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Supplement of

Storm type effects on super Clausius–Clapeyron scaling of intense rainstorm properties with air temperature

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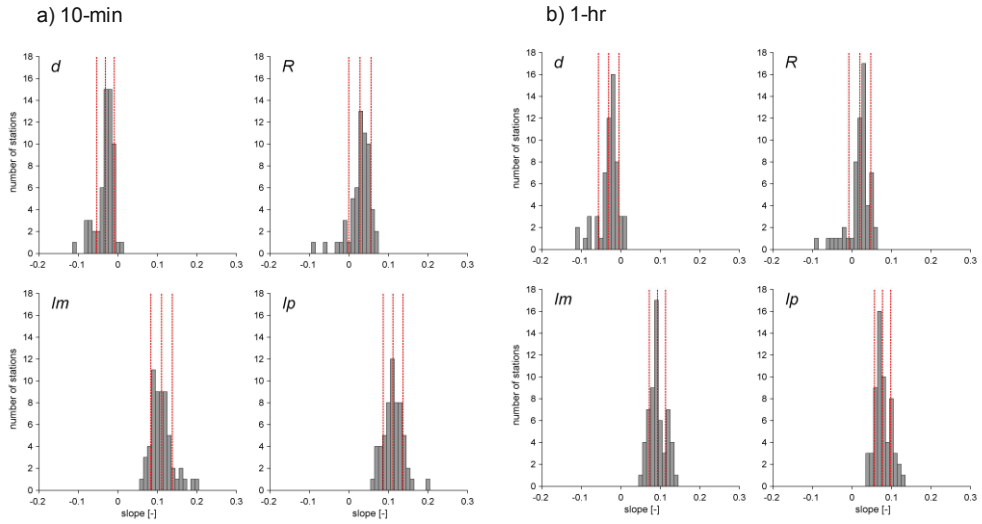
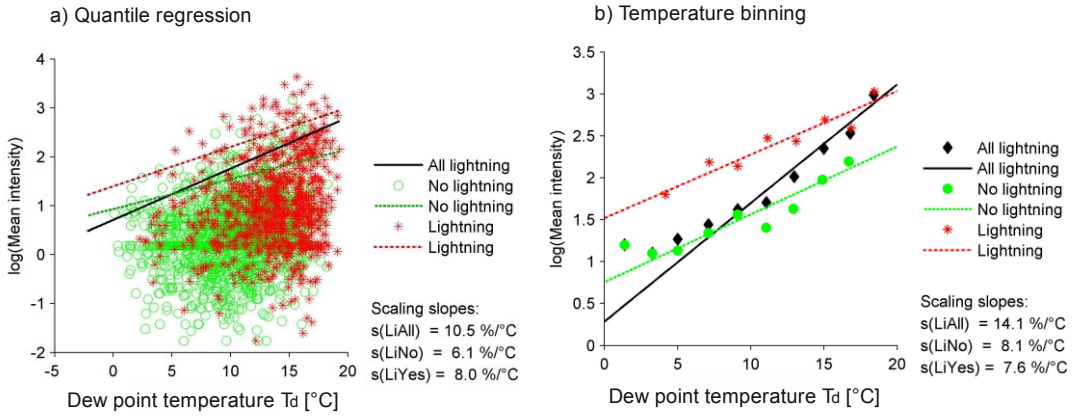
SUPPLEMENT

The Supplementary materials contain 6 figures which are versions of the same figures in the manuscript. The captions of the figures and highlights in bold explain the differences.

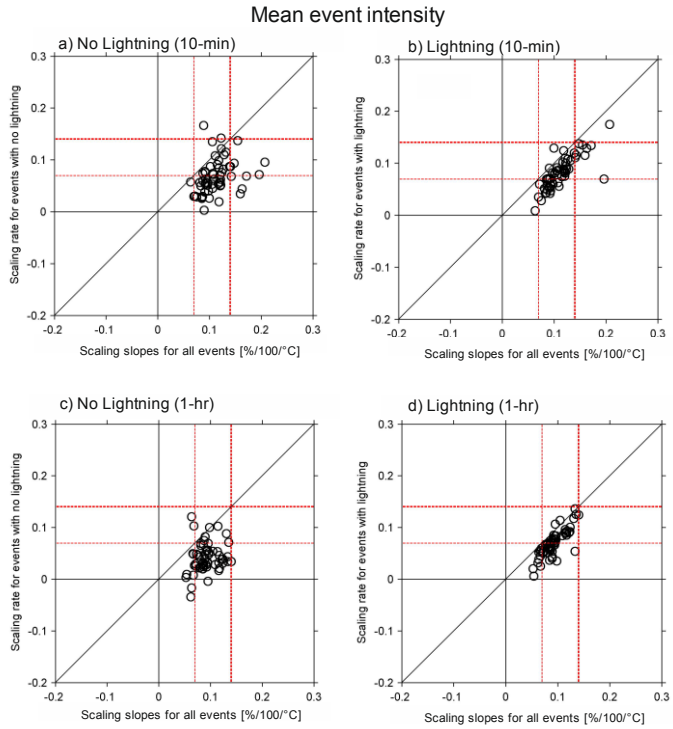
Supplementary Figure 2: Histograms of the scaling slopes in % °C^{-1} fitted to the 95th percentiles of event duration d, total storm depth R, mean intensity I_m and peak intensity I_p for 59 stations with the **temperature binning method**. Data are shown for a) 10-min and b) 1-hr resolutions. Vertical dashed lines indicate the mean +/- 1 standard deviation.



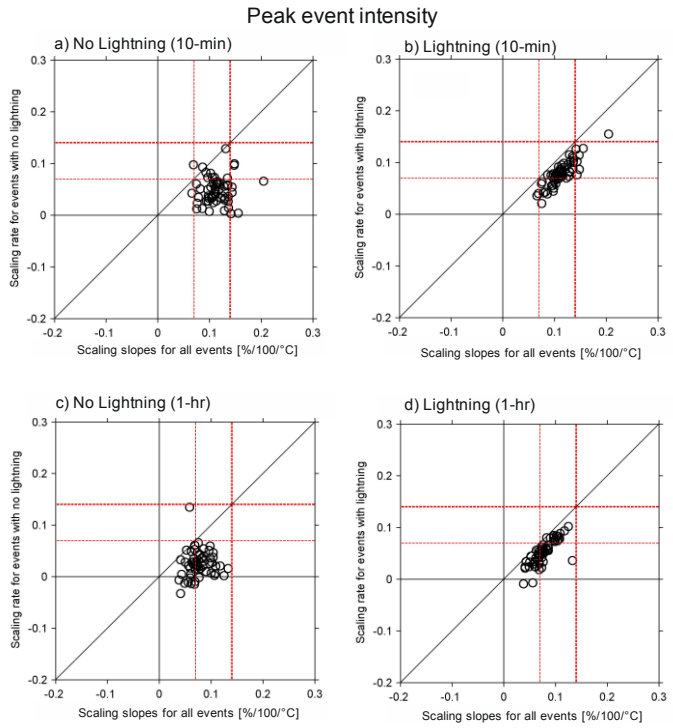
Supplementary Figure 3: Example of the estimates of scaling slopes by a) the quantile regression method and b) the temperature binning method for the station Wynau for **dew point temperature** instead of air temperature. Slopes for no-lightning (green, s(LiNo)) and lightning (red, s(LiYes)) events as well as all events together (black, s(LiAll)) are shown and their magnitudes in % °C^{-1} are reported.



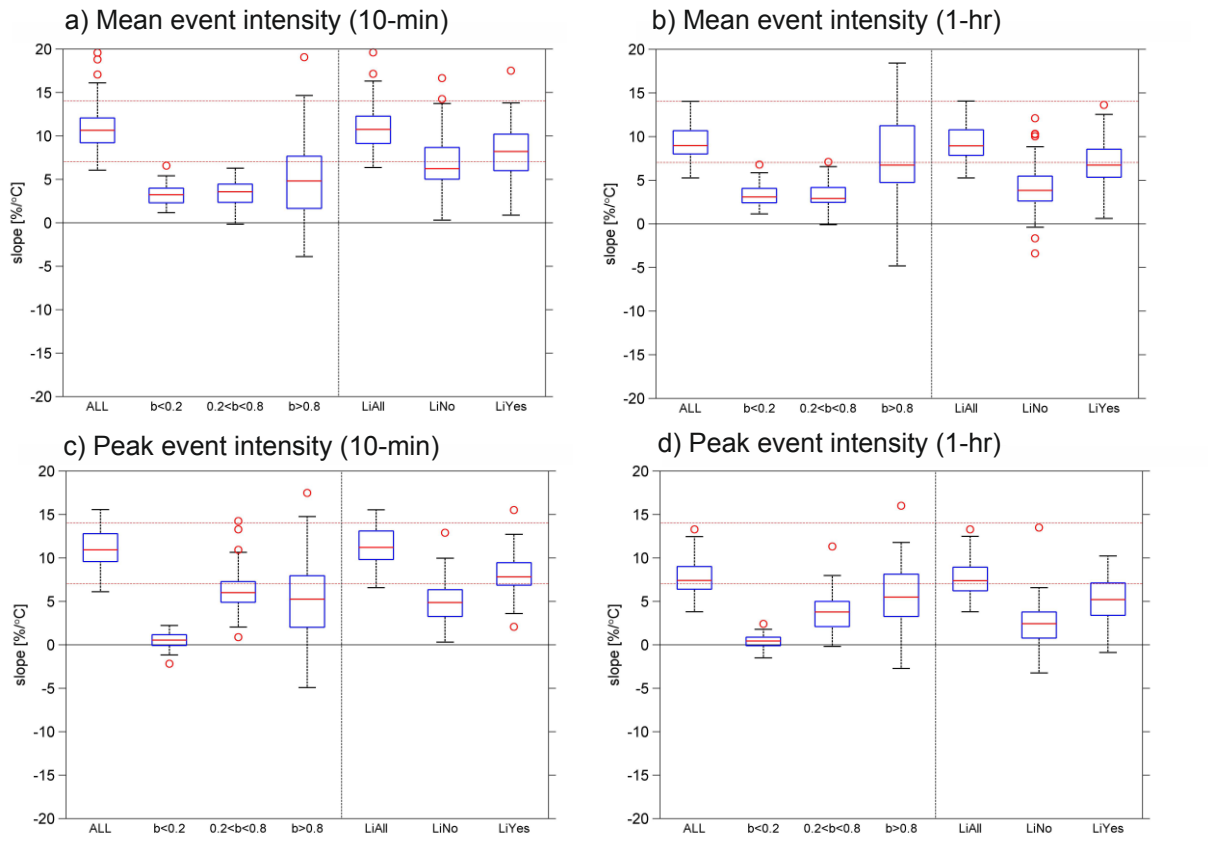
Supplementary Figure 4: Scatterplots of station-derived estimates of scaling slopes for mean event intensity I_m in lightning and no-lightning events versus all events at the a-b) 10-min and c-d) 1-hr resolution using the **temperature binning method** (95th percentile). Red dashed lines indicate the CC rate (7% °C^{-1}) and 2CC rate (14% °C^{-1}).



Supplementary Figure 5: Scatterplots of station-derived estimates of scaling slopes for peak event intensity I_p in lightning and no-lightning events versus all events at the a-b) 10-min and c-d) 1-hr resolution using the **temperature binning method** (95th percentile). Red dashed lines indicate the CC rate (7% °C^{-1}) and 2CC rate (14% °C^{-1}).



Supplementary Figure 6: Boxplots showing the distributions of scaling slope magnitude for mean event intensity I_m at the a) 10-min scale and b) 1-hr scale; and for peak event intensity I_p at the c) 10-min scale and d) 1-hr scale. The slopes were estimated using the **temperature binning method** for the 95th percentile. The data are organized into different subgroups (from left): using all events (1981-2011, ALL), three convectivity levels; all events with lightning data (1987-2011, LiAll), and the division into no lightning (LiNo) and lightning (LiYes) subsets. The red line shows the median, the upper and lower bound are the 25th and 75th percentiles (25P and 75P). The whiskers are calculated as 75P +/- 1.5(75P-25P). Outliers are plotted as red circles. The horizontal dashed line shows the CC rate (7% $°C^{-1}$) and 2CC rate (14% $°C^{-1}$).



Supplementary Figure 8: Spatial maps of scaling slopes for mean event intensity I_m for lightning events at the a) 10-min and b) 1-hr resolution; and no-lightning events at the c) 10-min and d) 1-hr resolution for the 95th percentile estimated with the **temperature binning method**. The color and size of the legend markers indicate the scaling slope magnitude in % $°C^{-1}$.