospheric levels	1986 =1 yr (Total=3 yrs)	

NB — The synoptic situations enumerated above relate to the periods of onset of monsoon

It is seen that simultaneous occurrence of an onset event over Kerala and Orissa is early on no occasion normal on about 60% of the occasions and late on about 13% of the occasions. Hence, this shows that on about 73% of the occasions, the onset events over Kerala and Orissa are in phase.

Fig. 1 represents diagrammatically the onset dates of monsoon over Kerala and Orissa during the last 15 years period (1975-1989). It is seen that the normal and late onset of monsoon over Orissa is generally in phase with that of Kerala.

The occasions, though rare when the onset events over Orissa and Kerala are not in phase may be seen in Fig. 1.

The difference between normal onset dates over Kerala and Orissa is 16 days. It is seen that on 8, i.e., 53%

occasions the difference between the onset dates between Kerala and Orissa is less than 16 days.

4. The synoptic systems associated with onset of monsoon over Orissa in different years during this 15 years period (1975-1989) are studied and indicated in the Table 1.

The mean monsoon onset date for Orissa of 17 June with standard deviation of 5 days differs from the normal date of 10 June onset of monsoon over Orissa.

The difference between the actual and mean onset dates for Orissa and Kerala and the correlation coefficient have been computed. The result is that the onset of monsoon over Kerala to that over Orissa is correlated with a correlation coefficient of 0.54 signifying that the events are positively correlated.

To verify the above results for the year 1990, it is noticed that the monsoon set in over Kerala on 28 May 1990 and over Orissa on 13 June 1990, thereby indicating that both the events have occurred as early as 4 days from the normal date. This is in agreement with the above conclusion, that the events are in phase, i.e., early onset over Kerala is followed by early onset over Orissa.

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Reference

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