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CYCLONIC STORMS AND DEPRESSIONS, AFFECTING ORISSA STATE

1. Tropical cyclones are perhaps the most devastating natural event. The huge potential of tropical cyclones to cause damage and loss of life is due to copious rainfall and violent winds. In the coastal region the damage is mainly due to induced storm surge, particularly over the low elevated coastal margin. De and Joshi (1995) and Srivastava *et al.* (2000) have discussed the decadal variability and trends in the frequency of cyclonic storm. Joshi *et al.* (1999) have studied the decadal trends in frequencies of cyclonic storms crossing different coastal states of India. In this paper, the authors have studied the storms affecting Orissa state during 1891-1990.

The state of Orissa lies between latitude 22°36' N and 17°49' N, longitude 81°36' E to 87°18' E. The land mass of the state form a succession of hill ranges rolling backwards towards central India. On the eastern margin of the peninsular plateau lie much more discontinuous but small ranges called the Eastern Ghats.

The east coast plains are broader and are vulnerable to frequent severe cyclonic storms formed in the Bay of Bengal.

2. The cyclonic storms/depressions which generally affect Orissa, originate and intensify over the Bay of Bengal. They usually move west-northwest and cross the coast. The state being situated on the east coast, experiences very frequently the full fury of the severe storms/depressions of the Bay of Bengal.

3. All the cyclonic storms/depressions which struck the Orissa coast during the period 1891-1990 have been studied from various sources namely, India Meteorological Departments publications on Disastrous Weather Events (1971, 1972, 1979, 1982); India Meteorological Department (1979) and (1996); Mukherjee *et al.* (1981) and Indian J. Met. & Geophys. (1972) and Das *et al.* (1973). The series of annual frequency of cyclonic storms/depressions which affected the Orissa state during the period 1891-1990 has been examined and an attempt is made to study the significant change which have occurred in the mean frequency. Some specific cases of intense cyclonic disturbances are also discussed in this study.

TABLE 1

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Number of cyclonic storms	Nil	Nil	Nil	Nil	7	24	31	23	20	15	10	1	131
Number of depressions	1	Nil	Nil	Nil	8	54	106	155	130	62	11	Nil	527
Total	1	Nil	Nil	Nil	15	78	137	178	150	77	21	1	658

TABLE 2

S. No.	Date / Month & Year	Formation	Landfall	Maximum wind	Storm surge	Loss & damage
1.	14-21 November, 1946	8.5° N & 86.5° E	Between Cuddalore and Nagapattinam	*	*	The storms caused widespread heavy rainfall all along the coast, considerable loss of life and damage to property and crops
2.	26-30 October, 1971	10.5° N & 91.0° E	Near Paradeep	150-170 kmph (81-92 kts)	4-5 m	10,000 people killed, 71 millions people became homeless, 50,000 Cattle heads lost, 8,00,000 houses damaged, the crops and other properties worth rupees few crores damaged
3.	20-25 September, 1972	16.5° N & 92.5° E	Near Gopalpur	136 kmph (73 kts)	3-4 m	60 people died, Thousand of cattle heads lost. Caused damages to crops and houses. Telecommunication and power supply cut off
4.	1-4 June, 1982	14.5° N & 91.5° E	Near Chandbali	235 kmph (148 kts)	*	150 people died, 2 lakhs rendered homeless, 10,000 houses damaged, 2 ships and 100 boats damaged. Train services badly disrupted. Large number of cattleheads perished. Heavy damage to crops and property was also reported

* Data not available

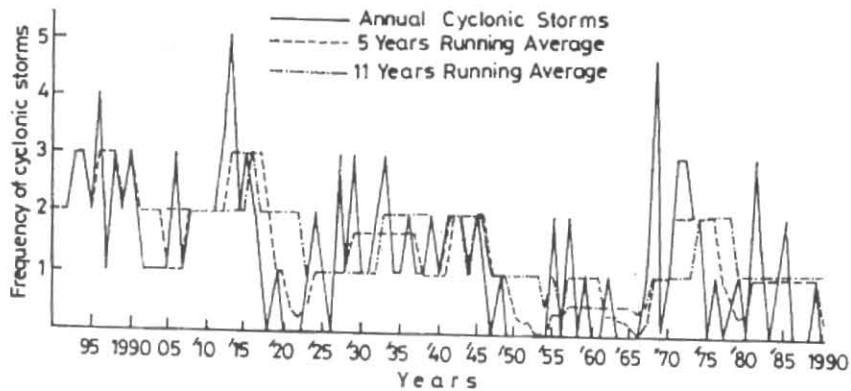


Fig. 1. Variation of Cyclonic Storms/affecting Orissa State during 1891 - 1990

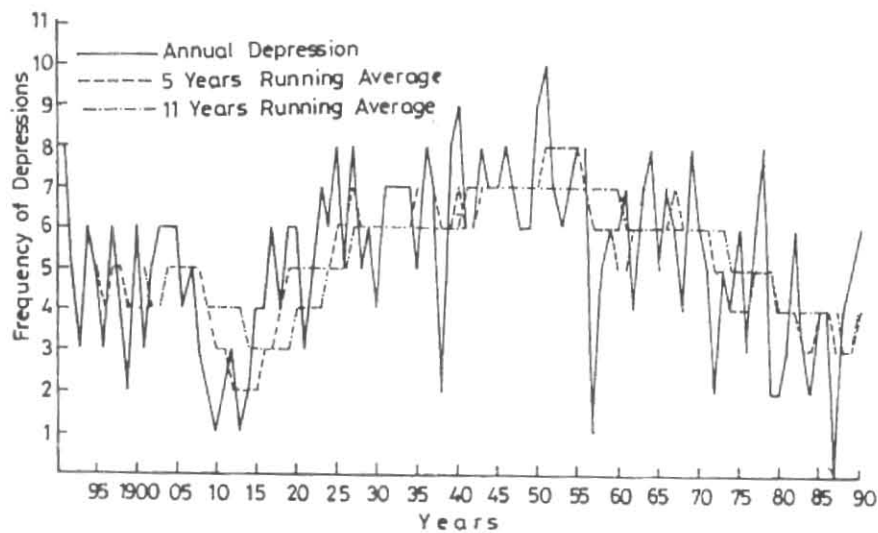


Fig. 2. Variation of depression affecting Orissa state during 1891-1990

It can be seen from Table 1 that the cyclonic storms/depressions affect the Orissa state mostly during May to November and maximum in July/ August. In the entire period of 1891-1990 out of 131 cyclonic storms, only one Bay storm and out of 527 depressions only one depression crossed the Orissa state in December (1981) and January (1966) respectively and there was none during February to April. There has been one year without a single storm/depression (*viz.* 1987).

Fig.1. shows the year-to-year variation in the number of cyclonic storms during the period 1891-1990 over Orissa. It can be clearly seen that there is a decreasing trend till around 1920's and 1960's and increasing trend

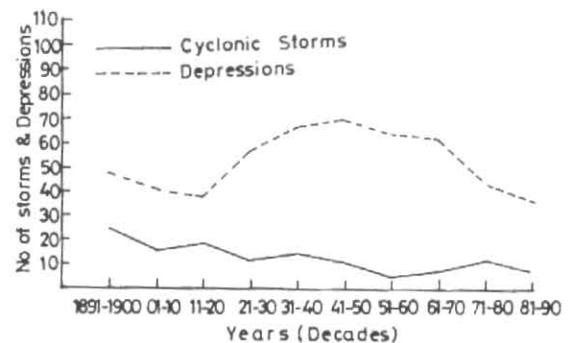


Fig. 3. Decadal pattern of variability of storms/depressions

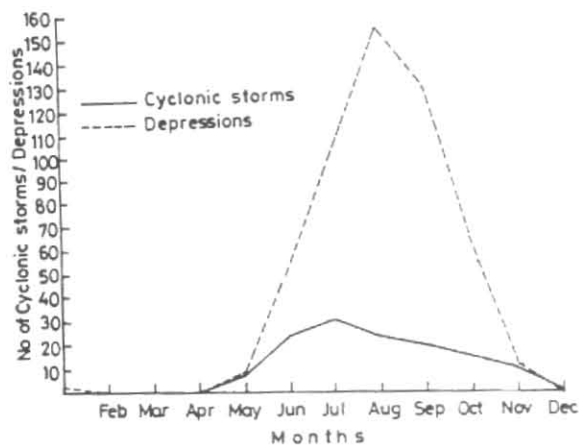


Fig. 4. Monthly variation of the frequency of cyclonic storms/depressions affecting Orissa state during 1891 - 1990

with peaks around 1912 and around 1970's. In order to check whether any cyclicity of events in relation to sunspot cycle (11 years) or to examine forcing if any, corresponding to El-Nino events (of periodicity 3 - 7 years), 11 years and 5 years period for frequency analyses have been tested. 5 years running average curve shows fluctuation with the periodicity of 12-15 years. The 11 year running average curve shows the decreasing trend after 1955.

Fig. 2. shows the year-to-year variation in the number of depressions during the period 1891-1990. It can be seen that there is an increasing trend after 1920 till 1955 with peaks around 1925 and 1950 and decreasing trend afterwards.

Fig. 3. shows the decadal pattern of variability of storms/depressions and Fig. 4. gives the total number of monthly variation during 100 years period from 1891 - 1990.

During the period 1891-1990, out of 131 storms which influenced the weather of Orissa state, 63 became severe.

A few cases are presented in Table 2 and their tracks are shown in Fig. 5.

The cyclonic storm of November 1946 originated in the southwest Bay of Bengal on 15th deserves mention for its long travel through both the Bay of Bengal and Arabian Sea and back across Orissa. This storm entered Tamil Nadu from southwest Bay of Bengal, then emerged into the Arabian sea near Mangalore, again crossed the Konkan coast to enter into mainland. As it journeyed over

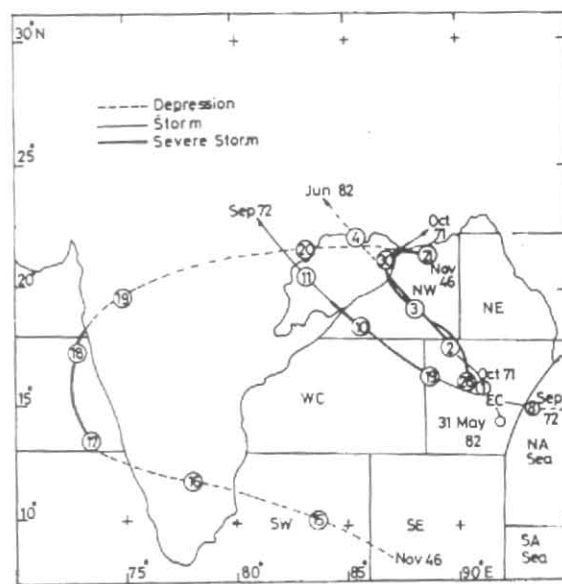


Fig. 5. A few cases of cyclonic disturbances affecting Orissa coast

land, it passed through Orissa before it finally emerged into the Bay of Bengal again and dissipated there.

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