

## EXTRAORDINARY THUNDER ACTIVITY OVER BOMBAY DURING SEPTEMBER-OCTOBER 1974

1. The unusual thunder activity over Bombay during September-October 1974 has been studied with reference to synoptic charts. Fig. 1 gives the number of days of thunder activity during September and October for the years 1950 to 1975.

2. The thunder activity during September 1974 was in two spells—one between 14th & 20th and another between 24th & 29th. The monsoon over the western Peninsula strengthened with the first spell of thunder activity. The low pressure area from southeast Arabian Sea which moved north-westwards after intensification favoured this.

3. With the formation of a depression in the west central Bay of Bengal on 24 September, the wind discontinuity line across the Peninsula passed through Bombay. On 25th a low pressure area could be located over Andhra Pradesh and low level winds upto 850-mb level over Saurashtra and adjoining areas favoured the formation of cyclonic circulation over Gujarat. The Bay system intensified into a cyclonic storm on 27th with its centre near  $17.5^{\circ}\text{N}$ ,  $88.0^{\circ}\text{E}$ . A typical situation of streamline pattern at 1.5 km asl on 28th is given in Fig. 2. The convergence over Bombay with its NW'lies and WSW'lies at stations south of Bombay was evident on many of these days. With the system crossing coast on 29th, the trough line was tilted

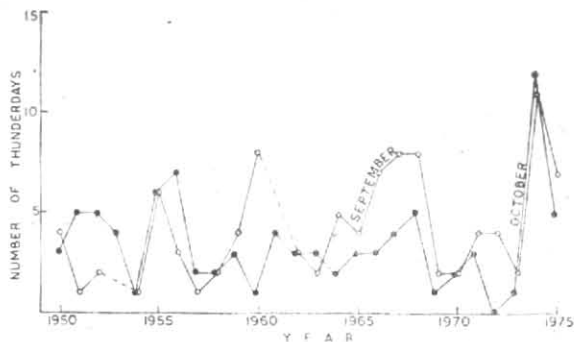


Fig. 1. Thunder-days during September and October

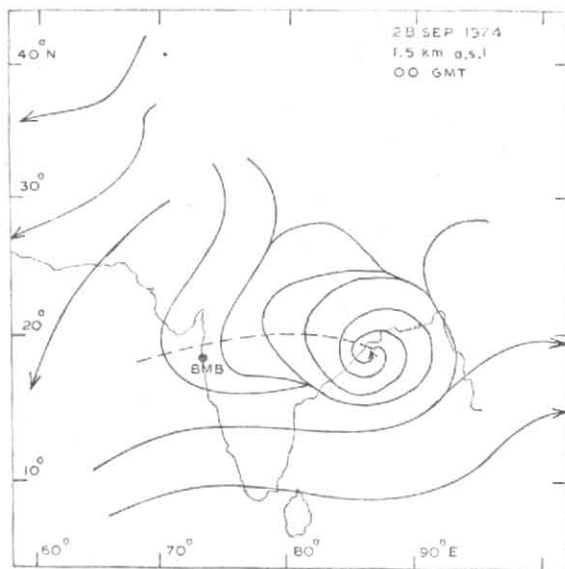


Fig. 2

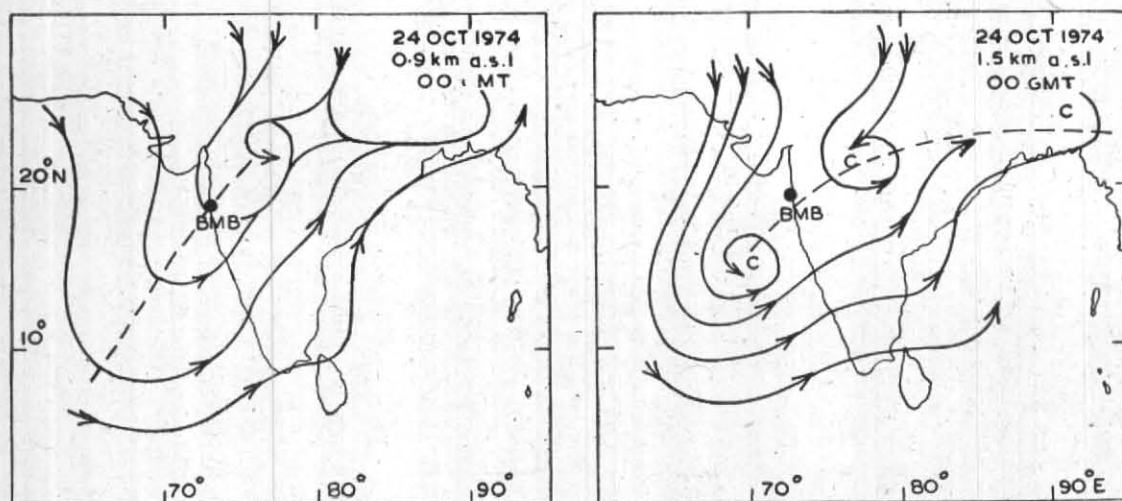


Fig. 3

from NE to SW passing to the south of Bombay on 30th, the thunder activity ceased. Thus the continental air which extended to Bombay latitude with the circulation associated with the cyclonic storm in the Bay was responsible for the thunder activity over Bombay.

4. The thunder activity during October 1974 was in three spells (i) 2nd to 4th, (ii) 9th to 12th and (iii) 20th to 25th. The anticyclone over the Peninsula in upper troposphere established on 2nd. Nasik reporting NE'ly 5 kt and Ratnagiri SW'ly 5 kt at 5000 and 7000 ft asl indicated the trough line through Bombay. This pattern was responsible for the thunder activity between 2nd and 4th. On 8 October the trough line associated with the system that crossed Andhra coast was passing through Bombay. This trough line was responsible for the second spell of activity.

5. With the anticyclonic circulation over north India at mid levels and a deep trough in westerlies along Long. 65° E at 500 and 300-mb levels a convergence zone was observed over Bombay on 20th and 21st and thunder occurred at Bombay. On 22nd a well marked trough of low pressure off Maharashtra-Karnataka coasts was seen. With the continental air already setting in with east/northeasterlies in north and central India this trough appears to have created the contrast of airmasses by bringing the moist air in west coastal stations north of Lat. 15°N. At 0.9 km asl a sharp discontinuity line passed through Bombay on 23rd. With the intensification of the system, the

discontinuity line became a pronounced one. Fig. 3 gives 0.9 and 1.5 km upper air charts of 24th. The 1200 GMT charts of 25th indicated the tendency of disorganisation of streamlines. Accordingly though thunder occurred on 25th its activity stopped later on that day.

6. It may, therefore, be stated that the first spell of thunder activity over Bombay in September and October 1974 was characteristic of the months. The second spell in September was due to the extension of continental air drawn to Bombay latitudes due to favourable synoptic situations. It explains the unusual frequency of thundery days in September 1974 at Bombay. The second spell in October was caused by the Bay depression. The synoptic situations on days during the third spell was unusual of the month and the Arabian Sea system was mainly responsible for that.

7. The study reveals that the conclusion of Faria and Viswanathan (1962) that the thunderstorms over Bombay during the end of September are mostly in association with systems in the north Arabian Sea need not be true always as the system in the east Bay of Bengal can also cause the activity. In causing the thunder activity over Bombay, the intensity and persistence of systems from the Bay of Bengal has a key role to play both in September and October.

8. The author is highly thankful to Dr. A. K. Mukherjee, Regional Director, Bombay for the suggestion and guidance he gave for this work.

Regional Meteorological Centre, Colaba, Bombay  
4 February 1976

T. R. SIVARAMAKRISHNAN

Faria, J. F. and Viswanathan, T. R.

REFERENCE

1962 *Indian J. Met. Geophys.*, 13, 3, pp. 377-382.