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A STUDY OF THE MAXIMUM TEMPERATURE TENDENCY AT POONA USING THE THEORY OF RUNS

The daily maximum temperature data of Poona Central Agrimet Observatory for the months April and May for the ten years 1945-54 have been utilised to study the distribution of the spells of days with the maximum temperature having the same tendency, *i.e.*, either increasing (positive tendency) or decreasing (negative tendency). Table 1 represents the ten years' data in which are given the duration x in days and the corresponding frequencies for both the positive and negative tendency.

It is seen from the actual values that a functional form of the type $S_x = Kp^x$ can be used to describe the above distribution. The values S_x and x represent the frequency and duration of spell in days respectively.

TABLE 1

Length of spell (x)	Positive tendency		Negative tendency	
	Frequency		Frequency	
	Actual	Calculated	Actual	Calculated
1	68	69.4	73	77.9
2	35	37.3	41	36.5
3	25	20.0	19	17.1
4	9	10.7	9	8.0
5	6	5.7	3	3.8
6	4	3.1	1	1.8
7	3	1.7	0	0.8
8	0	0.9	1	0.4

The values of the parameters K and p are given as

$$p = \frac{T_1 - S}{T_1} \text{ and } K = \frac{S^2}{T_1 - S}$$

where, $S = \sum S_x = \frac{Kp}{1-p}$, the total

number of spells and

$$T_1 = \sum x S_x = \frac{Kp}{(1-p)^2}, \text{ the first}$$

moment of the distribution.

TABLE 2

	S	T_1	K	p
Positive tendency	150	324	129.3	0.54
Negative tendency	147	277	166.2	0.47

The values of S , T_1 , K , and p for the distribution given above are shown in Table 2.

It will be seen that the K for falling tendency is larger than that for the rising tendency and the persistence coefficient p is greater for the rising tendency indicating that the maximum temperature rise takes place gradually while the decrease of maximum temperature takes place much more rapidly.

It is seen from Table 1 that the calculated frequencies agree very well with the actual frequencies and the theoretical curve provides an objective assessment of the probability of occurrence of any length of spells of rising or falling day temperatures.

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