Snowfall at Srinagar (1939-1953)

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1. Introduction

A brief study of the snowfall data of Srinagar (Lat. 34°08′ N, Long. 74°45′ E, height above mean sea level 5207 ft) for the 15 years, 1939 to 1953, is given in this note. Snowfall is given directly as the depth of the snow for each day and other types of precipitation like rain and sleet accompanied with snowfall are indicated in terms of precipitated water in inches. For this study a day has been taken as a period of 24 hours ending with 0830 IST of the day. The measurements of snowfall have been noted at the routine hours of observation, *i.e.*, 0830 and 1730 IST. The times of observation were, however, changed to 0800 and 1700 IST during 1943 to 1949.

2. Frequency of days with snowfall*

The total number of occasions of snowfall on each calendar date during the 15-year period is given in Table 1.

The table shows that the greatest number of 153 occasions of snowfall have occurred in the month of January and the next highest number of 99 in February. 59 such occasions have occurred in December. The table also shows that snowfall at Srinagar mainly commences from about the middle of December and lasts till the middle of March.

3. Frequency of snowy days accompanied with rain and sleet

Table 2 indicates the frequency of days of snowfall accompanied with rain and sleet only.

Out of the total of 341 occasions of all kinds of snowfall, 121 were accompanied with rain and sleet. 57 per cent of these 121 cases have been recorded during January and February and the rest 43 per cent during March and October to December.

4. Daily average snowfall

The daily average snowfall is shown in Table 3.

The highest daily average of 2·2 inches corresponds to 3 February and the next highest of 1·7 inches on 25 January. These two calendar dates did not have any occasion of snow with rain or sleet. The average of the other forms of precipitations like rain and sleet accompanying the snowfall have been indicated within brackets. It is seen that the highest monthly total of the daily average corresponds to January, being 19·7 inches of snowfall accompanied with 0·41 inches of rain and sleet. The three months of winter (December—February) together accounts for 48·1 inches of average snowfall accompanied with 1·24″ of the average other form of precipitation and the months of March, October and November for 7·2″ of snowfall accompanied with 0·94 inches of other terms of precipitation.

5. Average depth of snowfall per day

Table 4 gives the average depth of snowfall calculated by dividing the total amount of snowfall by the total number of occasions each calendar date has recorded snow, *i.e.*, this figure gives the average depth of snow that falls on snowfall days.

The highest average intensity of 13·6 inches has been recorded on 28 November, which has been recorded only on one occasion in 1946, during the 15 years. The highest average intensity of 9·00″ during the winter

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*Days on which not only snowfall but snowfall with other types of precipitation also occurred

TABLE 1
Frequency of days of snowfall at Srinagar during the 15 years (1939 to 1953)

Date	Jan	Feb	Mar	Oct	Nov	Dec
1	5	6	2	nil	nil	nil
2	5	6	1	nil	nil	nil
3	4	6	1	nil	nil	1
4	4	5	2	nil	nil	1
5	4	3	nil	nil	nil	nil
6	5	2	1	nil	nil	2
7	8	5	2	nil	nil	nil
8	7	5	2	nil	nil	1
9	5	4	3	nil	nil	3
10	3	5	2	nil	nil	2
11	6	4	1	nil	nil	nil
12	5	2	1	nil	nil	1
13	6	2	1	nil	1	nil
14	6	2	nil	nil	nil	nil
15	6	1	nil	nil	nil	nil
16	3	2	nil	nil	nil	2
17	4	3	nil	nil	nil	nil
18	10	5	nil	nil	1	1
19	9	5	nil	nil	1	1
20	4	5	nil	nil	nil	1
21	5	3	1	nil	nil	5
22	4	2	nil	nil	nil	4
23	6	1	nil	nil	nil	4
24	4	4	nil	nil	1	4
25	4	6	nil	nil	nil	3
26	5	3	nil	1	1	3
27	3	1	nil	1	1	3
28	3	1	nil	nil	1	3
29	4	nil	nil	nil	1	3
30	4		nil	nil	1	6
31	2		nil	nil		5
Total	153	99	20	2	8	59

NOTE : *nil* indicates ro snowfall

TABLE 2
Frequency of days of snowfall accompanied with rain and sleet during 15 years (1939 to 1953)

Date	Jan	Feb	Mar	Oct	Nov	Deo
1	3	1	2	—	—	—
2	2	nil	1	—	—	—
3	1	1	1	—	—	1
4	1	1	1	—	—	1
5	1	2	—	—	—	—
6	1	nil	1	—	—	2
7	1	1	1	—	—	—
8	2	2	2	—	—	nil
9	1	2	3	—	—	2
10	nil	3	2	—	—	1
11	1	2	1	—	—	—
12	2	nil	1	—	—	nil
13	1	nil	nil	—	1	—
14	nil	nil	—	—	—	—
15	2	1	—	—	—	—
16	nil	1	—	—	—	1
17	2	1	—	—	—	—
18	1	1	—	—	1	1
19	2	2	—	—	1	1
20	2	3	—	—	—	1
21	1	1	1	—	—	3
22	nil	2	—	—	—	2
23	1	nil	—	—	—	2
24	1	3	—	—	1	1
25	1	2	—	—	—	2
26	nil	2	—	1	1	2
27	nil	1	—	1	1	1
28	1	1	—	—	nil	1
29	2	—	—	—	nil	nil
30	nil		—	—	—	1
31	nil		—	—		1
Total	33 (22)	36 (36)	17 (85)	2 (100)	6 (75)	27 (46)

NOTE :—Dash (—) indicates no snowfall

Nil indicates only snowfall but no rain

Figures within brackets indicate the percentages of the total number of occasions (*vide* Table 1)

TABLE 3

Average snowfall at Srinagar (snow depth in inches)—1939 to 1953

Date	Jan	Feb	Mar	Oct	Nov	Dec
1	0·5(0·06)	1·1(0·01)	0·3(0·04)	nil	nil	nil
2	0·7(0·01)	1·6(—)	t (0·13)	nil	nil	nil
3	0·4(0·02)	2·2(—)	0·1(—)	nil	nil	0·1(0·02)
4	0·3(0·02)	0·7(0·01)	0·3(0·01)	nil	nil	0·1(—)
5	0·3(—)	0·2(—)	nil	nil	nil	nil
6	0·9(—)	t (—)	0·6(0·04)	nil	nil	0·5(0·02)
7	1·5(—)	0·5(0·02)	0·2(0·07)	nil	nil	nil
8	0·9(0·10)	0·2(0·07)	0·8(0·08)	nil	nil	0·2(—)
9	0·8(—)	0·8(0·01)	0·6(0·16)	nil	nil	0·1(0·05)
10	0·2(—)	0·6(0·04)	0·8(0·08)	nil	nil	1·0(0·03)
11	0·4(0·01)	0·2(0·02)	0·3(0·01)	nil	nil	nil
12	0·6(—)	0·4(—)	0·5(—)	nil	nil	t (—)
13	0·2(0·01)	0·1(—)	t (—)	nil	t (0·02)	nil
14	0·3(—)	t (—)	nil	nil	nil	nil
15	0·7(0·01)	0·1(0·03)	nil	nil	nil	nil
16	0·2(—)	0·9(0·05)	nil	nil	nil	0·1(0·01)
17	0·3(—)	1·5(—)	nil	nil	nil	nil
18	1·3(0·04)	0·8(0·01)	nil	nil	0·3(0·04)	0·3(0·01)
19	1·0(0·03)	1·5(0·04)	nil	nil	t(0·02)	0·1(—)
20	0·2(0·02)	0·9(0·02)	nil	nil	nil	t(0·01)
21	0·9(0·02)	0·3(—)	0·7(0·07)	nil	nil	0·6(0·04)
22	0·4(—)	0·1(0·02)	nil	nil	nil	0·9(0·01)
23	1·4(—)	t (—)	nil	nil	nil	0·4(0·01)
24	0·5(0·02)	1·1(0·04)	nil	nil	0·1(0·02)	0·1(0·01)
25	1·7(—)	0·7(0·03)	nil	nil	nil	0·5(0·08)
26	0·5(—)	0·2(0·01)	nil	t (0·06)	t (0·05)	1·5(—)
27	0·4(—)	0·1(0·05)	nil	0·1(0·01)	0·3(0·03)	0·7(0·01)
28	0·5(0·01)	0·6(0·03)	nil	nil	0·9(—)	1·4(—)
29	0·5(0·03)		nil	nil	0·3(—)	1·5(—)
30	1·0(—)		nil	nil	nil	0·4(0·01)
31	0·2(—)		nil	nil		0·5(—)
Total	19·7(0·41)	17·4(0·51)	5·2(0·69)	0·1(0·07)	1·9(0·18)	11·0(0·32)

NOTE :(—) indicates snow with rainfall amounts nil or negligible

Figures in brackets indicate rainfall in inches accompanied with snow

Nil indicates days with no snowfall

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TABLE 4

Average snowfall (in inches) at Srinagar for snowfall days only (1939—1953)

Date	Jan	Feb	Mar	Oct	Nov	Dec
1	1·4	2·8	3·8	nil	nil	nil
2	2·0	4·1	0·8	nil	nil	nil
3	1·5	5·5 *	1·6	nil	nil	1·9
4	1·1	2·2	2·5	nil	nil	1·1
5	1·0	0·9	nil	nil	nil	nil
6	2·6	0·1	8·5	nil	nil	3·9
7	2·8	1·6	1·6	nil	nil	nil
8	1·9	0·6	5·6	nil	nil	2·5
9	2·3	2·8	3·2	nil	nil	0·6
10	1·0	1·9	6·1	nil	nil	7·5
11	1·1	0·9	4·5	nil	nil	nil
12	1·7	3·0	7·3	nil	nil	0·5
13	0·6	0·4	t	nil	0·6	nil
14	0·8	0·2	nil	nil	nil	nil
15	1·6	2·1	nil	nil	nil	nil
16	1·0	6·5	nil	nil	nil	0·8
17	1·0	7·3	nil	nil	nil	nil
18	2·0	2·3	nil	nil	3·9	4·3
19	1·7	4·5	nil	nil	0·7	1·0
20	0·9	2·7	nil	nil	nil	0·6
21	2·8	1·3	10·5	nil	nil	1·9
22	1·3	0·9	nil	nil	nil	3·2
23	3·5	0·3	nil	nil	nil	1·7
24	1·7	4·1	nil	nil	2·0	0·5
25	6·3	1·8	nil	nil	nil	3·5
26	1·5	0·9	nil	0·1	0·2	7·6
27	2·1	0·8	nil	1·0	4·4	3·6
28	2·5	9·0	nil	nil	13·6	7·1
29	1·9	nil	nil	nil	4·9	7·0
30	3·8		nil	nil * nil	1·1
31	1·7		nil	nil		1·7
Total	59·1	71·5	56·0	1·1	30·3	63·2

NOTE: *nil* indicates no snowfall

TABLE 5

Total average precipitation in terms of depth of precipitation (inches) on snowy days (1939—1953)

Date	Jan	Feb	Mar	Oct	Nov	Dec
1	0·11	0·12	0·07	nil	nil	nil
2	0·08	0·16	0·13	nil	nil	nil
3	0·06	0·22	0·01	nil	nil	0·03
4	0·05	0·08	0·04	nil	nil	0·01
5	0·03	0·02	nil	nil	nil	nil
6	0·09	t	0·10	nil	nil	0·07
7	0·15	0·07	0·09	nil	nil	nil
8	0·19	0·09	0·16	nil	nil	0·02
9	0·08	0·09	0·22	nil	nil	0·06
10	0·02	0·10	0·16	nil	nil	0·13
11	0·05	0·04	0·04	nil	nil	nil
12	0·06	0·04	0·05	nil	nil	t
13	0·03	0·01	t	nil	0·02	nil
14	0·03	t	nil	nil	nil	nil
15	0·08	0·04	nil	nil	nil	nil
16	0·02	0·14	nil	nil	nil	0·02
17	0·03	0·15	nil	nil	nil	nil
18	0·17	0·09	nil	nil	0·07	0·04
19	0·13	0·19	nil	nil	0·02	0·01
20	0·04	0·11	nil	nil	nil	0·01
21	0·11	0·03	0·14	nil	nil	0·10
22	0·04	0·03	nil	nil	nil	0·10
23	0·14	t	nil	nil	nil	0·05
24	0·07	0·15	nil	nil	0·03	0·02
25	0·17	0·10	nil	nil	nil	0·13
26	0·05	0·03	nil	0·93	0·05	0·15
27	0·04	0·06	nil	0·32	0·06	0·08
28	0·06	0·09	nil	nil	0·09	0·14
29	0·08		nil	nil	0·03	0·15
30	0·10		nil	nil	nil	0·05
31	0·02		nil	nil		0·05
Total	2·38	2·25	1·21	1·25	·37	1·42

NOTE: *nil* indicates no snowfall

TABLE 6

Frequency of snowfall within different ranges of depth (inches) during 15 years, 1939—1953

Ranges	Jan	Feb	Mar	Oct	Nov	Dec	Total
t	15	7	2	—	—	5	29
0·1- 2·0	98	55	6	2	4	36	201
2·1- 4·0	18	20	2	—	1	4	45
4·1- 6·0	15	7	4	—	2	6	34
6·1- 8·0	4	1	3	—	—	4	12
8·1-10·0	—	3	2	—	—	—	5
>10·0	3	6	1	—	1	4	15
Highest fall (in.)	17·5	24·5	10·2	1·0	13·6	21·6	
Date	7	3	21	27	28	26	
Year	1952	1949	1950	1939	1946	1953	

TABLE 7

Duration of spells of snowfall (in days)—1939 to 1953

Month	1	2	3	4	5	>5
Jan	25	22	8	7	3	1
Feb	15	13	6	5	2	1
Mar	6	1	1	1	1	—
Oct	—	1	—	—	—	—
Nov	3	1	1	—	—	—
Dec	17	9	5	1	—	—
Total	66	47	21	14	6	2

(December—February) has been recorded on 28 February. The average intensity of more than 5″ in 24 hours has been recorded on 13 days.

6. Total average precipitation on each snowy day

The total average precipitation, including snowfall and sleet etc converted into the rainfall in inches is shown in Table 5. The highest total of 2·38″ is recorded in January and the least of 0·37″ in November. The records show that the snowfalls in October and November are mostly in the form of sleet. During the period December to February the highest daily average of 0·22″ has been recorded in February.

7. Frequency of snowfall within different ranges of intensity

Table 6 gives the frequency of the average depth of snowfall during the 15-year period.

It is seen that the snowfalls between the depth limits from 0·1″ to 2·0″ during the 15-year period, have been most frequent. Snowfalls with intensities of more than 10″ have occurred only on 15 occasions during the period, being 6 times in February, 4 in December, 3 in January and once each in March and November.

The heaviest snowfall of 24·5′ during 24 hours has occurred on 3 February 1949.

8. Duration of spells of snowfall

From Table 7, it is seen that the snowfalls have seldom continued for more than 5 days, there having been only 2 such occasions, once each in January and February. The one-day spells have been most frequent, being 66 out of the total of 156. There have been about 70 per cent of the spells which have not lasted for more than 2 days.

9. Frequency of snowfalls within different 4-hour periods

The frequency of occurrence of snowfall within each 4-hour period of a day (0830 to 0830 IST) has been given in Table 8. In calculating this frequency, the occasions of the snowfall which have lasted for more than any 4-hour period, have been included in all such periods, e.g., occasions of snowfalls having lasted between 1030 to 1730 IST have been included in all the periods, 0830 to 1230, 1231 to 1630 and 1631 to 2030 IST.

It is seen that the occurrences of snowfalls are generally more during the periods 0431 to 0830 IST and 0831 to 1230 IST than in the remaining periods. The total number of falls between these two periods being 169 in the former and 183 in the latter. During January and February, there are more occasions of snowfalls between 0831 to 1230 IST whereas in December the frequency is more between 0431 to 0830 IST.

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TABLE 8

Frequency of occasions of snowfall during 4-hour periods (1939 to 1953)

	January						February						March					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI
1939	5	4	3	4	6	5	4	1	4	2	2	6	1	1	2	2	.	.
40	6	2	3	3	2	3	3	1	1	1	2	3	.	.	.	.	.	.
41	2	2	2	3	4	4	2	2	.	.	.	.	.	.	1	1	.	.
42	8	5	5	4	4	7	5	3	2	2	4	4	.	.	.	.	.	.
43	10	11	6	6	6	6	4	4	3	3	2	1	.	.	.	.	.	.
1944	8	4	5	7	6	6	4	5	6	6	4	3	.	.	.	.	.	.
45	9	9	7	8	7	8	5	1	1	2	1	2	2	1	.	.	.	2
46	.	1	4	3	1	1	1	2	1	1	1	1	.	.	.	.	.	.
47	4	2	3	6	3	5	1	5	4	3	1	2	.	.	.	.	.	.
48	4	4	3	4	4	4	7	8	8	5	5	6	2	4	5	2	2	4
1949	1	2	1	.	2	4	4	6	5	4	6	6	.	.	.	.	.	.
50	7	2	7	8	7	5	3	2	2	2	5	4	1	1	1	1	1	1
51	9	6	6	3	4	10	6	3	5	4	3	3	2	2	1	.	.	.
52	5	4	4	4	1	3	1	1	1	1	1	1	2	1	1	.	.	1
53	10	5	5	4	4	9	1	1	3	3	.	1	.	.	.	.	.	.
Total	88	63	64	67	61	80	51	45	46	39	37	43	10	10	11	6	3	8

	October						November						December					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI
1939	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
41	.	.	.	.	.	.	1	1	.	1	1	1	2	.	1	1	1	.
42	.	.	.	.	.	.	.	.	1	.	.	.	3	3	1	.	.	1
43	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	2	3
1944	.	.	.	.	.	.	2	.	.	.	.	.	4	3	3	1	1	4
45	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.
46	.	.	.	.	.	.	1	2	3	2	2	2	4	4	6	5	8	7
47	.	.	.	.	.	.	.	.	.	.	.	.	4	4	3	3	3	6
48	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2	1	4	3
1949	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1	.	.	2
50	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.
51	.	.	.	.	.	.	.	.	.	.	.	.	2	1	2	1	.	1
52	.	.	.	.	.	.	.	.	.	.	.	.	3	4	4	2	1	4
53	.	.	.	.	.	.	.	.	.	.	.	.	1	4	.	3	3	3
Total	1	.	.	.	.	1	4	3	4	3	3	3	29	25	26	19	23	34

I—0831 to 1230 IST, II—1231 to 1630 IST, III—1631 to 2030 IST,
IV—2031 to 0030 IST, V—0031 to 0430 IST, VI—0431 to 0830 IST