



## **Summer half-year hailstorms in South Moravia, Czech Republic: a long-term chronology**

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Hailstorms are natural phenomena of local or regional significance causing great material damage in present time, similarly as it was in the past. In Moravia (eastern part of the Czech Republic), systematic meteorological observations started generally in the latter half of the 19th century. Therefore, it is necessary to search for other sources of information in order to create long-term series of hailstorms. Documentary evidence is used in this study to extend the hailstorm information before the period of systematic observations and to complement existing systematic data. It allowed to compile a long-term series of summer half-year hailstorms in South Moravia using various types of documentary evidence (out of them taxation records, family archives, chronicles and newspapers are the most important) and systematic meteorological observations in the station network. Although available hailstorm data cover the 1435–2015 period, incomplete documentary evidence allows reasonable analysis of fluctuations in hailstorm frequency only since the 18th century (the frequency of hailstorms increases with the number of surviving documents). The long-term series compiled from documentary data and systematic meteorological observations is used to identify periods of lower and higher hailstorm frequency. The best temporal coverage of summer half-year hailstorm days in South Moravia starts in 1925 with a general decreasing trend of  $-0.05$  days per 10 years up to 2015, more evident after 1961 ( $-1.4$  days per 10 years). Existing data may also be used for the study of spatial hailstorm variability which is demonstrated on four particularly damaging hailstorms (on 20 June 1848, 1 July 1902, 10 July 1902 and 19 July 1903). Finally, uncertainties in the hailstorm chronology are discussed and differences related to various aspects of hailstorms detected from documentary and meteorological data in three 40 year periods are analysed. Despite some bias in hailstorm data, South-Moravian hailstorm series significantly extends knowledge about this phenomenon in the south-eastern part of the Czech Republic.

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