551.553.21 : 551.511.2

ONSET OF SOUTHWEST MONSOON OVER VIDARBHA

According to the diagram currently in use in India Meteorological Department the normal date of onset of southwest monsoon over Vidarbha is 10 June. This date has been arrived at from 5-day normals of accumulated rainfall (vide *Climatological Atlas for Airman*, 1943). While some empirical criteria have been attempted to declare the date of onset of monsoon over south Kerala (Ananthakrishnan *et al.* 1967) no definite criteria exist for declaring the onset of monsoon over other areas. The forecaster generally announces the onset of southwest monsoon over a particular region, mainly on the basis of synoptic situation and the associated rainfall. There are practical difficulties in defining the monsoon onset date uniquely over different areas. According to Bhullar (1954), different criteria may be used to fix the date of onset, depending upon what feature of monsoon one is interested in, and he decided the date of onset over Delhi keeping in view the farmer's need of widespread rainfall over the districts. Ramdas *et al.* (1954) decided the onset date of monsoon mainly on the basis of commencement of persistent heavy rainfall. Accordingly to Subramanayya & Bhanukumar (1978) rainfall and its nature alone should form the basis for fixing onset date of the southwest monsoon over India.

2. In this study an attempt has been made to develop a criterion for onset of southwest monsoon over Vidarbha on the basis of rainfall patterns, keeping in view the distinction between the pre-monsoon thundershower activity and the onset of monsoon. Accordingly, the first spell of monsoon rain should fulfil the following conditions laid down for declaring active monsoon condition in a particular sub-division by India Met. Department (1943) : (*i*) The rainfall should be between 1/2 &

TABLE 1

Frequency of main synoptic situations that brought monsoon current over Vidarbha

Main synoptic situations	Years	No. of systems
1. Depression over Bay of Bengal or adjoining land areas	1953, 1956, 1959, 1961, 1962, 1963, 1966, 1969, 1971, 1974, 1975, 1978, 1979, 1981	14
2. Depression over east central Arabian Sea	1959, 1973, 1976 1980	4
3. Low pressure area in Bay of of Bengal	1955, 1957, 1960, 1970, 1974, 1976, 1977	7
4. U/A cyclonic circulation in the Bay of Bengal	1960	1
5. U/A cyclonic circulation in the east Arabian Sea	1952, 1967, 1971, 1972	4
6. Other systems such as trough of low pressure on sea level and U/A troughs etc.	1954, 1958, 1964, 1965	4

4 times of the daily normal; (*ii*) Minimum rainfall of at least two neighbouring stations should be 3 cm and (*iii*) rainfall in the sub-division must be fairly widespread or widespread. Rao (1976) has also referred to the first two conditions to describe the activity of monsoon.

3. 30 years rainfall data (1952-1981) collected from the daily weather reports of Nagpur together with the synoptic charts of Nagpur and *Indian Daily Weather Report* (IDWR) have been examined.

4. Vidarbha has been divided into following two met. sub-divisions. The distribution of rainfall over each sub-division was analysed from 1 June onwards keeping the above criteria in view. The onset dates as given in IDWR along with the the associated synoptic situation were also examined.

1. *East Vidarbha* — Nagpur Airport, Nagpur city, Bramhapuri, Chandrapur, Gondia, Sironcha, Wardha and Hinganghat (8 stations)

2. *West Vidarbha* — Akola city, Akola airport, Amravati, Buldana, Yeotmal, Pusad, Murtizapur, Malkapur, Akot, Anjangaon and Khamgaon (11 stations)

5. The onset dates for Vidarbha as per the IDWR is shown graphically in Fig. 1(a). The horizontal line corresponds to 10 June which is the normal date currently accepted . It is seen that for the 30-year period under study the monsoon arrived late on as many as 22 occasions and early on 8 occasions. The maximum delay in onset was 19 days and earliest onset was 9 days ahead of the normal. In 16 out of 30 years the onset was on 17 June or beyond.

The onset dates as derived based on the proposed criteria for East and West Vidarbha which differ by a few days in some years are shown in Fig. 1(b). The mean dates of monsoon onset for the 30-years period and the standard deviation (σ) as per IDWR data and as per present study are as follows :

	Sub-division	Mean date	Standard deviation (σ)
IDWR	Vidarbha	15 June	7 days
Present study	East Vidarbha	18 June	5 days
	West Vidarbha	19 June	6 days

According to the present study about 70% of the onset date lie between 13 and 25 June.

6. The synoptic systems associated with the onset of the monsoon over Vidarbha in the different years are indicated in Table 1. On 22 occasions out of 30 the onset of monsoon was in association with depressions or low pressure systems in the Bay of Bengal.

7. Onsets of southwest monsoon over Kerala as per IDWR were also compared with the new derived average dates of onset over Vidarbha as a whole, taking the mean of the dates for East and West Vidarbha (Fig. 1 c).

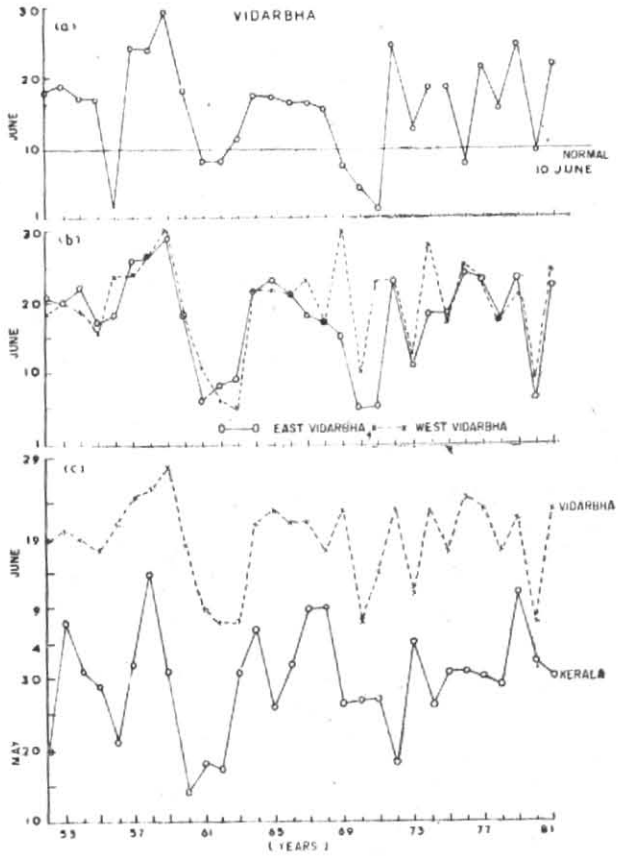

Fig. 1. Dates and years of onset of southwest monsoon over Vidarbha as declared in I.D.W.R. Derived onset date of southwest monsoon over East and West Vidarbha and onset date over Kerala

There were 4 occasions when onset in Kerala took place between 14 & 18 days earlier but there was no corresponding earlier setting over Vidarbha. However, when monsoon was delayed by more than a week over Kerala, corresponding delay over Vidarbha was by 2 to 3 days only. Otherwise one sees a general similarity between the two curves.

8. The study leads to the conclusion that for the 30 years period (1952-1981) and utilizing the criteria employed by us the mean date of onset of the monsoon over Vidarbha was 9 to 10 days later than 10 June which is the normal date as per the IMD onset diagram prepared in 1943 utilizing earlier data. For this 30-year period the mean onset date as per IDWR records is 15 June. This is 4 to 5 days earlier than the date we have found in the present study, presumably because of the more stringent rainfall criteria utilised by us.

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