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Rainfall extremes in the Nordic-Baltic region

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Rainfall extremes, not least short-duration (sub-daily) extremes, are associated with a range of societal hazards, notably pluvial flooding but in addition e.g. debris flow and erosion-driven nutrient transport. Fundamental for all analysis, modelling and risk assessment related to rainfall extremes is the access to and analysis of observations. In this study, rainfall observations from meteorological stations in the Nordic-Baltic region were collected, quality controlled and consistently analyzed in terms of records, return levels and trends as well as geographical, climatic and seasonal dependencies. In terms of daily extremes, long-term analyses (since 1901) were performed at 138 stations and short-term analyses (since 1969) at 724 stations. In terms of sub-daily extremes, fewer stations and shorter records are available, and long-term analyses (since 1981) were performed at 47 stations and short-term analyses (since 2000) at 370 stations. The results reflect the heterogeneous rainfall climate in the region, with longitudinal and latitudinal gradients in the return levels as well as their time of occurrence for different durations (and return periods). Trend analyses show a majority of positive trends, both at daily and sub-daily scales, with geographical differences. Observations and data from the study are provided open access and we hope that this will be useful e.g. for regional harmonization of rainfall statistics used in infrastructural design and for climate model evaluation.