

Minimum temperature variation at Dapoli in Konkan region of Maharashtra

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ABSTRACT

Twenty years daily (1985-2004) data on minimum temperature of Dapoli, located in the Konkan region of Maharashtra at an altitude of 174 m above msl for the month December to January were collected and classified into various groups for interpretation. Result shows that the record of minimum temperature below 10°C occurred 93 times in the month of February and the minimum number (81) in December for the period of the study from 1985-2004. Among the extreme values, the lowest and highest minimum temperature were 3.4°C and 21.4°C recorded in January and February respectively. The CV varied from 22 to 44 per cent. Persistence in minimum temperature for one day was found to be maximum varied from 59.4 to 64.0 per cent. Analysis indicated that maximum numbers of cold wave occurred during December.

Key word: Minimum temperature, cold wave.

Plants depend for growth and development, on their genetic make up and environmental condition. Temperature is the most important environmental factor which affects sowing time, germination, timing of different growth phases, insect-pests and disease incidence, crop quality and duration of the crop (Wang, 1960). A linear relationship between growth and development of plant with temperature was reported by (Arnon, 1972). In general for *kharif* crop production, temperature is not a constraint in Konkan region, but rapid rise or fall of temperature is a constraint for many cold sensitive *rabi* crops like sesame, groundnut and brassicas. Recently, more such studies have been undertaken by

different authors in different parts of India [Attri *et al.*, (1995) for Gangtok (Sikkim), Deosthali and Payyappalli (1997) for Niphad region (Madhya Maharashtra), Ram Singh (2003) for Hissar (Haryana) and Murty *et al.*, (2004) for Ranichauri (Uttaranchal)]. The present study is an attempt in this direction for Konkan region in Maharashtra. The main crops in the region during winter season are cabbage, sesame, mustard, groundnut, field bean, cowpea etc.

MATERIAL AND METHODS

The daily minimum temperature values recorded for December, January and February at Dapoli (17°45' N to 73° 26' E,

Table 1: Extreme values of minimum temperature (°C) at Dapoli (1985-2004)

Month	Lowest			Highest			Mean (T _{min} °C)	SD	CV (%)
	Value	Date	Year	Value	Date	Year			
December	6.7	20	1987	21.2	30	1989	12.7	2.8	22.0
January	3.4	2	1991	20.8	12	1994	11.9	5.2	43.7
February	5.4	3, 4	1991	21.4	12	1988	12.2	2.7	22.1

Table 2 : Number of events (%) of departure of minimum temperature from normal at Dapoli (1985-2004)

Month	Nearly normal +1.4 to -1.4°C	Above normal +1.5 to +3.4°C	Appreciably above normal +3.5 to +5.4°C	Markedly above normal > + 5.5°C	Below normal -1.5 to -3.4°C	Appreciably Below normal -3.5 to -5.4°C	Markedly Below normal > - 5.5°C
December	43	17	7	3	24	5	1
January	58	17	9	2	7	6	1
February	47	19	8	2	16	7	1

174 AMSL) in Konkan region of Maharashtra for the period from December 1985 to February 2004 were collected from the agrometeorology observatory, Department of Agronomy, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (Maharashtra) and used for the study. These data were analyzed using statistical methods for finding extreme values, standard deviation and c.v., events having below 10°C, daily departure from the normal, persistence for number of days and these are classified into three categories viz; no change (within $\pm 1^\circ\text{C}$), Rise ($> 1^\circ\text{C}$) and fall ($< 1^\circ\text{C}$) (Ram Singh, 2003) and Number of cold waves computed as per criteria given by India Meteorological Department (IMD): If daily departure of minimum temperature from normal is negative by 6

to 7 °C it is known as moderate cold wave and if departure is $> 7^\circ\text{C}$, it is a severe cold wave condition.

RESULTS AND DISCUSSION

Extreme values

The extreme minimum temperatures (Table 1) recorded from December to February indicated the that lowest was 3.4 °C recorded on 2nd January 1991 and the highest 21.4 °C on 12th February 1988. The SD and CV were lowest in February (2.7) and December (22.0) respectively with the highest CV of 43.7 per cent during January.

Departure of minimum temperature

The Data on percentage number of cases of departure of minimum temperature

Table 3 : Percentage of occurrence of persistence in minimum temperature at Dapoli

Month	Number of continuous days						
	1	2	3	4	5	6	> 7
No change							
December	14.4	9.0	6.3	4.1	1.7	1.4	8.5
January	15.6	7.6	6.4	2.3	3.1	3.8	4.6
February	19.8	9.9	7.6	2.6	3.2	1.3	2.6
Rise > 1^oC							
December	23.8	3.6	0.5	0.5	0.5	0	0
January	22.9	4.2	0	0.4	0.4	0	0
February	21.5	4.3	0.4	0	0	0	0
Fall < 1^oC							
December	21.2	3.6	1.4	0	0	0	0
January	21.3	6.4	0.4	0	0	0	0
February	22.7	2.6	1.3	0.3	0.3	0	0
Total							
December	59.4	16.2	8.2	4.6	1.7	1.4	8.5
January	59.8	18.2	6.8	2.7	3.1	3.8	4.6
February	64.0	16.8	9.3	2.9	3.5	1.3	2.6

Table 4 : Frequency of cold waves at Dapoli (1985-2004)

Month	Number of cold waves		Total
	Moderate	Severe	
December	9	257	266
January	15	185	200
February	11	224	235

from the normal values under different categories are presented in Table 2. Nearly normal ($+ 1.4^{\circ}\text{C}$) were the highest in all the months December to February than the other categories. Markedly below normal were rare with only one event in each month.

Persistence in minimum temperature

The results on percentage

occurrence of persistence in minimum temperature (no change, rise or fall) are presented in Table 3. Data indicate he persistence for all categories in respect of three months of study. On an average, 61 per cent of total cases were observed for the change lasting for one day and 17 per cent for two days when all the months were taken together. Chances of persistence beyond 3 days is very low. The maximum

numbers of moderate and severe cold waves (Table 4) were recorded during December (266) followed by February and January. Severe cold waves occurred for twenty five percent of the time out of 666 of 2425 days taken as study period.

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