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Co-existence of Tropical Storms

K. RAGHAVAN

Meteorological Office, Poona

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ABSTRACT. Results of a climatological study of two or more tropical cyclones/depressions that occurred simultaneously over the sea (Bay of Bengal and Arabian Sea) and the land area (India, Pakistan, Burma and Ceylon) during the years 1923 to 1962 are presented. Not more than two storms exist at a time in the region and they are observed during the period June to December. There was no occasion when both the storms existed in the Arabian Sea or in the Bay of Bengal. The shortest distance apart between the co-existing storms was 1000 km. The line joining the centres of two co-existing storms was generally east-west. Statistics of the storms are presented in charts and tables.

1. Introduction

A number of climatological studies on tropical cyclones/depressions occurring in the Indian region have been made in the past. However, no information is available regarding the simultaneous occurrence of two or more cyclones/depressions over the region. A study of this aspect is presented here on the basis of information available for the years 1923 to 1962.

Particulars of cyclones/depressions have been collected from the *Indian Daily Weather Reports* and *India Weather Review*. The present study is restricted to the disturbances that occurred in the Arabian Sea, Bay of Bengal and the land areas comprising India, Pakistan, Burma and Ceylon. Occasions when more than one cyclone/depression existed over the area are listed in Table 1.

2. Monthly summary

June—During the 40-year period 1923—1962, there were 4 occasions when two cyclones/depressions co-existed in the month of June. They did not persist for more than two days and the corresponding centres of these disturbances were generally more than 2000 km apart.

July—In this month there were 5 cases of simultaneous existence of two disturbances. The maximum period of co-existence was 5 days (in the year 1927). The disturbances were generally separated by a distance of about 1800 km.

August—Three disturbances were observed in this month. The duration of co-existence was two days or less. The average distance apart of the centres of disturbances was about 2000 km.

September—There were in all 5 pairs of disturbances that co-existed. They lasted for 5 days or less at a distance of about 1800 km.

October—Only two such pairs were observed in this month, one of which lasted for 4 days. They were about 2500 km apart.

November—Two cases of simultaneous existence of disturbances were noticed in this month. The members of the pair were about 2000 km apart.

December—There was only one such case in this month and it occurred in the year 1959. The centres were 3000 km apart.

3. General characteristics

In the region under consideration, not more than two disturbances existed at a time, and they were observed during the period June to December. One member of the pair was generally over the land during the monsoon months while the other was over the sea areas. There was no occasion when both the

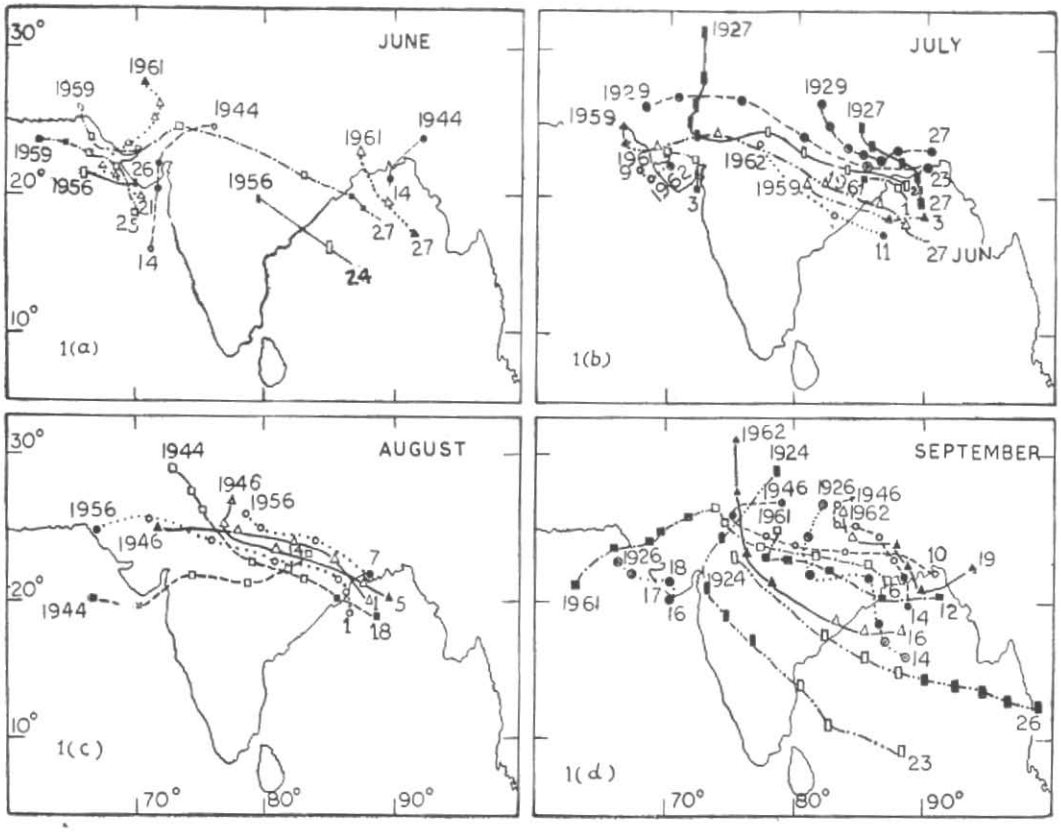
TABLE 1

Particulars of tropical storms that co-existed in the Indian area (1923–1962)

Year	Dates of origin of storm/depression	Dates of co-existence	Direction of centre of the second storm/ depression with reference to the first	Distance (km) between centres of co-existing storms/depressions
		JUNE		
1944	14-6-1944	15-6-1944	E	1870
	14-6-1944	16-6-1944	E	2200
1956	24-6-1956			
	26-6-1956	26-6-1956	W	1000
1959	25-6-1959	28-6-1959	ESE	2400
	27-6-1959	29-6-1959	E	2350
1961	21-6-1961			
	27-6-1961	27-6-1961	SE	2450
		JULY		
1927	23-7-1927	27-7-1927	ESE	1750
	27-7-1927	28-7-1927	ESE	1750
		29-7-1927	E	1700
		30-7-1927	E	1500
		31-7-1927	SE	1500
1929	23-7-1929	27-7-1929	E	2000
	27-7-1929	28-7-1929	E	2100
1959	27-6-1959	3-7-1959	E	2300
	3-7-1959	4-7-1959	ESE	2100
1961	1-7-1961			
	3-7-1961	3-7-1961	W	1450
1962	9-7-1962			
	11-7-1962	11-7-1962	SE	1800
		AUGUST		
1944	14-8-1944	18-8-1944	E	1900
	18-8-1944	19-8-1944	E	2050
1946	1-8-1946			
	5-8-1946	5-8-1946	E	1850
1956	1-8-1956			
	7-8-1956	7-8-1956	E	2250
		SEPTEMBER		
1924	23-9-1924	26-9-1924	E	2350
	26-9-1924	27-9-1924	ESE	2450
		28-9-1924	ESE	2450
		29-9-1924	SE	2450
		30-9-1924	SE	2100

TABLE 1 (*contd*)

Year	Dates of origin of storm/depression	Dates of co-existence	Direction of centre of the second storm/ depression with reference to the first	Distance (km) between centres of co-ex sting storms/depressions
		SEPTEMBER (*contd*)		
1926	14-9-1926	16-9-1926	W	1700
	16-9-1926	17-9-1926	W	1600
		18-9-1926	W	1150
1946	10-9-1946	14-9-1946	SE	1400
	14-9-1946	15-9-1946	SE	1150
1961	6-9-1961	12-9-1961	ESE	2200
	12-9-1961	13-9-1961	ESE	1900
		14-9-1961	E	1500
		15-9-1961	E	1450
		16-9-1961	E	1650
1962	16-9-1962	19-9-1962	E	1650
	19-9-1962	20-9-1962	E	1450
		21-9-1962	SE	1450
		22-9-1962	SE	1450
		OCTOBER		
1932	14-10-1932	19-10-1932	E	3450
	19-10-1932	20-10-1932	E	3150
		21-10-1932	E	2800
		22-10-1932	E	2450
1935	17-10-1935	20-10-1935	E	2000
	20-10-1935	21-10-1935	E	1750
		22-10-1935	NE	1800
		NOVEMBER		
1960	6-11-1960	10-11-1960	ESE	1750
	10-11-1960			
	17-11-1960	18-11-1960	E	2050
	18-11-1960	19-11-1960	E	2050
		20-11-1960	E	2000
		DECEMBER		
1959	28-11-1959	5-12-1959	E	3000
	5-12-1959	6-12-1959	E	3000


30°
JUNE
1961
1959
1944
1961
1944
1959
20°
1956
1956
26
21
25
14
27
27
24
10°
1(a)
1927
JULY
1929
1929
1927
1959
27
1962
1959
23
27
3
11
27 JUN
1(b)
30°
1944
AUGUST
1946
1956
1956
1946
20°
1944
7
5
1
18
10°
1(c)
70°
80°
90°
1962
1924
SEPTEMBER
1946
1926
1946
1961
1962
1926
10
19
18
1924
1961
17
16
14
12
16
14
26
23
1(d)
70°
80°
90°

Figs. 1 (a to d)

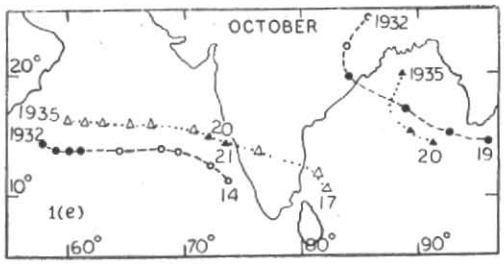


Fig. 1 (e)

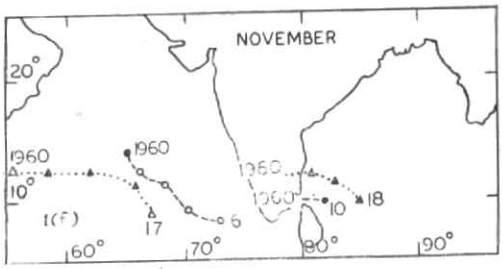


Fig. 1 (f)

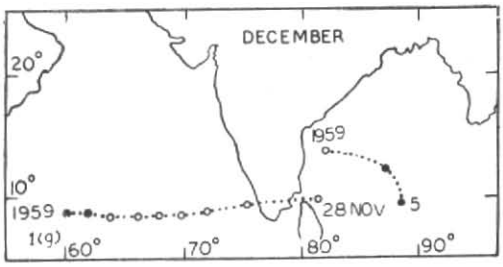


Fig. 1 (g)

storms existed simultaneously in the Arabian Sea or in the Bay of Bengal.

The shortest distance between the co-existing disturbances was 1000 km and the largest over 3000 km. On no occasion the disturbance co-existed for more than 5 days continuously. It was noticed that the line joining the centres of two co-existing disturbances was generally east-west.

Figs. 1 (a) to 1 (g) represent the tracks of co-existing storms/depressions observed during the months June to December in the

40-year period. Each track is labelled with the date of origin at one end and the year at the other to enable identification of the corresponding tracks of each pair. The 0300 GMT positions of the centres are indicated along the tracks by different symbols for each pairs of tracks. The dates of co-existence are indicated by filled symbols.

4. Acknowledgement

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