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Temporal and spatial variability of hailstorms in Moravia and Silesia (Czech Republic) in the 19th–20th centuries

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Critical evaluation of hailstorm observations for the meteorological stations of the Czech Hydrometeorological Institute (CHMI) is presented. Analysis of spatiotemporal patterns of hailstorm variability in Moravia and Silesia in the summer halfyear (April–September), as a background for further studies, is made for the period 1961–2000. Considering geographical distribution, maxima are perceptible in the regions of the Hrubý Jeseník and the Moravian-Silesian Beskids Mountains. Data from 135 stations supply a series of the numbers of days on which hailstorms occurred for Moravia and Silesia (a statistically significant falling trend -2.3 days/10 years). Application of the MESA method also revealed statistically significant cycles within this series with durations of 3.3 and 2.2 years. The maximum number of days with hailstorms takes place in May, followed by June (50% of all days with hailstorms). Following CHMI synoptic classification, 88% of days with hailstorms occurred during cyclonic situations. Series of hailstorms before 1961 are extended using further meteorological stations of the CHMI as well as information from documentary evidence (narrative sources, visual daily weather observations, newspapers etc.) covering the whole 19th–20th centuries. Results of their statistical analysis are discussed with respect to the period 1961–2000 with the best spatial coverage.