The aim of the paper was to characterise thermal conditions and to analyse air temperature variability in Bydgoszcz in the years 1931–2013. The study included annual, summer half-year (April–September), winter half-year (October–March) and monthly mean temperatures. The average air temperature in the analysed long term period was 8.5°C.

We noticed a significant increasing trend in the mean annual air temperature in Bydgoszcz, which raised by 0.19°C per 10 years. Stronger increasing trend was observed for winter half-year (0.23°C per 10 years) than for summer half-year (0.14°C per 10 years). Winter months were characterised by greater temperature variability than summer months.

Distinct warming of the winter half-year was observed in the 1970s, that for summer half-year – one decade later.

We determined mean annual, half-year and monthly temperature for a given probability of non-exceedance. On this basis we performed thermal classification of examined periods (year, half-year, month). We specified periods with extremely and abnormally low or high air temperatures. The share of the extremely and abnormally cold years was 12.0% whereas that of extremely and abnormally warm years – 8.4%. Normal years accounted for 16.9% in the whole 83-year study period.

Due to the long data series of temperature in Bydgoszcz (83 years), the results of the analysis can be used for comparative analysis of other long lasting temperature series. They can also be useful for the analysis and assessment of climate change and assessment of thermal conditions either in the past or in the future.

**Key words:** climate change, long term data series, quintile-based thermal classification, trend