

LONG-TERM VARIABILITY OF STORM PRECIPITATION IN POLAND (1951-2000)

Zuzanna Bielec-Bakowska¹, Ewa Lupikasza²

¹*University of Silesia, Faculty of Earth Sciences, Department of Climatology, Bedzinska 60 str., 41-200 Sosnowiec, Poland, e-mail address zuzanna.bielec-bakowska@us.edu.pl*

²*University of Silesia, Faculty of Earth Sciences, Department of Climatology, Bedzinska 60 str., 41-200 Sosnowiec, Poland, e-mail address ewa.lupikasza@us.edu.pl*

(Dated: April 30, 2007)

I. INTRODUCTION

The occurrence of sudden climatic events that are usually characterized by a violent course and trigger of serious damages are becoming more and more significant in daily life. In Poland, heavy storm rainfalls may be counted among the extreme meteorological events. The storm rainfalls often cause locally occurring floods, landslides, local infrastructure (e.g. streets, bridges) damages. Moreover, the storm rainfalls spreading throughout the vast areas (flood in Poland in 1997) accompany selected synoptic situations favourable for floods formation.

The results of previous studies on storm precipitation in Cracow in the 1896-1995 period show that in the most cases the precipitation total during days with thunderstorm are not higher than 10,0mm (67% of cases). In the 4% of cases only, precipitation amount during investigated days (with thunderstorm) was higher than 30,0mm; at the same time it's worth stressing that precipitation amount above 60mm may be expected one time per 10 years. It was also noted that the frequency of days with the storm precipitation amount above 20 mm decreased during last century. There were no differences in occurrence of the storm precipitation between cyclonic and anticyclonic situations however the highest totals were noted two times more often at high-pressure situations comparing with low-pressure ones (Bielec, 1997)

II. GOALS AND METHODS

The main goal of this study is determination of the storm precipitation amount in Poland in the 1951-2000 period and than assessment of connections between such precipitation and atmospheric circulation. Chronological sequences of meteorological observations from about 50 meteorological stations, the types of synoptic situation by B. Osuchowska-Klein (1978, 1991, 2001) as well as circulation indices (NAO and circulation indices by T. Niedzwiedz 2005) were used to further analysis.

In his study, the share of thunderstorms with rainfall in the overall number of thunderstorms as well as spatial variability of the storm rainfall higher than specific threshold values was studied. Moreover, annual and long-term variability of storm events mentioned above and their relation to circulation types were examined. Detailed analysis of select high storm rainfall events using synoptic charts and satellite images was made as a supplement.

III. REFERENCES

Bielec Z., 1997, *Opady burzowe w Krakowie w latach 1896-1995 (Storm precipitation in Cracow in the period 1896-1995)*, Ekstremalne zjawiska meteorologiczne,

hydrologiczne i oceanograficzne, Warszawa

Osuchowska-Klein B., 1978, *Katalog typów cyrkulacji atmosferycznej (Atmospheric circulation types catalogue) (1901-1975)*, Wydawnictwa Komunikacji i Łączności, Warszawa

Osuchowska-Klein B., 1991, *Katalog typów cyrkulacji atmosferycznej (Atmospheric circulation types catalogue) (1976-1990)*, Wydawnictwa Komunikacji i Łączności, Warszawa

Osuchowska-Klein B., 2001, *Katalog typów cyrkulacji atmosferycznej (Atmospheric circulation types catalogue) (1990-2000)* – IMGW materials.

Niedzwiedz T., 2005, *Kalendarz sytuacji synoptycznych dla dorzecza górnej Wisły (Calendar of synoptic situations for the Upper Vistula Basine) (1896-2000)* – author's materials.