

ANOMALNIE WYSOKIE MIESIĘCZNE OPADY ATMOSFERYCZNE W POLSKICH KARPATACH I NA ICH PRZEDPOLU (1881–2010)

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Anomalously high monthly precipitation totals in the Polish Carpathian Mountains and their foreland (1881–2010)

Abstract: The study addresses the problem of river flooding and other dangerous natural processes as well as phenomena resulting from persistent heavy rainfall. Annual and multi-annual records of anomalously heavy precipitation were investigated using data from 16 weather stations in the Polish Carpathian Mountains and their foreland from the period 1881–2010. The anomalously high precipitation was studied in terms of its annual and multi-annual pattern, time of occurrence, spatial extent and the coinciding atmospheric circulation. The anomalously high monthly totals were defined as those, which exceeded the upper quartile plus 1.5x the interquartile range. It was found that during the 130 years of the study period, there were 200 anomalously heavy precipitation months (AHMs), which occurred in 106 years. Most of them were only recorded at either a single station or at two neighbouring stations, which would suggest that precipitation of this magnitude depends not just on circulation circumstances, but also on local factors. No statistical change was found in the long-term AHM occurrence pattern. There were two instances, where an AHM was recorded simultaneously at all 16 stations, in May 1940 and 2010, and they both contributed to catastrophic floods. The latter of the events involved both the highest absolute totals (exceeding 500 mm) and the highest relative totals (i.e. the percentage of the long-term average close to 500%). The AHMs tended to coincide with cyclonic circulation. Between October and March, this was the western cyclonic circulation (Wc), while for the remaining part of the year it was cyclonic trough (Bc).

Keywords: anomaly, extreme precipitation, monthly precipitation, interquartile range, Polish Carpathian Mts.

