

Henryk Galant, Alicja Węgrzyn

MAXIMUM PRECIPITATION IN AGROMETEOROLOGICAL OBSERVATORY AT FELIN IN THE SECOND HALF OF THE 20TH CENTURY

Abstract: In the paper the statistical characteristics of monthly and annual sums of atmospheric precipitation were presented. Standard deviation, variation coefficient, means, median, kurtosis coefficient and skewness coefficient were calculated. The linear trend was determined too, which shows minimal decrease of annual sums of atmospheric precipitation over the years 1951-1999. The statistical analysis of collected materials confirms great differences of precipitation in particular months and years of the analysed period.

Key words: kurtosis, precipitation, skewness, trend, variation coefficient.

1. Introduction

Atmospheric precipitation is a very variable meteorological element both, in the space and in the time. It happens, there are periods in which sums of precipitation exceed average values of norm several times (Kożuchowski 1986; Liniewicz 1974). Maximum daily and monthly sums of precipitation appear mainly in vegetation period (Galant 1996; Kaszewski et al. 1995). However, months with negative anomalies occur more often than months with positive ones (Kossowska-Cezak, Mrugała 1999).

2. Data and Methods

The paper was based on daily, monthly and yearly sums of atmospheric precipitation which were obtained from Agrometeorological Observatory at Felin near Lublin (SE Poland - Lublin Upland). These observations were taken from 1951 to 1999. For these data mean values, median, standard deviation, variation coefficient, kurtosis coefficient and skewness coefficient were calculated (Fig. 1, Tab. 1). The linear trend for annual sums of precipitation was presented (Fig. 2.).

2. Results

For last 49 years the daily maximum of precipitation appeared in August 1967 and amounted 58.2 mm. However, the monthly maximum – 248.2 mm – was observed in July 1960 and in October 1974 – 245.6 mm (Fig. 1). The mean values of monthly sums of atmospheric precipitation fluctuated from 21.6 in January to 77.0 mm in July. Yet, median ranged from 20.3 mm in January to 73.8 mm in July.

In 1951-95 the most wet year in 1974 in which annual sum amounted 988,5 mm (182 % of norm). On the second place was the year 1960 with annual sum 964.8 mm. The linear trend of annual sums of precipitation demonstrated a slightly decreasing tendency (Fig. 2).

Statistical analysis of atmospheric confirmed great differences of atmospheric precipitation in particular months and years. The standard deviation fluctuated from 12.0 mm in January to 43.0 mm in July (Tab. 1). The least stabile were monthly sums of precipitation in October, where variation coefficient was 101.5%. In the other months the coefficient ranged from 43.6% to 66.4%.

The kurtosis coefficient showed negative values in December (-0.2) and in May (-0.1). In other months this coefficient had positive values (highest value in October – 11.0), which testified slenderness distribution. Skewness coefficient confirmed right-

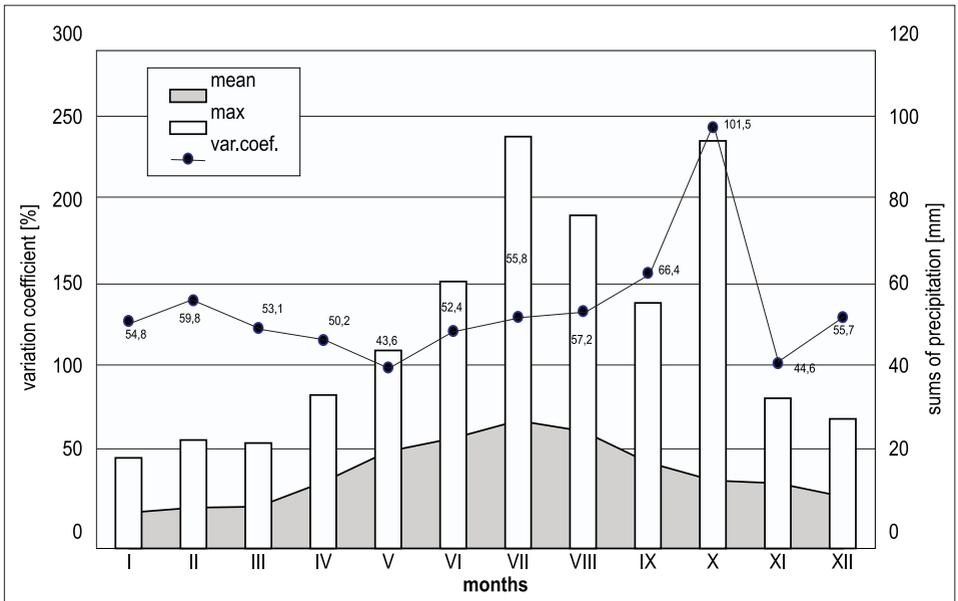


Fig.1. Variation coefficient on the ground of means and maximum of monthly sums precipitation at Felin in 1951-1999.

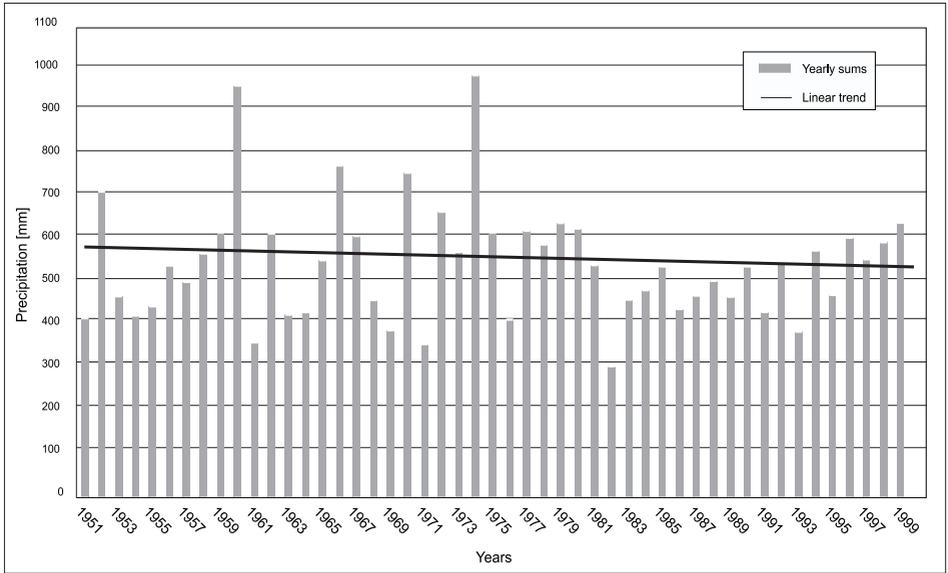


Fig.2. Linear trend of annual sums of atmospheric precipitation at Felin.

Tab.1 Characteristics of variability of atmospheric precipitation at Felin in 1951-1999.

Months	Mean	Median	Standard deviation	Kurtosis	Skewness
I	21.6	20.3	11.85	0.2	0.74
II	24.6	22.5	14.75	0.2	0.76
III	25.1	22.5	13.32	0.4	0.91
IV	40.0	39.3	20.11	0.1	0.79
V	51.8	43.5	34.41	1.0	1.10
VI	58.5	55.1	25.52	-0.1	0.61
VII	66.4	61.4	34.77	0.8	0.96
VIII	77.0	73.8	43.01	4.7	1.70
IX	70.6	62.1	40.34	1.1	0.85
X	41.0	30.7	41.66	11.3	2.81
XI	39.2	36.0	17.47	0.5	0.76
XII	31.3	29.2	17.44	-0.2	0.66
Year	547.3	543.0	137.08	2.4	1.19

sided asymmetry, because the coefficient was always positive and oscillated from 0.61 in May to 2.81 in October (Tab. 1).

References

- Galant H., 1996, *Temporal and Spatial Variability of Precipitation in Five-Day Periods in Lublin Region in 1951-1990*, Zesz. Nauk UJ, MCLXXXVI, Prace Geogr., 102, 413-418.
- Kaszewski B. M., Mrugała S., Warakomski W., 1995, *Temperatura powietrza i opady atmosferyczne na obszarze Lubelszczyzny (1951-1990)*, LTN Lublin, I, 17-23.
- Kossowska-Cezak U., Mrugała S., 1999, *Opady atmosferyczne o anomalnej wysokości (na przykładzie Warszawy i Lublina)*, Prz. Geof., XLIV, 1-2, 39-51.
- Kożuchowski K., 1986, *Zmienność opadów atmosferycznych w Polsce w przebiegu wieloletnim*, Prz. Geogr., LVIII, 3, 441-457.
- Liniewicz K., 1974, *Najwyższe opady dobowe w procentach miesięcznych sum opadów*, Annales UMCS, sec. B, vol. XXIX, 5, 107-124.

*Henryk Galant, Alicja Węgrzyn
Chair of Agrometeorology
Agricultural University
Lublin
Poland*