

THE CASE OF EXTREMELY LOW PRECIPITATION IN JULY 2006: ŚWIĘTOKRZYSKIE MTS. EXAMPLE

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High precipitations, especially convective, usually are limited to small areas. Atmospheric droughts affect larger areas. Both these kinds of meteorological extremes influence a water balance in small basins equally firmly. A period of very low precipitation – 1.9 mm monthly total – was observed in the Święty Krzyż meteorological station located in the summit of the Łysogóry Range in the Świętokrzyskie Mts. in July 2006 (Figure 1).

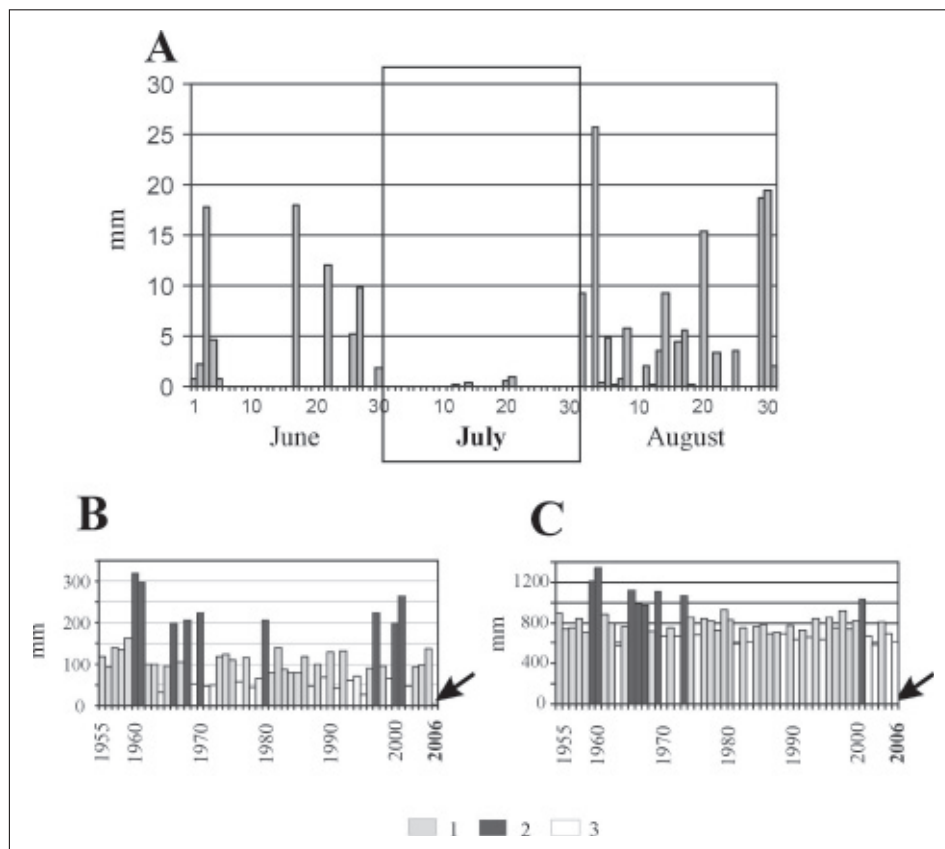


Figure 1. Daily precipitation totals in the Święty Krzyż meteorological station during the summer 2006 (A), July (B) and annual (C) precipitation totals in the Święty Krzyż meteorological station in the period 1955-2006: normal (1), higher than normal (2), lower than normal (3) according of criterion of Mrugała (1997)

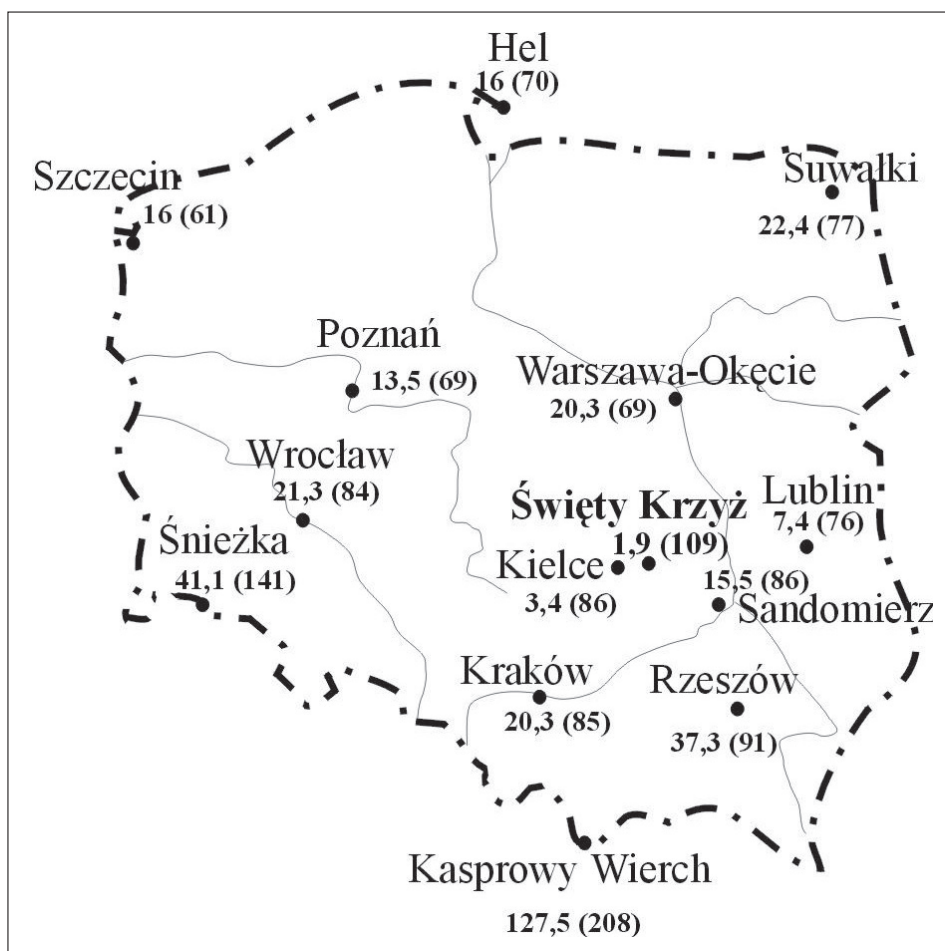


Figure 2. Precipitation totals (mm) in few meteorological stations in Poland in July 2006 (<http://www.ncdc.noaa.gov/oa/mpp/freedata.html>) on the background of July normals from the period 1961-90 (in brackets) – Kossowska-Cezak *et al.* 2000

It is the lowest monthly precipitation total in this station since the beginning of the meteorological observations in 1955. It amounts only 1.6% of the 1955-2005 normal for July. The period of a dry weather typical for July 2006 was interrupted only by three non-intensive rain showers (Figure 1). Annual precipitation total in 2006 was also lower than normal according to criterion proposed by Mrugała (1997). It amounts 76% of the 1955-2005 normal (Figure 1). Also summer precipitation total in 2006 was lower than normal but not so significantly as in July. It was mainly because of high and prolonged precipitations in August (Figure 1).

Precipitation totals in July 2006 was also very low in meteorological stations: Bodzentyn (0.8 mm) and Kielce-Suków (3.4 mm) located in the Świętokrzyskie Mts. July 2006 was a very dry period nearly everywhere in Poland (Figure 2). Monthly precipitation totals were much lower than 1961-1990 normals then.

Other areas in central and eastern Europe experienced period of low precipitations in July 2006 too (e.g. Helsinki – 4.6 mm, Berlin – 10 mm, Budapeszt – 20 mm).

Described above extremal meteorological conditions were connected with high pressure patterns which dominated in the central Europe nearly for the whole month (Figure 3a). Positive value of Hurrell's NAO index in July 2006 – +0.83 (<http://www.cru.uea.ac.uk...>) suggests that the weather in our part of Europe was formed by a wedge of the Azores High (Wibig 2000). A persistence of this anticyclonic weather was caused by atmospheric blocking which obstructed eastward progression of synoptic disturbances (Iribarne, Cho 1989). It is clearly visible in a localization of jet-streams (<http://squall.sfsu.edu...>) which signals a polar front course (Figure 3b). Such conditions prefer strong and persistent meridional flow.

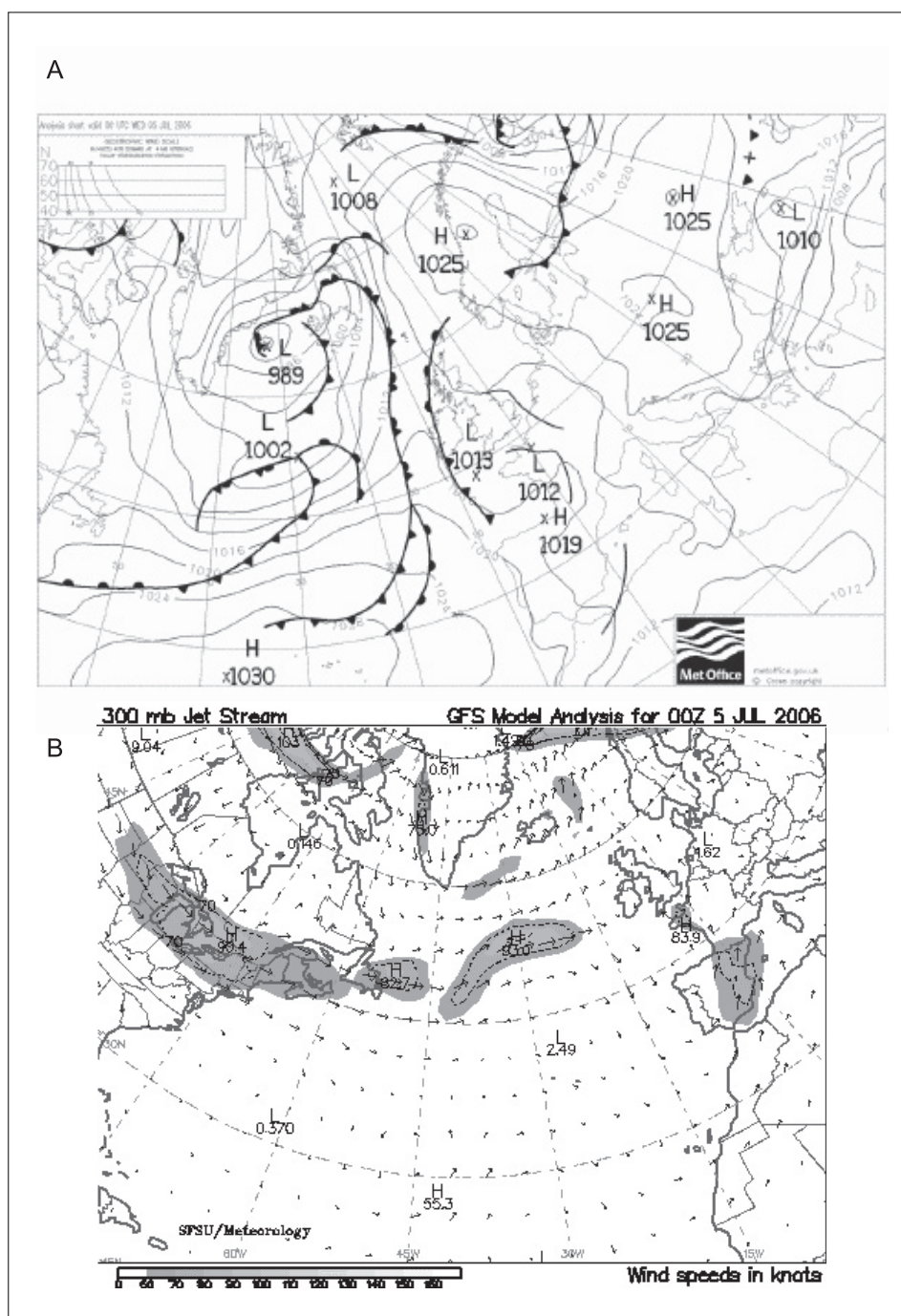


Figure 3. Example of typical circulation conditions in Europe in July 2006. Synoptic chart for 5 July 2006, 00:00UTC (<http://www.wetterzentrale.de/topkarten/fsfaxbra.html>) - A, course of jet-stream on 5 July 2006, 00:00UTC

Low precipitation in July 2006 was accompanied by high temperatures and evaporation, fall in the groundwater table and a drop in river discharges (Kostrzewski *et al.*, 2007). The question is the status of this extremal meteorological episode. Is it a signal of aridisation of our climate or phenomenon of low frequency but not alarming? Its extraordinariness in the data set from the Święty Krzyż station may be attributed to limited length of measurement period. Longer data sets from the Polish Lowlands show equally low July precipitation totals (Kossowska-Cezak *et al.*, 2000).

References

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