



The reconstruction of air pressure in Gdańsk in the period of instrumental observations, 1739-2012

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The purpose of the paper is to characterise the details of reconstruction of air pressure in Gdańsk in the whole period of regular instrumental records spanning the period 1739-2012. Gdańsk pressure series has been reconstructed by joining air pressure observations of 15 local shorter series.

The entire instrumental series can be divided into three sub-periods: the Early Observers period, lasting to 1806, the First Meteorological Networks, covering the years from 1807 to 1875 and Modern Measurements begun in 1876. During the first period, observations were made from two to four times per day, sometimes even at midnight. In the 19th century and up to 1945 thrice-daily barometer readings were a standard, in the last few decades the density of data is much denser. A serious gap in the original daily data exists for the period 1849-1875, where it appears that no original source of data have survived. Selected data are presented in the form of five-day or monthly averages. Numerous errors made probably during the re-writing of original observers' data by their assistants were discovered during digitalization. Despite this the quality of observations can be regarded as good. Data have been corrected to provide a monthly-mean measure of atmospheric pressure in the unit of hPa at standard conditions, i.e. standard gravity, 0 °C and at sea level. Some inconsistencies may still arise as the procedure of the homogenization of air temperature is not completed and in case of a few oldest series air temperature was estimated. Numerous breakpoints were identified in the homogenisation of the series and they cannot be always linked to known causes. A reasonably detailed station history has been compiled by incorporating metadata contained in various written sources. These metadata have facilitated the homogenisation of the data series.

Mean annual atmospheric pressure in Gdańsk in period 1739-2012 calculated on the basis of homogenized series was 1014.9 hPa. Mean seasonal means are equalled as follows: winter – 1015.2 hPa, spring – 1014.9 hPa, summer – 1014.2 hPa and autumn – 1015.4 hPa. The average annual course of air pressure in Gdańsk in the period 1739-2010 reveals some characteristic features. Winter is characterized by the highest variability, what is connected to most intense cyclonic activity in this season. Thus in winter occur the highest daily maxima and lowest minima. Several cases of extremely deep cyclones with the pressure of less than 960 hPa were identified as well a few barometer readings exceeding 1045 hPa. It is also evident that annual minima occurs in summer and this season is also described as of the lowest value of standard deviation.