

Letters to the Editor

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A COMPARATIVE STUDY OF RAINFALL OVER BAY AND ARABIAN SEA ISLANDS

1. The northern hemispheric summer monsoon, as it is often referred to, sets first in Bay Islands and Arabian Sea towards middle or end of May and then progressively moves northwards to central and northern India. The advance in the Bay and Arabian Sea often acts as a precursor to the start of monsoon rains over the rest of the country.

The Arabian Sea and Bay Island groups lie approximately at the same latitude belt ($8-12^{\circ}\text{N}$) but separated by 20° meridian. Yet, rainfall in these two regions is marked by diversity in duration, intensity and amount.

In this work, an attempt has been made to study various facets of rainfall in these islands.

2. Two locations, *viz.*, Amini (11°N , 73°E) and Port Blair (12°N , 92°E) situated respectively in the Arabian Sea and Bay of Bengal have been chosen in the study. Monthly data from 1901 to 1987 for Port Blair and from 1918 to 1987 for Amini have been utilised in the analysis. The data series at both stations was not continuous, as for a few years data were not available. At Port Blair data from 1903 to 1905 and at Amini, data of 1928 and 1946 were missing. These were replaced by mean values. From the monthly values, total for each of the four seasons, *viz.*, winter, pre-monsoon, monsoon and post monsoon, were calculated.

3. In the present study pentad rainfall was analysed for each year from middle of April onwards. That pentad, in which the rainfall showed rise by more than 50 mm compared to preceding pentad, was selected. The next two succeeding pentads were then scanned. If the rainfall in these two pentads remained more than 50 mm, the pentad selected earlier was thought to be the one in which monsoon onset has occurred at that place. The middle date of the pentad is taken as the onset date and the pentad is called the 'Onset'

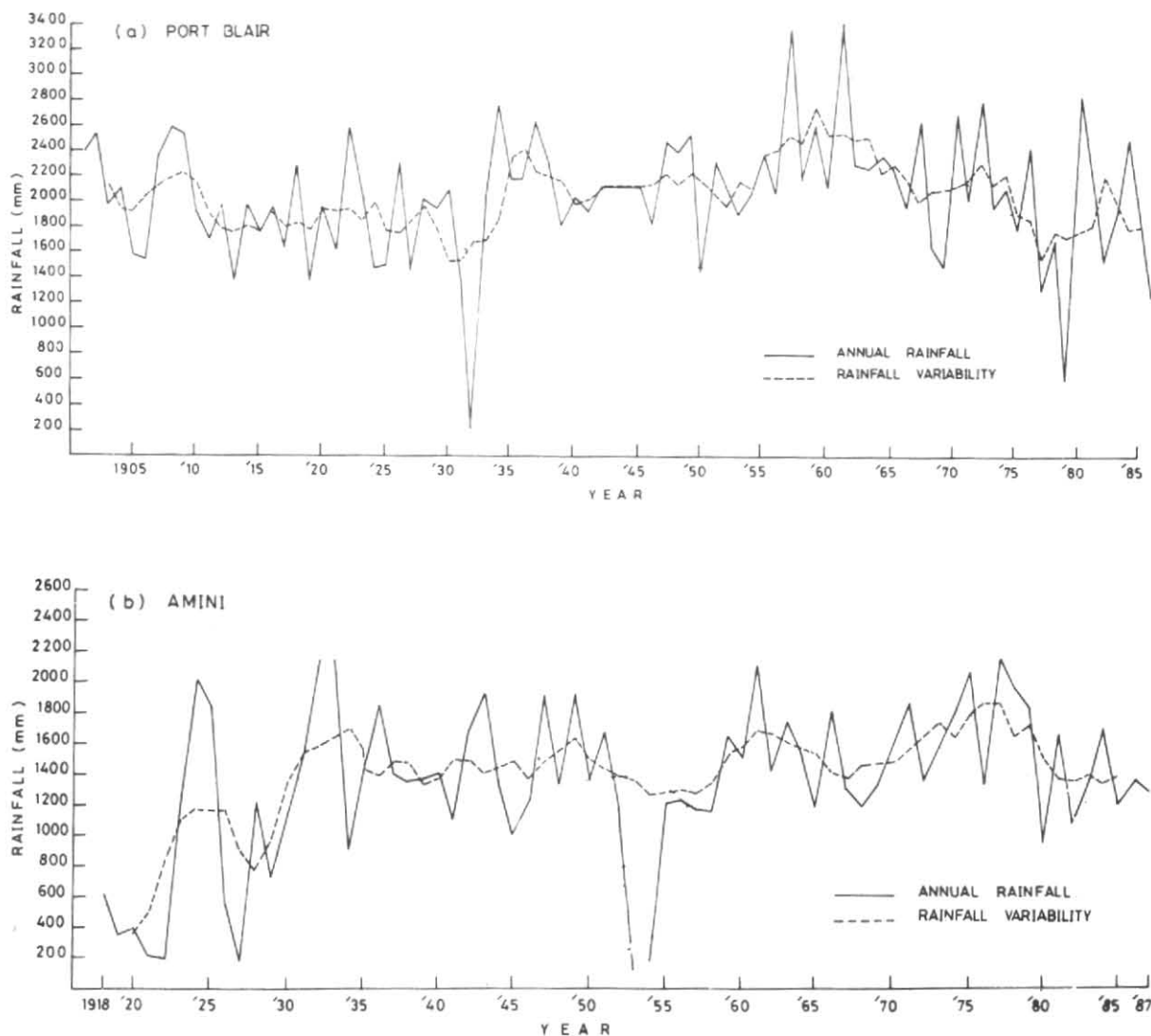
pentad. According to this methodology, the onset at Port Blair is 13 May while that at Amini is 23 May which are about a week ahead of the normal dates being used in India Meteorological Department (IMD).

3.1. The mean monthly distribution of rainfall at the two stations during the year is given in Table 1. Month-by-month, rainfall at Port Blair is more than that at Amini by at least a multiple of two. The annual mean at Port Blair comes out as 295 cm approximately, whereas, at Amini it is about 150 cm. This large difference in the rainfall at the two equatorial locations is really surprising. Perhaps more cyclogenesis in the Bay is a result of (i) easterly waves and (ii) somewhat higher sea surface temperature.

3.2. A good amount of work in trend, periodicities and persistence has appeared in past few years in meteorological literature. Most of these studies deal with the mainland. Biswas (1980) analysed rainfall data of Bay Islands for a period of 30 years and concluded that large scale deforestation has resulted in sharp fall in rainfall. In this study, a 5 years' moving average was fitted to Port Blair and Amini annual data. The results are shown in Figs. 1 (a & b).

Year-to-year fluctuations are evident at both the stations. However, the smoothed data did show some regular pattern in brief intervals of time. For instance, rainfall at Amini revealed a rising trend upto about 1934 and fluctuated around mean till 1955 and registered a rise which seems to have terminated in 1976. Subsequently, an un-ambiguous fall in the rainfall is evident.

At Port Blair, rainfall was more oscillatory. A rise between 1905 to 1910 is clearly seen followed by a fall for a brief period. The rainfall then remained more or less stationary till 1926, a slight rise between 1930 to 1935 followed by a fall for similar period and then fluctuations within a narrow limit appeared as peculiar features of rainfall at this station. After 1960, however, rainfall seems to have a general declining tendency.



Figs. 1 (a & b). Variability in annual rainfall (mm) (a) Port Blair and (b) Amini

TABLE 1

Mean monthly rainfall (mm)

Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean
Amini	15.1	2.6	3.5	25.4	123.8	380.7	311.9	217.2	149.6	141.1	77.3	32.0	1480.2
Port Blair	50.0	27.5	21.2	65.1	347.2	498.0	405.3	416.0	444.3	294.6	225.8	162.7	2957.7

A test of randomness by Von Neumann ratio method was performed. It is found that rainfall at Amini has been increasing at annual rate of 0.9 cm. In case of Port Blair the annual increment in rain-

fall is nearly 1/10th of that at Amini.

The above result appears quite significant, in view of importance being attached, in recent years to climatic change.

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Meteorological Office, Pune
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