



**Government of India  
Ministry of Earth Sciences (MoES)  
India Meteorological Department  
Meteorological Centre, Shimla**

**Annual Weather Report  
2023**

## **Table of Content**

### **1. Winter Season**

- 1) Weather summary for January, February and March-2023
- 2) Graphical Representation of Monthly precipitation for 2023
- 3) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023

### **2. Pre- Monsoon Season.**

- 1) Weather summary for March, April and May.
- 2) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023
- 3) Graphical Representation of Monthly precipitation for 2023

### **3. Monsoon Season**

- 1) Weather summary for June, July, August and September.
- 2) Graphical Representation of Monthly precipitation for 2023
- 3) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023
- 4) District wise Heavy rainfall events-
- 5) Monsoon Activity during Extreme events in Himachal Pradesh.
- 6) Records in 2023 (Rainfall and Temperatures)
- 7) Cloudburst

### **4. Post- Monsoon Season**

- 1) Weather summary for June September, October and November
- 2) Graphical Representation of Monthly precipitation for 2023
- 3) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023

### **5. Annual Precipitation**

- 1) Comparison of past year rainfall.

### **7. List of daily (24Hrs.) highest amount of rainfall in June, July, August and September.**

### **8. Thunderstorm**

### **9. Snowfall**

- 1) Snowfall Comparison

### **10. Legends**

## Winter Season. (January , February)

Winter begins in October and lasts till March and January is the coldest month of the year. But as per IMD terminology Winter Season is from January to February.

### 1) Weather summary for January, February and March

#### January-

In January month Una station has maximum temperature i.e 26.0°C and keylong station has minimum temperature (-11.5°C). In 2023 January month had received less rainfall as compared to 2022. The highest cumulative monthly rainfall in the month of January occurred in the year 1911.

**Ground frost-** Bilaspur, Palampur, Sundernagar and Mandi.

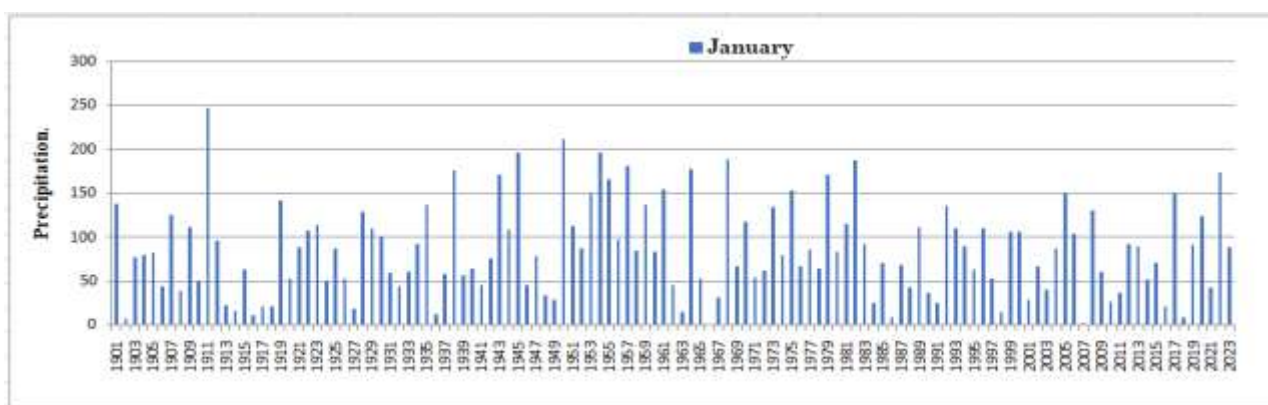
**Cold wave-** Una, Hamirpur, Berthin, Bilaspur

**Cold Day-** Kalpa, Dalhourise, Manali, Una, Hamirpur.

**Severe cold day-** Una, Hamirpur and Bilaspur.

**Fog-Moderate Fog-**Una , Dense fog-Bilaspur ,Mandi, Sundernagar,

**Very dense Fog-** Bilaspur.



**Graph: 1-** Monthly rainfall for January month from 1901 to 2023.

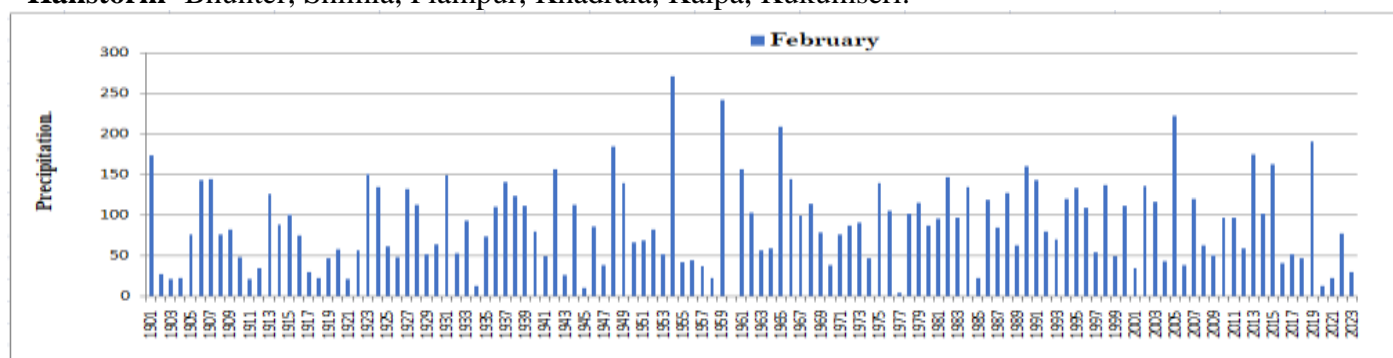
#### February-

In February month Una station has maximum temperature i.e 32.4°C and keylong station has minimum temperature of -13.2°C. The highest cumulative monthly rainfall in the month of February occurred in the year 1954.

**Fog-** Bilaspur, Mandi, Sundernagar, Bilaspur

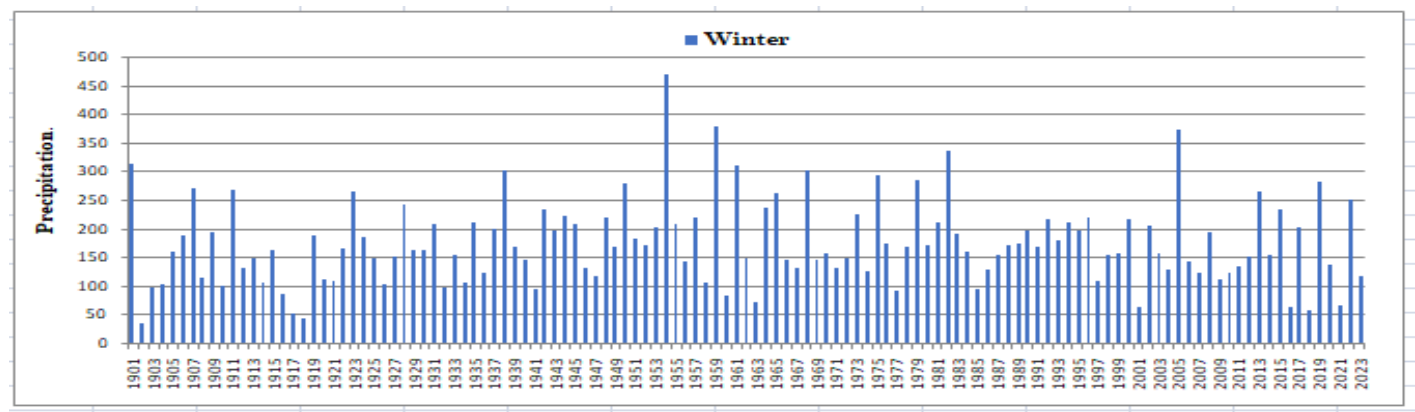
**Cold wave-** Hamirpur, Berthin, Una, DhaulaKuan.

**Hailstorm-** Bhunter, Shimla, Plampur, Khadralla, Kalpa, Kukumseri.



**Graph: 2-** Monthly precipitation for February month from 1901 to 2023.

Winter Season



Graph: 3- Winter Season precipitation from 1901 to 2023.

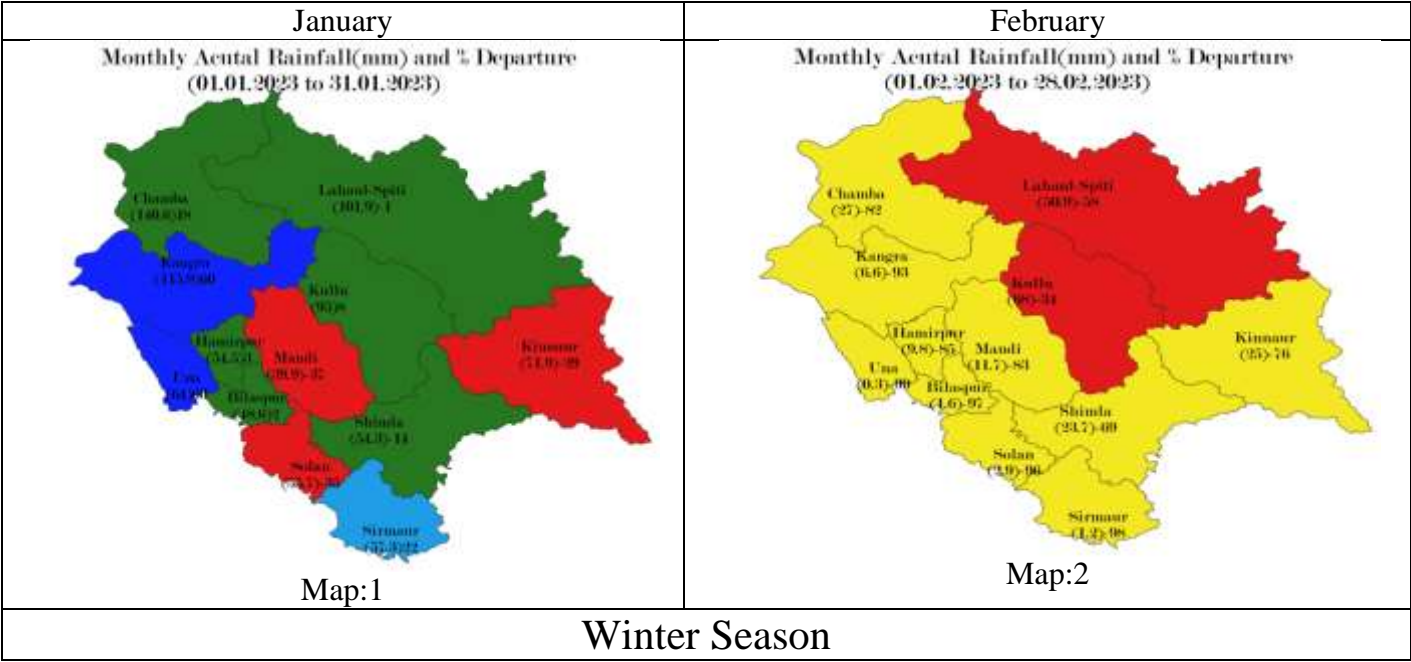
In the Winter Season (January and February) of 2023 state had received 116.8mm precipitation against the normal precipitation of 187.1mm which is (-38%) below the normal. The highest cumulative monthly rainfall in winter Season occurred in the year 1954.

2)Graphical Representation of Monthly precipitation for 2023

**January month** had received excess rainfall in kangra Una, and Sirmaur distt with deficient rainfall in the distt of Mandi, Kinnaur and Saolan. Rest of the distt had received normal rainfall. **February month** had received deficient rainfall in many distt of the state with lowest rainfall in Una district.

**In winter season** (01.01.2024 to 28.02.2023) cumulative rainfall for kullu distt was normal and deficient for rest of the distt.

Following Map shows the cumulative district wise Rainfall(mm) and Departure(%) in Map 1,2 and 3 respectively for 2023.



Winter Season Actual Rainfall(mm) and % Departure  
(01.01.2023 to 28.02.2023)



Map:3

### 3) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%)-2023

The cumulative monthly precipitation in the month of January and February is 87.3mm and 29.5mm respectively. Cumulative precipitation for winter Season is 116.8mm.

Month	Actual (mm)	Normal (mm)	Departure (%)
January	87.3	85.3	2
February	29.5	101.8	-71
Winter Season	116.8	187.1	-38

Table 1: Monthly Actual (mm), Normal (mm) and Percentage Departure(%)-2023

## Pre-Monsoon Season (March, April and May)

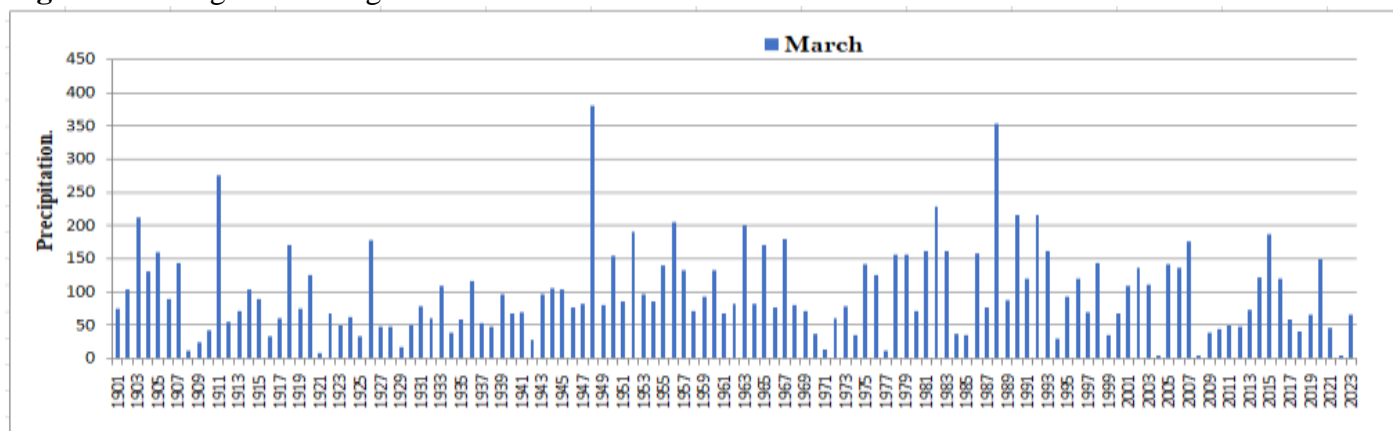
### 1) Weather summery for March, April and May.

#### March-

In March month Una station has maximum temperature i.e 34.0°C and keylong station has minimum temperature -5.4°C. In 2023 March month received more rainfall than last 2 years. The highest cumulative monthly rainfall in the month of March occurred in the year 1948.

**Hailstrom:-** Shimla, Kufri, Sundernagar, Palampur, Bilaspur, Dharmashala, Nurpur.

**Fog:-** Dense Fog- Sundernagar.

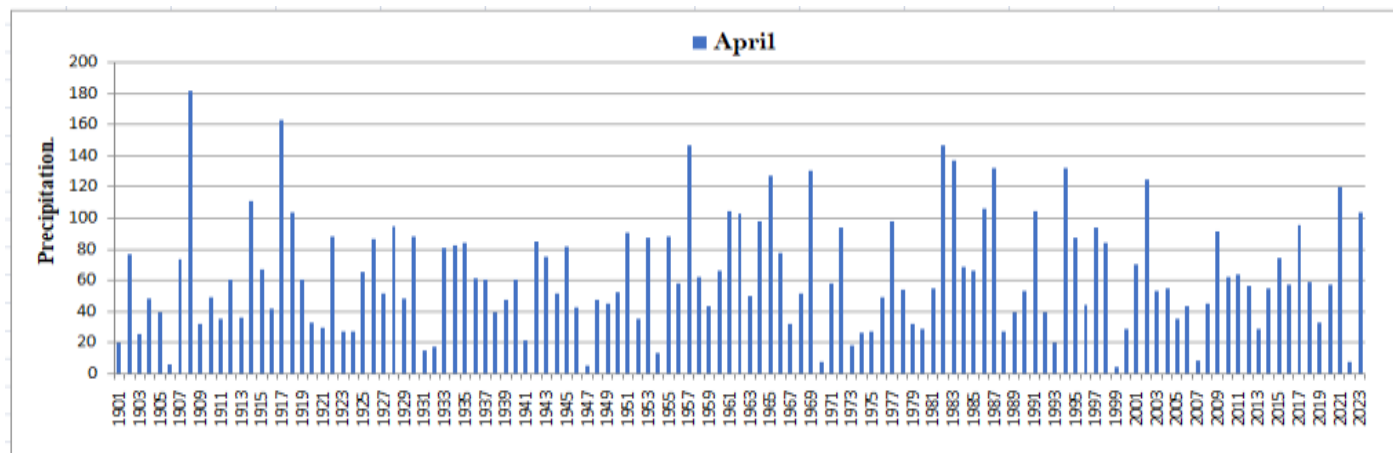


**Graph: 4-** Monthly rainfall for March month from 1901 to 2023.

#### April-

In April month Una station has maximum temperature i.e 41.0°C and kalpa station has minimum temperature -41.0°C. March 2023 received more precipitaion as compared to 2022.The highest cumulative monthly rainfall in the month of April occurred in the year 1908

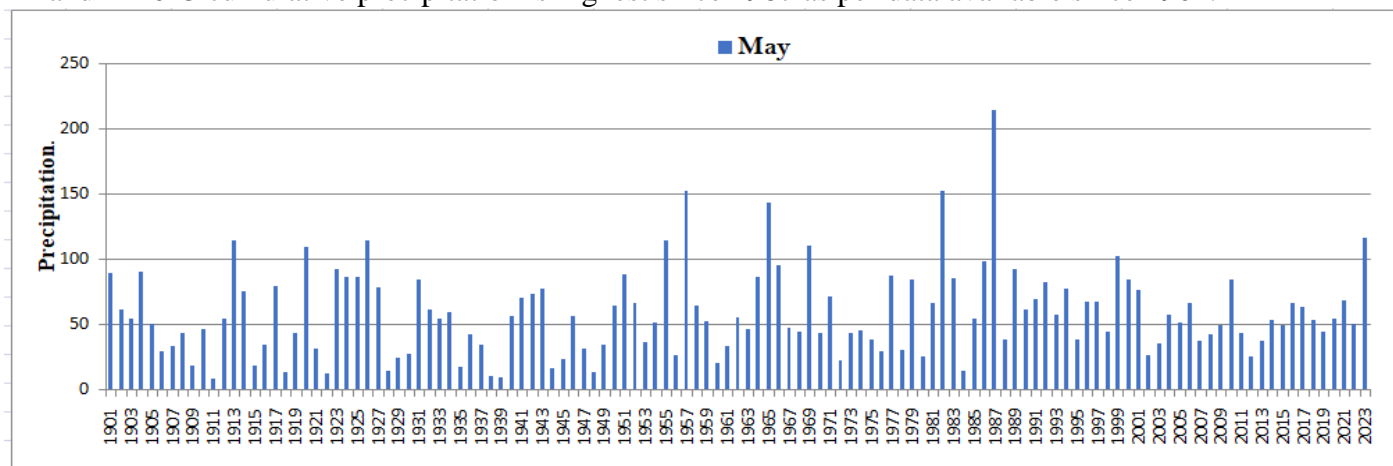
**Hailstorm-** Bilaspur, AMS Shimla(Jubberhatti), Shimla(Kotkhaie, Kufri, Jubbal, khadralla), Bhamaur, koksar, Palampur, Mandi(Seraj, Sainj), Sirmaur(Haripurdhara).



**Graph: 5-** Monthly rainfall for April month from 1901 to 2023.

## May-

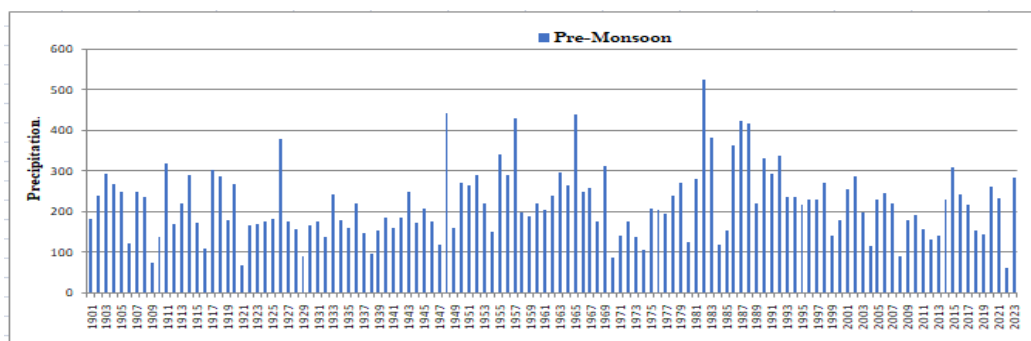
In May month Una station has maximum temperature i.e 42.4°C and keylong station has minimum temperature -2.6°C. The highest cumulative monthly rainfall in the month of May occurred in the year 1987 and in 2023 cumulative precipitation is highest since 1987 as per data available since 1901.



**Graph: 6-** Monthly rainfall for May month from 1901 to 2023.

## Pre-Monsoon Season(March, April and May)

In the Pre-Monsoon Season of 2023 state had received 286.9mm precipitation against the normal precipitation of 240.7mm. The highest cumulative monthly rainfall in pre-monsoon Season occurred in the year 1982.



**Graph: 7-** Pre-Monsoon Season precipitation from 1901 to 2023.

Following table shows the Actual normal and percentage departure for March, April, May and for Pre- Monsoon Season.

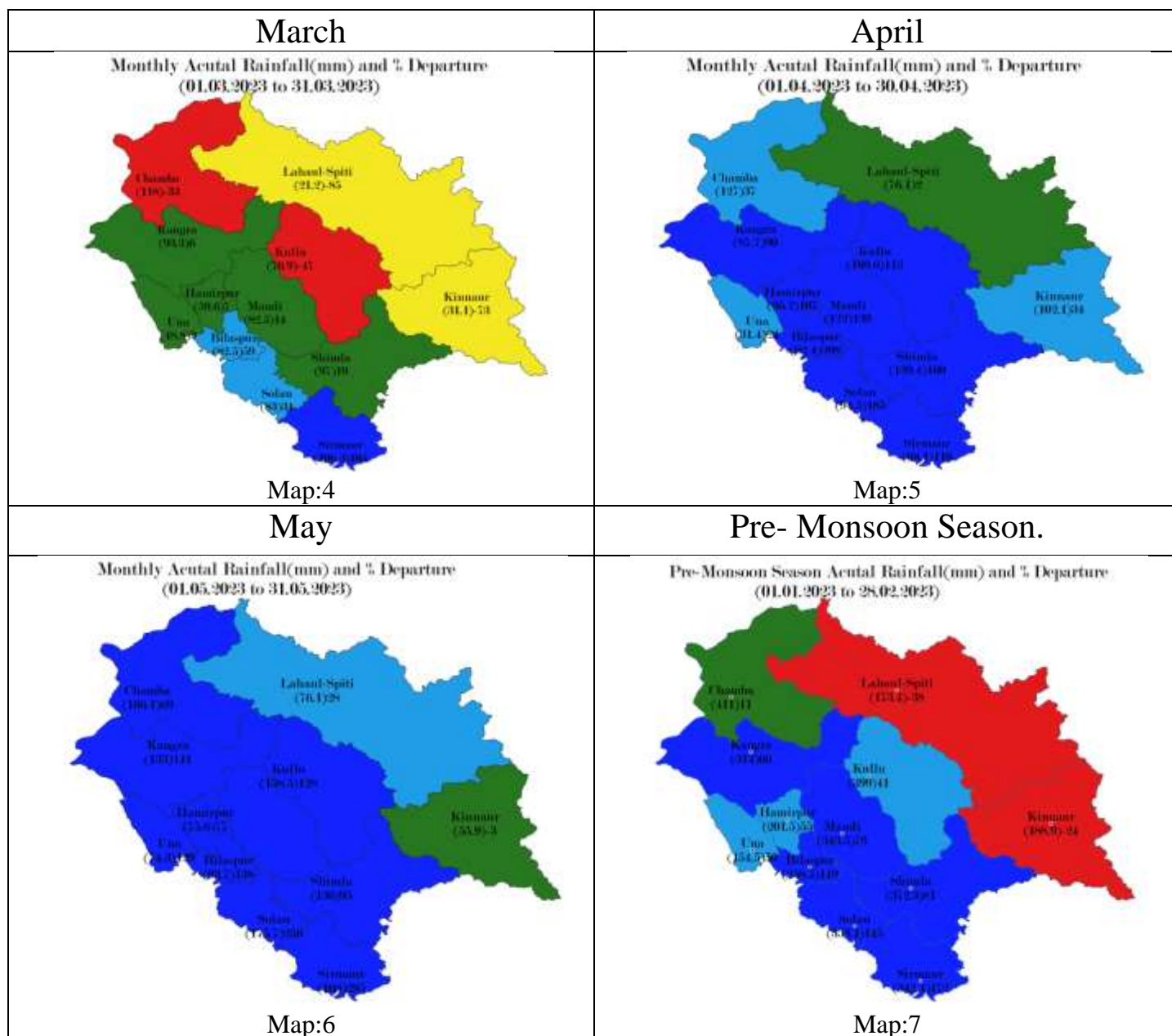
Month	Actual (mm)	Normal (mm)	Departure (%)
March	66.7	113.4	-41
April	103.5	64	62
May	116.8	63.3	84
Pre-Monsoon	286.9	240.7	19

Table 2: Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023



## 2)Graphical Representation of Monthly precipitation for 2023

**March month** had received excess rainfall in the districts of Bilaspur, Solan and Sirmaur. Districts Lahul Spiti, Kinnaur, Chamba and Mandi had received deficient rainfall while rest of the districts had received normal rainfall. **In April month** most districts of the state had received excess rainfall while normal rainfall in Lahul Spiti distt. Kullu districts had received highest precipitation with lowest in Una district. Also **in May month** Most of the districts had received excess rainfall with normal rainfall in districts Kinnaur. **In Pre Monsoon season** except Lahul Spiti and Kinnaur all the distt of the state had received excess rainfall. Following Map shows the district wise Rainfall (mm) and Departure(%) in Map 1,2 and 3 respectively-2023





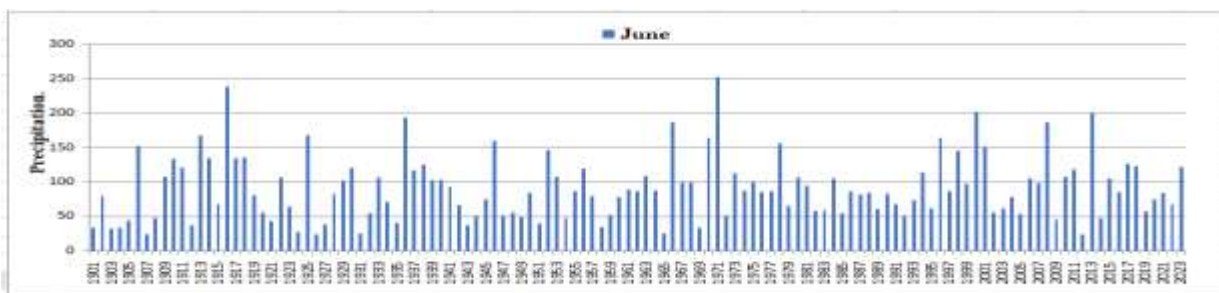
## Monsoon Season (June, July, August and September)

### 1) Weather summary for June, July, August and September.

#### June-

In June month Una station has maximum temperature i.e 40.0°C and keylong station has minimum temperature 3.7°C..

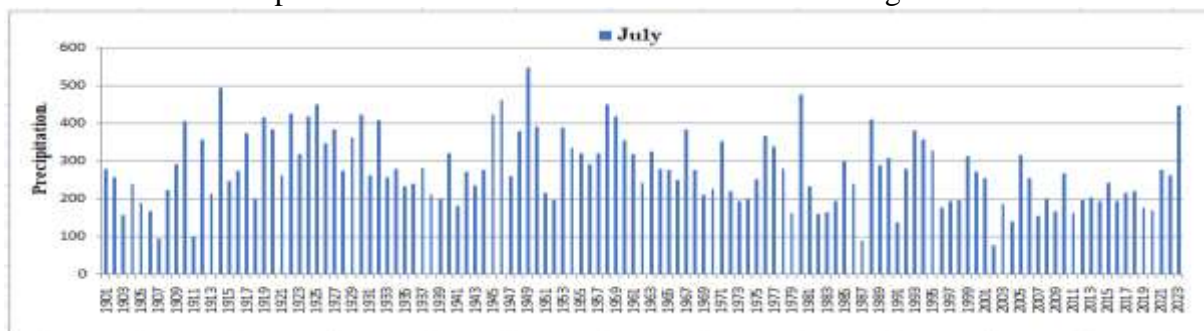
Following graph (Graph-08) shows the graphical representation of precipitation of June month rainfall from 1901 to 2023 as per data available. In 2023 state had received highest rainfall from past 5 years in June month.



**Graph: 8-** Monthly rainfall for June month from 1901 to 2023.

#### July-

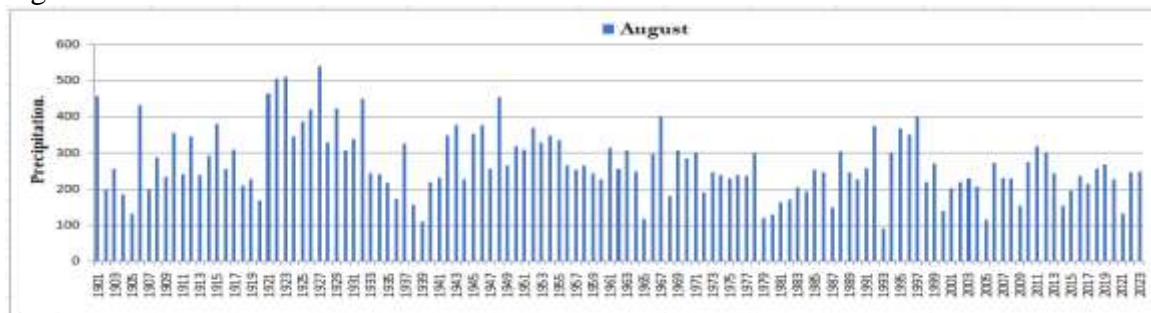
In July month Una station has maximum temperature i.e 38.0°C and keylong station has minimum temperature 9.2°C. Following graph (Graph-09) shows the graphical representation of precipitation of July month from 1901 to 2023 as per data available. In 2023 state had received highest rainfall after 1980.



**Graph: 9-** Monthly rainfall for July month from 1901 to 2023.

#### August-

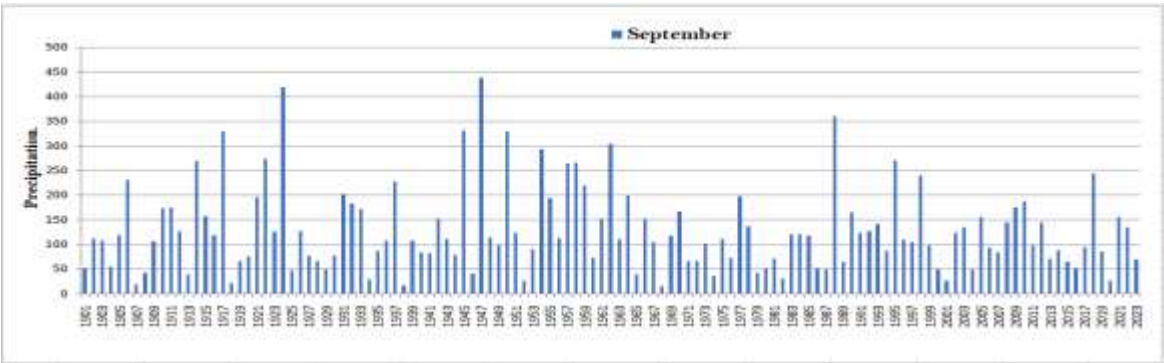
In August month Una station has maximum temperature i.e 36.8°C and keylong station has minimum temperature 6.7°C. Following graph (Graph-10) shows the graphical representation of precipitation of August month from 1901 to 2023 as per data available. In 2023 state had received maximum rainfall than last 3 years in August month.



**Graph: 10-** Monthly rainfall for August month from 1901 to 2023.

September-

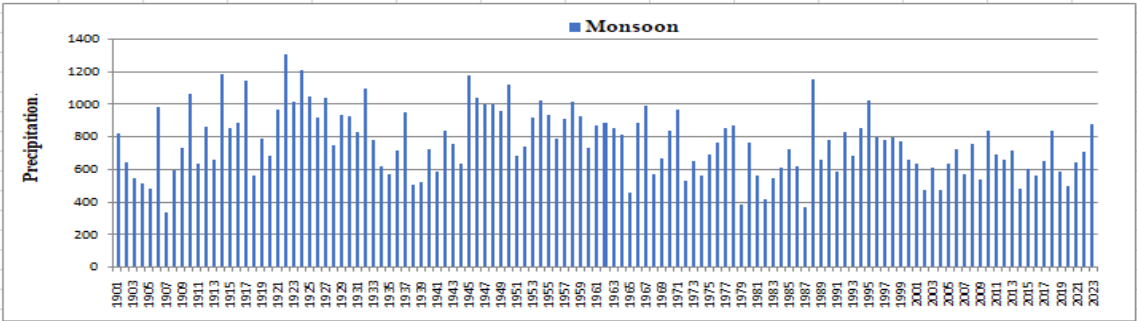
In March month Una station has maximum temperature i.e 38.0°C and keylong station has minimum temperature 4.9°C.Following graph (Graph-11) shows the graphical representation of precipitation(mm) for September month from 1901 to 2023 as per data available. The highest cumulative monthly rainfall in September month occurred in the year 1947



Graph: 11- Monthly rainfall for September month from 1901 to 2023.

Monsoon Season(June, July, August and September)

Following graph (Graph-11) shows the graphical representation of precipitation (mm) for September month from 1901 to 2023. This year in Monsoon Season state had received highest rainfall with actual of 886mm rainfall after 1995(1029.7mm) as per data available from 1901.



Graph: 12- Monsoon Season rainfall from 1901 to 2023.

2) Graphical Representation of Monthly precipitation for 2023

<p>June</p> <p>Monthly Actual Rainfall(mm) and % Departure (01.06.2023 to 30.06.2023)</p> <p>Map-8</p>	<p>July</p> <p>Monthly Actual Rainfall(mm) and % Departure (01.07.2023 to 31.07.2023)</p> <p>Map-9</p>
August	September

Monthly Actual Rainfall(mm) and % Departure  
(01.08.2023 to 31.08.2023)



Map-10

September Actual Rainfall(mm) and % Departure  
(01.01.2023 to 28.02.2023)



Map-11

### Monsoon Season

Monsoon season Actual Rainfall(mm) and % Departure  
(01.01.2023 to 28.02.2023)



Map-12

### 3) Cumulative Monthly Actual (mm), Normal (mm) and Percentage Departure (%)-2023

Following table shows the Actual normal and percentage departure for June, July, August, September and for Monsoon Season 2023. In Monsoon Season July month had received highest rainfall.

Month	Actual (mm)	Normal (mm)	Departure (%)
June	121.7	101.1	20
July	448.9	255.9	75
August	247.6	256.8	-4
September	69.6	120.6	-42
Monsoon Season	886	734.4	21

Table 3: Monthly Actual (mm), Normal (mm) and Percentage Departure (%)-2023

#### 4) District wise Heavy rainfall events-

**Table: 4** Shows the district wise rainfall events- (Extremely heavy rainfall (> 204.4 mm) or very heavy rainfall (115.6-204.4 mm), Heavy rainfall(64.4mm to 115.5mm)) recorded over some stations of Himachal Pradesh during July, August and September 2023.

District wise rainfall events-Monsoon Season 2023.									
	July			August			September		
District	HRF	VHRF	EHRF	HRF	VHRF	EHRF	HRF	VHRF	EHRF
Bilaspur	5	10	2	15	11	NIL	5	NIL	NIL
Chamba	12	5	NIL	2	NIL	1	NIL	NIL	NIL
Hamirpur	9	6	NIL	9	3	1	1	NIL	NIL
Kangra	13	10	NIL	11	4	3	5	2	NIL
Kinnaur	1	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Kullu	16	4	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Lahaul&Spiti	9	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Mandi	24	6	NIL	22	14	NIL	1	NIL	NIL
Shimla	47	4	NIL	10	2	NIL	NIL	NIL	NIL
Sirmaur	28	25	3	7	NIL	NIL	NIL	NIL	NIL
Solan	10	11	NIL	6	NIL	NIL	NIL	NIL	NIL
Una	1	7	2	5	5	NIL	2	1	NIL

Table 4: District wise rainfall events for June, July, August and September-2023

Note-HRF-Heavy rainfall, VHRF-Very Heavy rainfall, EHRF-Extremely Heavy rainfall

#### 5) Monsoon Activity during Extreme events in Himachal Pradesh.

Table Show the Monsoon Activity during extreme weather activity in Himachal Pradesh ( 08th July to 12th July & 11th to 14<sup>th</sup> August 2023)

Date	Activity	Date	Activity
08 July	Wide spread ,Active	11 Aug	Wide spread ,Active
09 July	Wide spread ,Vigorous	12 Aug	Wide spread ,Active
10 July	Wide spread , Vigorous	13 Aug	Wide spread ,Normal
11 July	Wide spread , Vigorous	14 Aug	Wide spread , Vigorous
12 July	Fairly Wide spread ,Normal		

Table 5: Monsoon Activity during Extreme events in Himachal Pradesh.

## Records

### New records in 2023(Rainfall)

Table-6 Show the Record break rainfall during 2023 monsoon season in the month of June, July and August.

24 hours Rainfall(mm) Records for June, July ,August and September 2023 for Himachal Pradesh			
Station	District	New Record	Old record
AMS Kangra	Kangra	<b>143.5(24<sup>th</sup> June, 2023)</b>	107.0 (11 <sup>th</sup> June, 2021)
Manali	Kullu	<b>131.3(09th July)</b>	105.1(09 July, 1971)
Rohru	Shimla	<b>185(09th July)</b>	170(25 July, 1966)
Ghamroor	Kangra	<b>166.4(09th July)</b>	164.8(19 July, 2021)
Nadaun	Hamirpur	<b>160.5(09th July)</b>	146(30 July, 1996)
Pachhad	Sirmaur	<b>220.3(10th July)</b>	189.2(26 July, 1973)
Pandoh	Mandi	<b>166.0 (14 Aug2023)</b>	137.0 (13 <sup>th</sup> Aug2011)

Table 6: Rainfall Records during Monsoon 2023

### Temperature Record

24 hours Maximum temperature(°C) for Himachal Pradesh			
Station	District	New Record	Old record
<b>Nahan</b>	Kangra	<b>32.8°C (07<sup>th</sup> September)</b>	<b>32.4°C (21<sup>st</sup> September)</b>

Table 7: Temperature Record in September month 2023

## Cloudburst

District wise Cloud burst Events in HP during July and August 2023(Source- State Disaster Management Authority) Govt. of HP.

Districts	July	August
Chamba	2	-
Kangra	-	-
Kinnaur	5	-
Kullu	26	-
Lahaul & spiti	1	-
Mandi	2	4
Shimla	8	-
Sirmaur	-	2
Solan	1	1

Table 8: Temperature Record in September month 2023

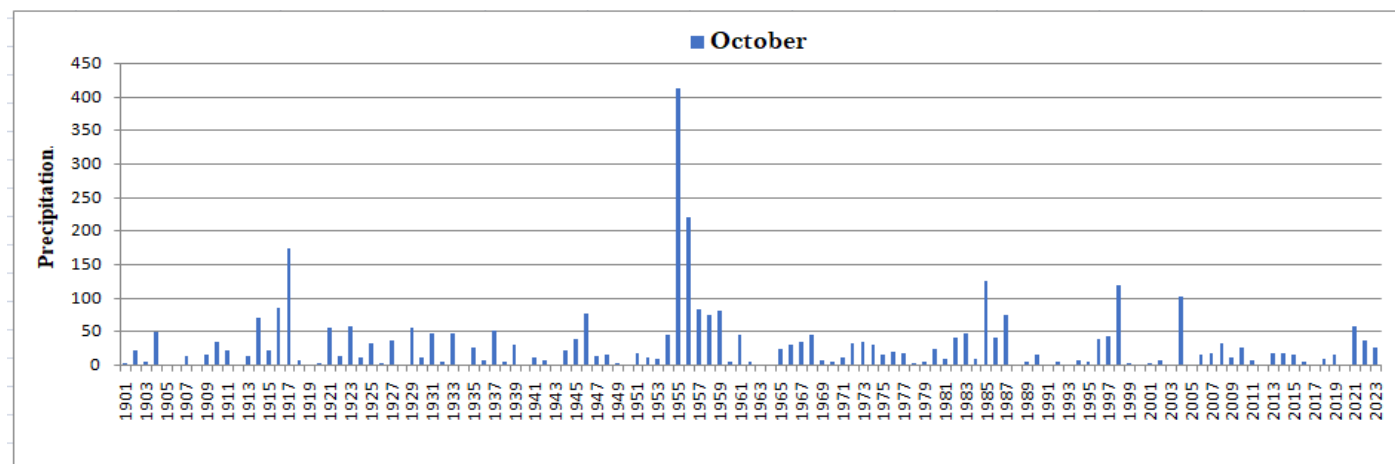


## Post Monsoon Season- (October, November and December)

### 1) Weather summary for June September, October and November

#### October-

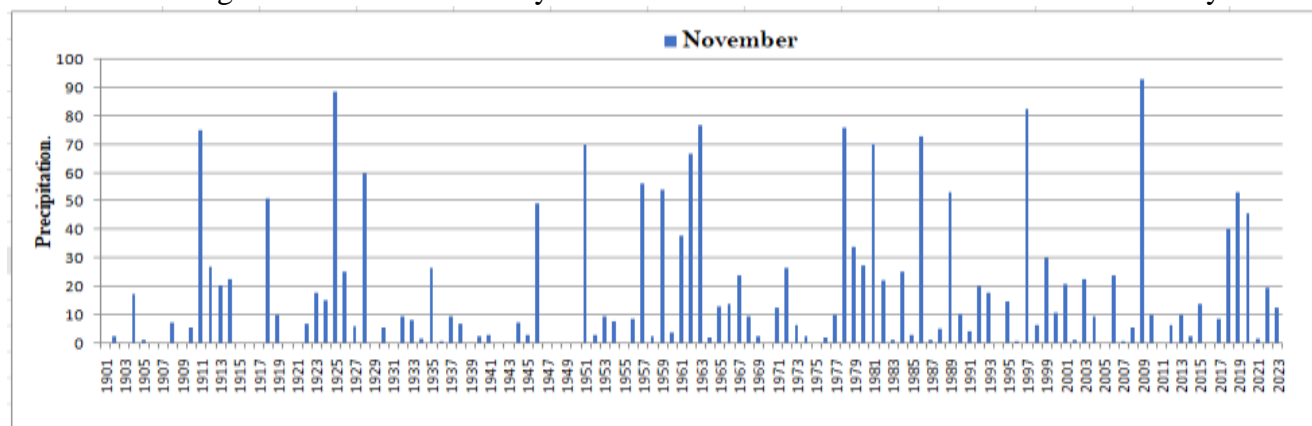
In October month Una station has maximum temperature i.e 36.0°C and Keylong station has minimum temperature -2.3°C. In October month state had received 27.3mm actual rainfall. Following graph (Graph-13) shows the graphical representation of precipitation for October month from 1901 to 2023 as per data available. The highest cumulative monthly rainfall in the month of October occurred in the year 1955.



**Graph: 13-** Monthly rainfall for October Month from 1901 to 2023.

#### November-

In November month Una station has maximum temperature i.e 32.0°C and Keylong station has minimum temperature -2.7°C. In November month state had received 12.2mm actual rainfall. Following graph (Graph-14) shows the graphical representation of precipitation for November month from 1901 to 2023 as per data available. The highest cumulative monthly rainfall in the month of November occurred in the year 2019



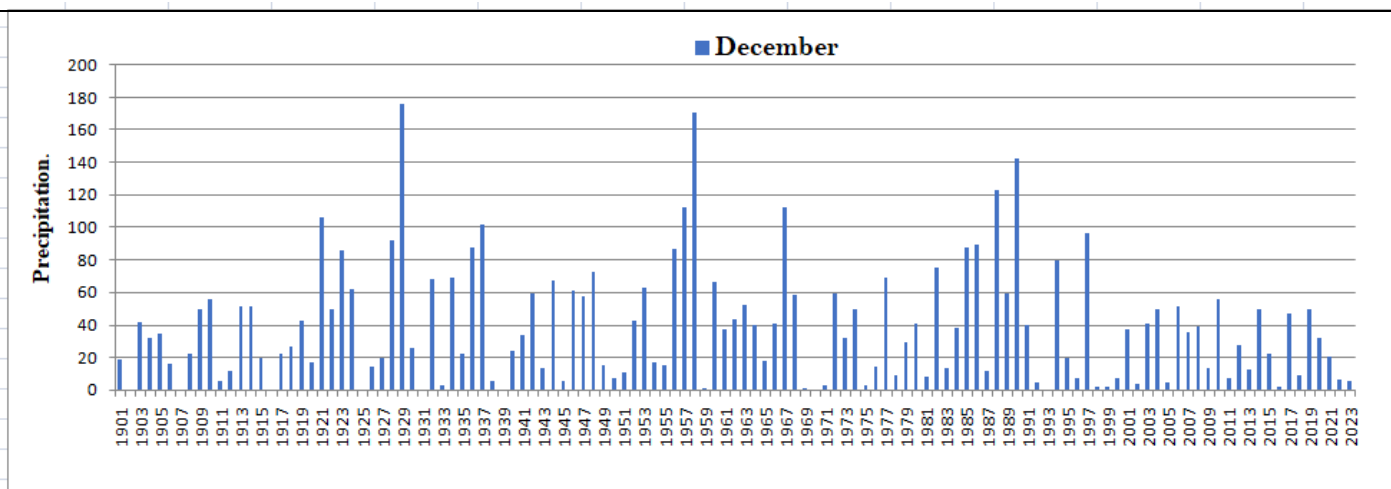
**Graph: 14-** Monthly rainfall for November month from 1901 to 2023.

#### December-

In December month Una station has maximum temperature i.e 26.6°C and kalpa station has minimum temperature -7.3°C. In December month state had received 5.8mm actual rainfall. Following graph (Graph-15) shows the graphical representation of precipitation for December month from 1901 to 2023 as per data available. The highest cumulative monthly rainfall in the month of December occurred 1928 in the year

**Shallow fog-** Sundernagar and Mandi.

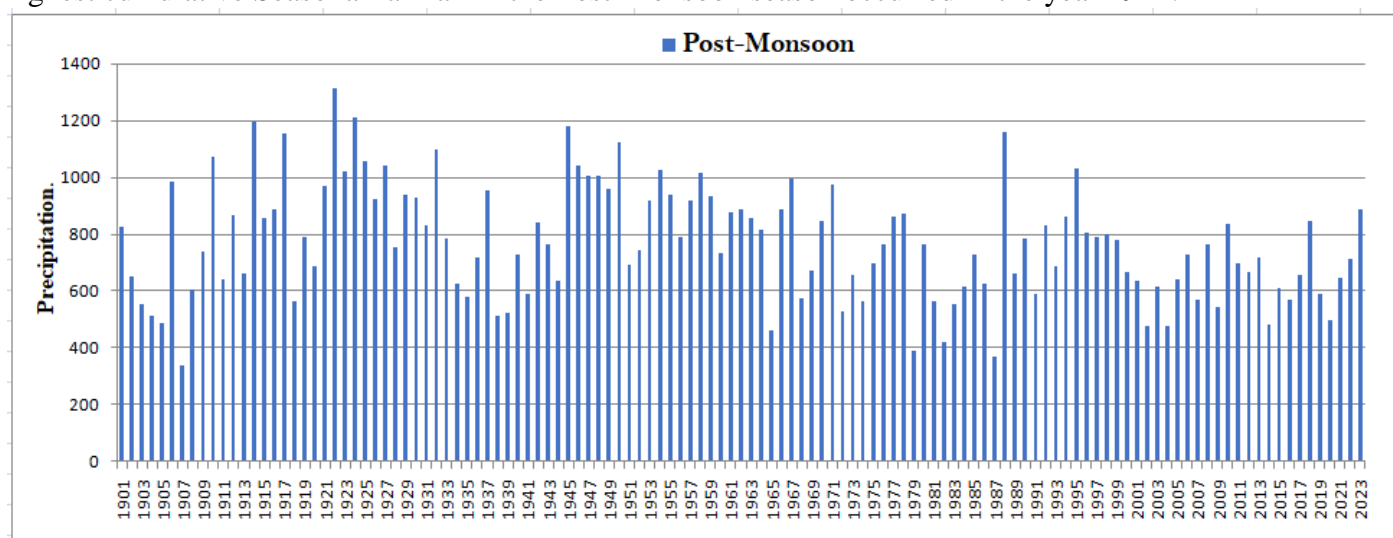
**Dense Fog-** Bilaspur and Nalagarh.



**Graph: 15-** Monthly rainfall for December month from 1901 to 2023.

### Post Monsoon Season(October, November and December)

In Post Monsoon Season state had received 45.2mm actual rainfall. Following graph (Graph-16) shows the graphical representation of precipitation for Post-Monsoon Season from 1901 to 2023 as per data available. The highest cumulative Seasonal rainfall in the Post-Monsoon season occurred in the year 1922.



**Graph: 16-** Post-Monsoon Season rainfall from 1901 to 2023.

## 2)Graphical Representation of Monthly precipitation for 2023

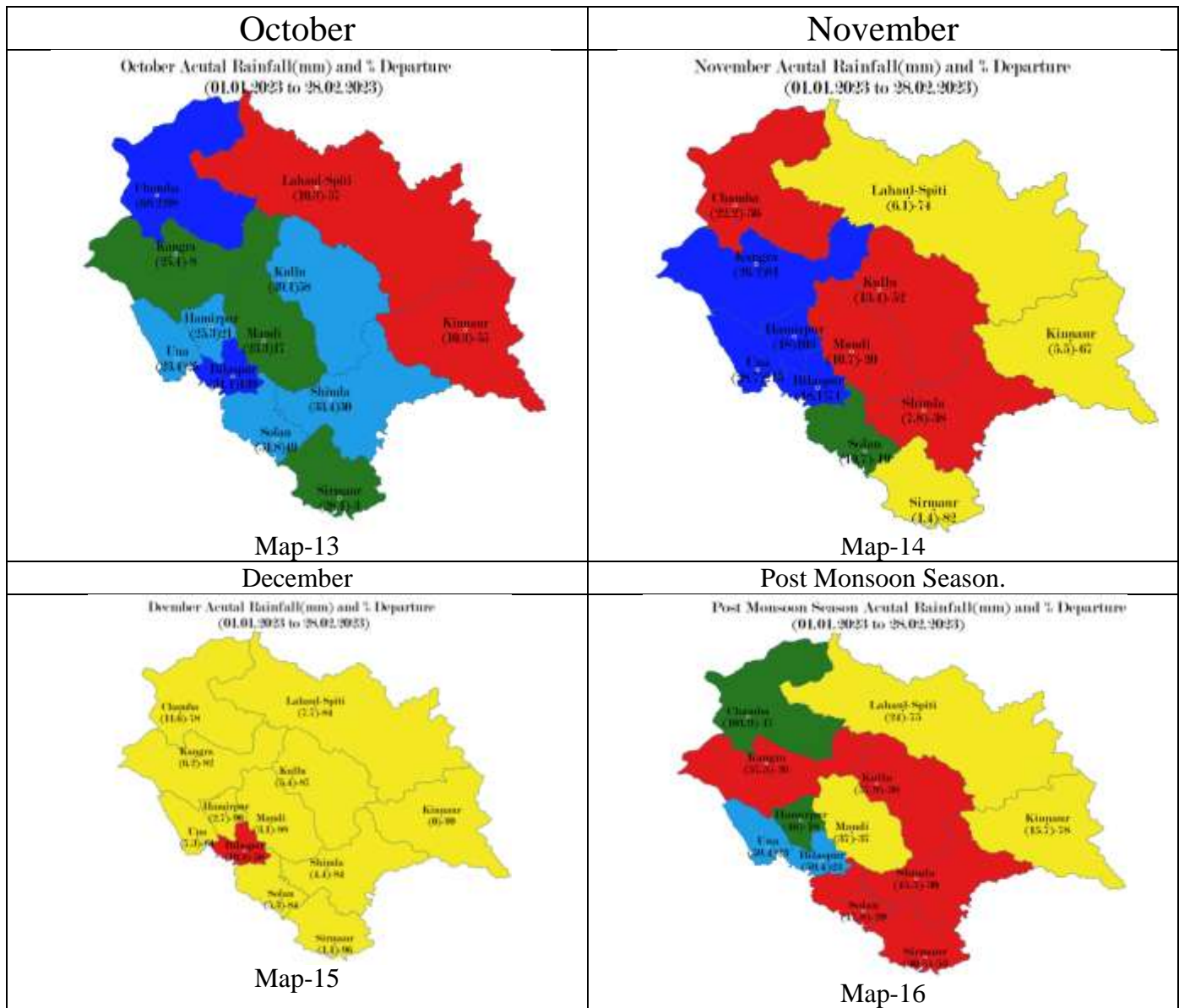
**In October 2023**, as shown in Map-13, District Chamba, Hamirpur, Una, Kullu, Shimla, and Solan received excess rainfall. District Kangra, Mandi, and Sirmaur received normal rainfall whereas there was deficient rainfall in the districts of Lahul Spiti and Kinnaur

**In November 2023**, as shown in Map-14, District Una, Hamirpur, Bilaspur and Kangra had received excess rainfall and rest of the districts had received deficient rainfall.

**In December 2023**, as shown in Map-15, all the districts of the state had received deficient rainfall.

**In Post Monsoon Season 2023** as shown in Map-16, districts Una and Bilaspur had received excess rainfall districts chamba and Hamirpur had received normal rainfall. All other districts received deficient rainfall.





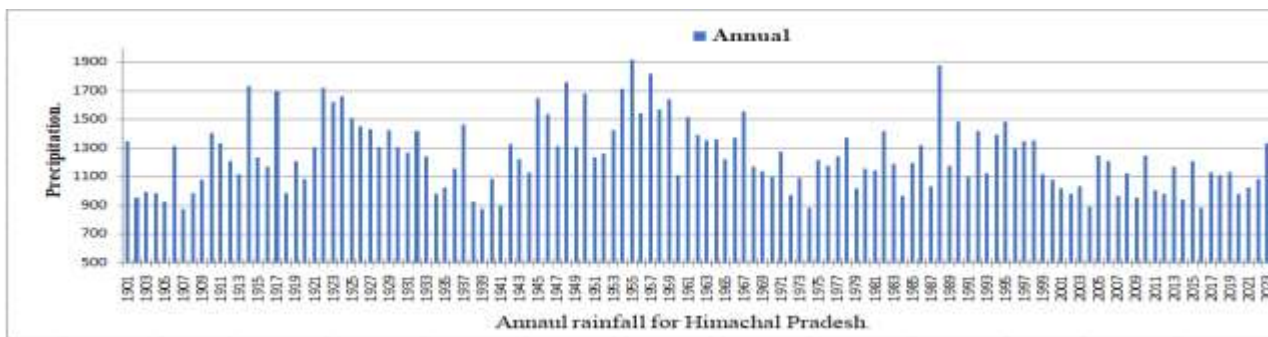
Following table shows the Actual normal and percentage departure for October, November December and for Post Monsoon Season. In Monsoon Season July month had received highest rainfall

Month	Actual(mm)	Normal(mm)	Departure (%)
October	27.3	25.1	9
November	12.2	19.7	-38
December	5.8	38.1	-85
Post-Monsoon Season.	45.2	82.9	-45

Table-9: Monthly Actual (mm), Normal (mm) and Percentage Departure (%) -2023

## Annual Precipitation (2023)

The yearly precipitation averaged over the state is about 1334.9mm which is highest since 1998. The yearly cumulative precipitation for the state is deficient in the districts of Lahul Spiti, and Kinnaur , Normal in the districts Chamba, Kangra, Una, , large excess in the districts of Bilaspur, Hamirpur, Kullu, Mandi, Shimla, Sirmaur and Solan. Graph-17 shows the annual cumulative rainfall for Himachal Pradesh.



**Graph: 17-** Annual Precipitation (mm) from 1901 to 2023.

### List of daily (24Hrs.) highest amount of rainfall in June, July, August and September.

#### June

Date	Station	Rainfall(mm)
23-06-2023	Bhoranj	122.4
24-06-2023	Kataula	163.3
	Kasauli	145.0
	Kangra Aero	143.5
	Dharampur	128.0
25-06-2023	Sarkaghat	130.4

#### July

Date	Station	Rainfall(mm)
06-07-2023	Jatton barrage	120.4
09-07-2023	Una rampur aws	228.5
	R l bbmb	224.0
	Una rampur aws	228.5
10.07.2023	Pachhad	220.3
	Naina davi	198.4
11.07.2023	Nahan	250.0
	Jatton barrage	238.0
13.07.2023	Jatton barrage	127.0
14.07.2023	Saloni	124.0
15.07.2023	Dharmsala	131.3
16.07.2023	Palampur	151.0
18.07.2023	Jatton barrage	120.0
	Renuka / dadhau	120.0
19.07.2023	Dharmsala	126.4
21.07.2023	Palampur	147.0
22.07.2023	Renuka / dadhau	195.0

	Jatton Barrage	150.4
23.07.2023	Nalagarh	140.0
26.07.2023	Jatton barrage	156.0
	Renuka / dadhau	120.0
28.07.2023	Bhoranj	127.2
	Kataula	118.3

### August

Date	Station	Rainfall(mm)
04.08.2023	Dharmsala	121.3
07.08.2023	Naina davi	162.6
	R l bbmb	139.0
11.08.2023	Nadaun	164.0
	Bilaspur sadar	160.8
	Una	124.8
13.08.2023	Sundarnagar	166.1
	Sujanpur tira	145.5
14.08.2023	Kangra aero	273.4
	Sujanpur tira	254.0
	Dharmsala	250.2
	Chuari	234.0
	Palampur	220.0
15.08.2023	Gohar	139.0
	Sujanpur tira	133.0
23.08.2023	Kahu	213.6
	Kataula	210.2
24.08.2023	Jogindarnagar	154.0

### September

Date	Station	Rainfall(mm)
16.09.2023	Ghamroor	128.4
19.09.2023	Amb	147.0
	Dehra gopipur	139.3

(#: Rainfall figures are for past 24 Hrs. ending on 8:30 Hrs. IST of the date)

## Thunderstorm

Table 10 shows the month wise Number of thunderstorm days. Number of thunderstorm observed during the month of March, April, May and June.

Month/Station	Shimla	AMS Shimla	Sundernagar	Bhunter	Kangra	Kalpa
January	3	4	4	2	5	0
February	3	3	2	5	2	0
March	9	11	13	11	15	1
April	9	11	10	10	11	1
May	14	15	16	12	11	3
June	14	14	18	12	17	1
July	9	21	23	15	20	0
August	4	10	15	6	19	0
September	4	12	9	4	11	0
October	4	4	4	6	4	2
November	1	1	2	1	2	0
December	2	2	1	0	1	0

Table 10: Number of monthly thunderstorm days

## Snowfall

There are four spells of snowfall in **January**, six spells snowfall each in February and March, and Four spell of snowfall in April, and Three spells of snowfall in May.

### **Highest snowfall**

January– Koksar(Lahaul Spiti): 71.0cm

February- Koksar(Lahaul Spiti): 41.0cm

March-Khadrala(Shimla):22.0cm

April- Koksar(Lahaul Spiti): 38.0cm

May- Koksar(Lahaul Spiti): 16.0cm

-There is one spell of snowfall in **September**. There are three spells of snowfall in each in October, November and December months with arrival of snowfall in September on 06<sup>th</sup> September with light snowfall in Lahaul Spiti district at Koksar.

### **Highest snowfall**

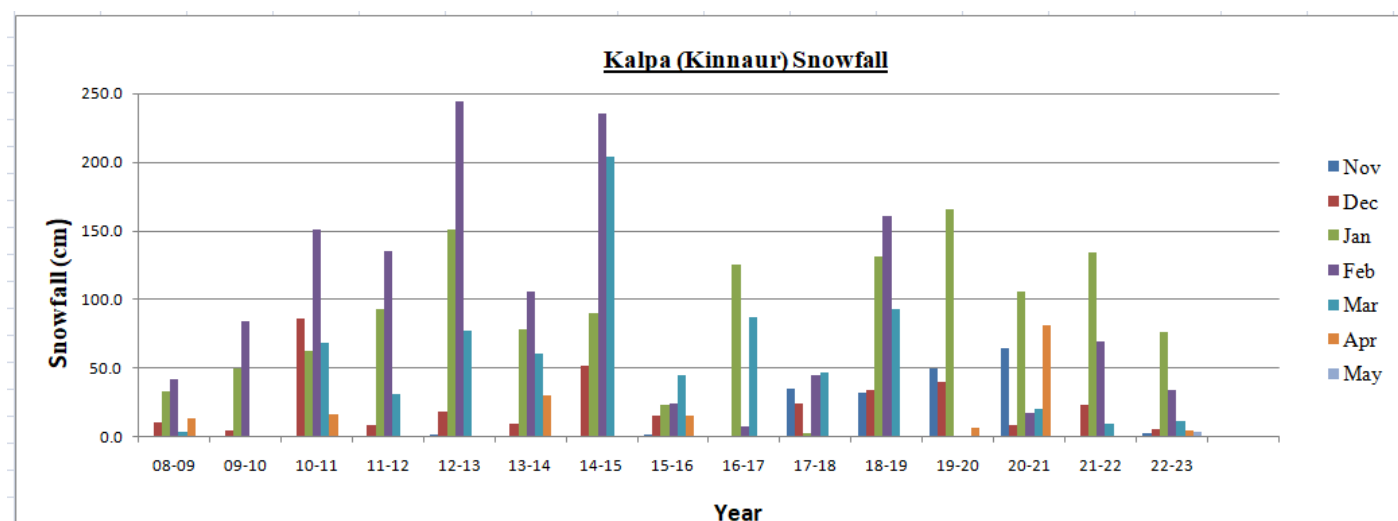
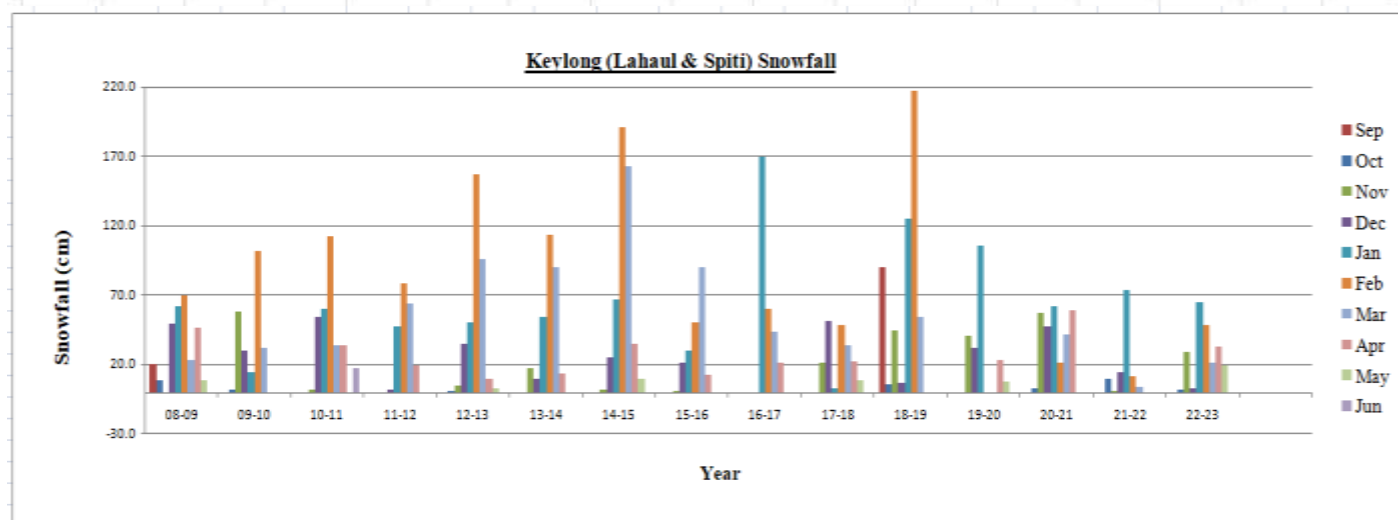
September- Koksar(Lahul Spiti):0.1cm

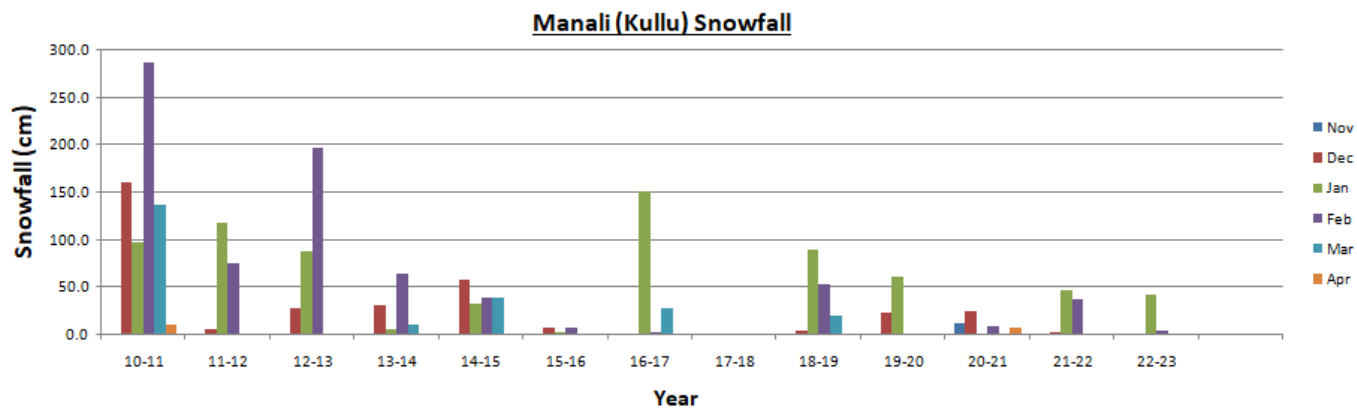
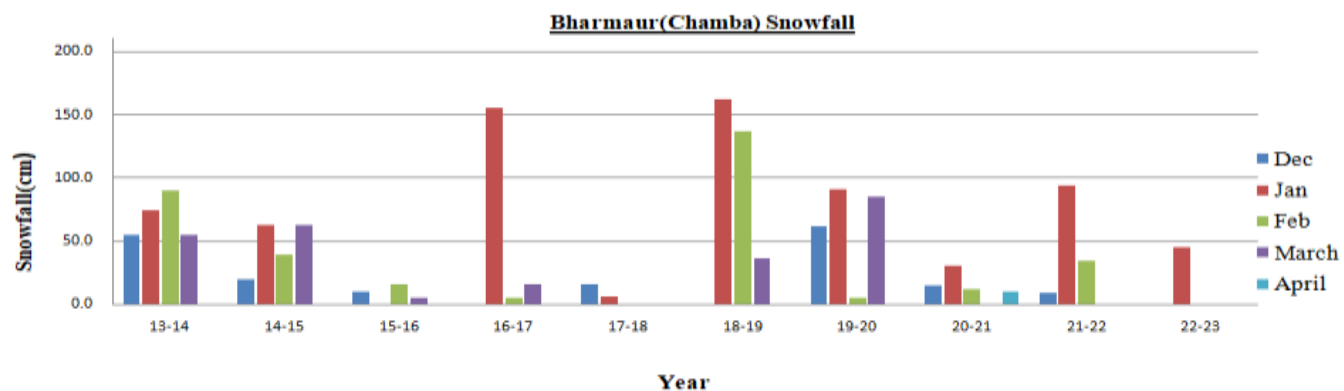
October- Koksar(Lahul Spiti):2.0cm

November- Koksar(Lahul Spiti):9.1cm

December- Gondla: 12.0cm

Following graphs show the snowfall comparison for Shimla City(Shimla), Keylong(lahul Spiti), Kalpa(Kinnaur), Bharmaur(Chamba)and Manali(Kullu)





With Regards  
Shailja Thakur, SA  
Meteorological Centre Shimla

## LEGENDS

(Terminology used in the summery)

### 1. Seasons (As Per IMD)-

**Winter Season:-**January-February

**Pre- Monsoon Season:-**March-May

**Monsoon Season:-**June-September

**Post-Monsoon Season:-**October-December

### 2. Rainfall (%)

Rainfall Departure Color Code		
Rainfall	Range	Color Code
Large Excess	(+60% or more)	
Excess	(+20% to +59%)	
Normal	(+19% to -19%)	
Deficient	(-20% to -59%)	
Large Deficient	(-60% to -99%)	
No rainfall	(-100%)	

### 3. Rainfall (mm)

Rainfall Departure Color Code	
Intensity of rainfall	Amount of rainfall(mm)
Very Light rainfall	0.1-2.4
Light rainfall	2.5-15.5
Moderate rainfall	15.6-64.4
Heavy rainfall	64.5-115.5
Very Heavy rainfall	115.6-204.4
Extremely Heavy rainfall	≥204.4
Exceptionally Heavy rainfall	When the amount is a value near about the highest recorded rainfall at or near the station for the month or season. However, this term will be used when the actual rainfall amount exceeds 12cm.

**For more information kindly visit:**

Website:<https://mausam.imd.gov.in/shimla/>

Twitter-<https://twitter.com/himachalmausam>

Facebook-<https://www.facebook.com/profile.php?id=100018411811087>