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A CLIMATOLOGICAL STUDY OF THUNDERSTORMS AT MOHANBARI AIRPORT

1. Thunderstorm is one of important hazards to aviation activities. Statistical knowledge of its occurrence at different times and months in a year is helpful to a forecaster. Vishvanathan and Faria (1962), Krishnamurthy (1965) and Awadhesh Kumar (1992) studied the climatic characteristics of thunderstorms for Bombay, Poona and Lucknow respectively. Similar climatological features of thunderstorms at Mohanbari have been presented here using 10 years' data.

2. The data for the period 1984-93 have been obtained from the current weather registers of Mohanbari. Monthwise/yearwise frequencies of actual number of thunderstorms in different months and years have been shown in Table 1. Three hourly frequency distribution and duration of thunderstorms have been presented in Tables 2 and 3.

3. Table 1 gives the actual distribution of thunderstorms. During 10 years' period, total of 1165 thunderstorms have been found. The frequency of thunderstorms is maximum in April according to the present study about Mohanbari. The occurrence of more than one thunderstorm in a day is more common during premonsoon hot weather season.

4. From Table 2, in which frequency distribution of time of commencement of thunderstorm has been shown, it is seen that the occurrence is maximum at 1500-1800 UTC respectively except during March and April when it is maximum during 1200-1500 UTC. The average per year and percentage occurrence in each three hourly interval can be seen in Table 2.

5. Table 3 gives an idea of the duration of thunderstorm activity in relation to its time of occurrence. During the 10 years' period, it is found that most of the thunderstorms are of duration less than 3 and 3-6 hours. About 44.7% of the thunderstorms are of duration less than 3 hours, 34.16%

TABLE 1

Distribution of number of thunderstorms

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1984	—	1	14	26	13	24	12	20	8	5	1	2	126
1985	4	2	13	21	12	13	16	26	17	7	1	2	134
1986	1	3	12	20	8	20	19	14	9	8	—	1	115
1987	—	8	14	22	17	15	12	8	16	2	—	—	114
1988	3	6	17	20	7	17	9	15	8	3	1	—	106
1989	1	8	4	25	8	16	11	20	11	6	1	—	111
1990	1	8	11	13	12	14	13	18	19	—	1	—	110
1991	3	6	14	19	13	16	9	18	16	2	1	—	117
1992	1	12	14	17	15	14	18	16	15	5	—	2	129
1993	1	9	11	9	15	11	16	11	17	3	—	—	103
Total	15	63	124	192	120	160	135	166	136	41	6	7	1165
Average	1.5	6.3	12.4	19.2	12	16	13.5	16.5	13.6	4.1	0.6	0.7	116.5
Percent	1.2	5.4	10.6	16.4	10.3	13.7	11.5	14.2	11.6	3.5	0.5	0.6	—

TABLE 2

Frequency distribution of time of commencement of thunderstorms

Month	Time (UTC) of commencement of thunderstorm								Total
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	
January	2	1	—	4	3	1	1	3	15
February	2	4	6	10	9	19	10	3	63
March	3	7	8	16	37	27	15	11	124
April	15	12	11	21	51	36	23	23	192
May	18	3	6	22	17	21	11	22	120
June	18	14	7	20	17	34	26	24	160
July	12	8	4	12	26	33	23	17	135
August	22	12	9	17	22	24	22	38	166
September	24	12	7	18	17	21	21	16	136
October	5	3	3	4	1	5	11	9	41
November	1	—	—	—	—	2	2	1	6
December	4	1	—	—	1	1	—	—	7
Total	126	77	61	144	201	224	165	167	1165
Average	12.6	7.7	6.1	14.4	20.1	22.4	16.5	16.7	116.5
Percent	10.8	6.6	5.2	12.3	17.2	19.2	14.1	14.3	—

TABLE 3

Frequency of time of commencement of thunderstorm activity and duration

Month	Duration (Hours)	Time (UTC) of commencement of thunderstorm activity								Total
		00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	
January	0-3	2	—	—	3	1	—	—	2	8
	3-6	—	1	—	—	2	1	1	1	6
	6-9	—	—	—	—	—	—	—	—	—
	9-12	—	—	—	1	—	—	—	—	1
February	0-3	2	1	4	2	3	10	5	1	28
	3-6	—	2	1	3	1	7	3	1	18
	6-9	—	1	1	2	4	2	2	1	13
	9-12	—	—	—	1	—	—	—	—	1
	>12	—	—	—	2	1	—	—	—	3
March	0-3	2	5	6	6	12	9	4	2	46
	3-6	—	2	—	4	10	9	9	6	40
	6-9	—	—	1	3	10	7	2	3	26
	9-12	1	—	1	1	2	2	—	—	7
	>12	—	—	—	2	3	—	—	—	5
April	0-3	9	8	6	4	10	11	8	13	69
	3-6	6	3	3	2	14	12	13	8	61
	6-9	—	—	—	5	14	10	1	2	32
	9-12	—	—	—	9	9	3	—	—	21
	>12	—	1	2	1	4	—	1	—	9
May	0-3	13	3	5	13	8	4	5	13	64
	3-6	5	—	1	7	—	9	3	7	32
	6-9	—	—	—	—	2	5	2	1	10
	9-12	—	—	—	2	5	1	1	1	10
	>12	—	—	—	—	2	2	—	—	4
June	0-3	8	9	5	8	8	10	10	9	67
	3-6	7	5	2	10	7	14	13	14	72
	6-9	3	—	—	2	2	1	2	1	11
	9-12	—	—	—	—	—	9	1	—	10

TABLE 3—(*Contd.*)

Month	Duration (Hours)	Time (UTC) of commencement of thunderstorm activity								Total
		00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	
July	0-3	10	6	2	9	15	13	8	8	71
	3-6	2	2	2	2	4	13	11	8	44
	6-9	—	—	—	1	4	6	3	1	15
	9-12	—	—	—	—	2	1	1	—	4
	>12	—	—	—	—	1	—	—	—	1
August	0-3	17	5	5	11	9	9	10	14	80
	3-6	5	7	3	4	5	7	8	18	57
	6-9	—	—	—	1	5	5	3	6	20
	9-12	—	—	—	1	3	3	1	—	8
	>12	—	—	1	—	—	—	—	—	1
September	0-3	12	8	2	11	7	6	7	5	58
	3-6	10	4	5	6	3	8	8	7	51
	6-9	2	—	—	—	6	5	6	4	23
	9-12	—	—	—	—	—	2	—	—	2
	>12	—	—	—	1	1	—	—	—	2
October	0-3	5	3	3	2	1	2	5	3	24
	3-6	—	—	—	2	—	1	5	6	14
	6-9	—	—	—	—	—	1	1	—	2
	9-12	—	—	—	—	—	1	—	—	1
November	0-3	1	—	—	—	—	1	1	—	1
	3-6	—	—	—	—	—	—	—	1	1
	6-9	—	—	—	—	—	1	1	—	2
December	0-3	3	—	—	—	—	—	—	—	3
	3-6	—	—	—	—	1	1	—	—	2

lie between 3-6 hours, 13.3% lie between 6-9 hours, 5.6% lie between 9-12 hours and remaining 2.1% are found in the range of more than 12 hours.

6. Rao and Raman (1961) have also done some climatological study of thunderstorms at Mohanbari airport. Monthly variation of thunderstorm

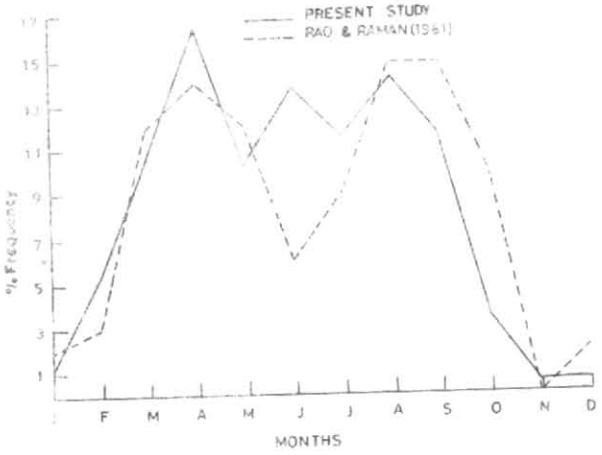

Fig. 1. Monthly frequency of thunderstorms at Mohanbari

frequency at Mohanbari, according to present study as well as according to the study done by Rao and Raman (1961), has been shown in Fig. 1. Both the studies show linear increase in thunderstorm frequency from January to April and sharp decrease after monsoon. Thunderstorm frequency according to Rao and Raman (1961) shows a bimodal maxima in April and August-September and minima in June, whereas according to present study it is maximum in April and remains nearly steady during monsoon.

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