*Supplement of*

# Environments and lifting mechanisms of cold-frontal convective cells during the warm season in Germany

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In this supplementary material, figures from the main paper are shown with the 25th and 75th percentiles of the distributions shown as horizontal lines.
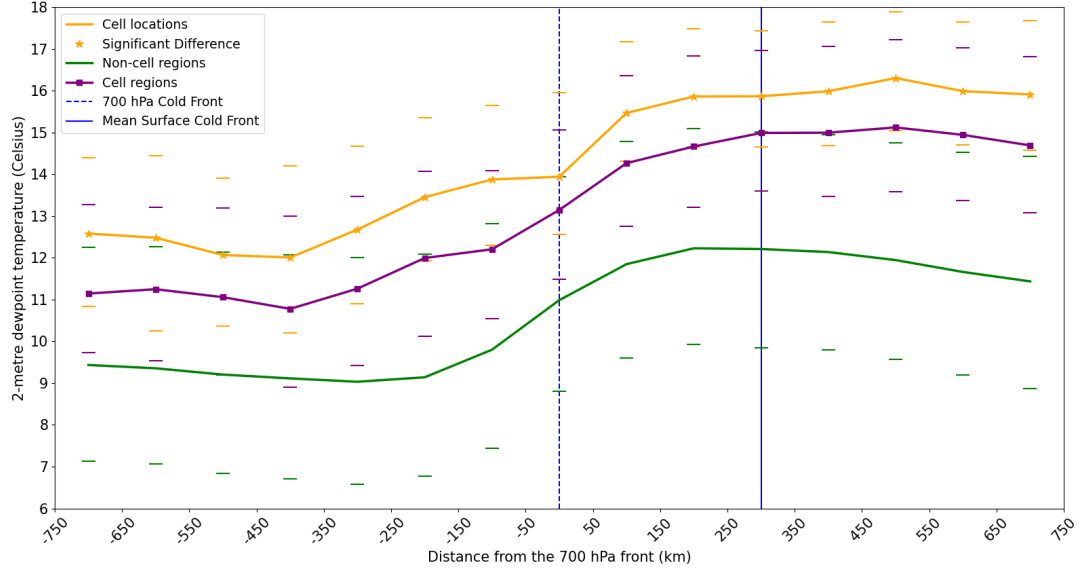


Figure S1: 2-metre dewpoint temperature (Celsius) depending on distance from the 700 hPa front (km) for cell grid points (orange), cell region grid points (purple) and non-cell region grid points (green). Stars indicate that the convective cell grid point mean is significantly different from the non-cell region grid point mean at the 95% confidence level based on a Welch's t-test, which does not assume equal population variance. **The coloured horizontal lines represent the 25th and 75th percentiles of the distributions**. The dashed vertical line and solid vertical line represent the 700 hPa front and mean surface front location, respectively.
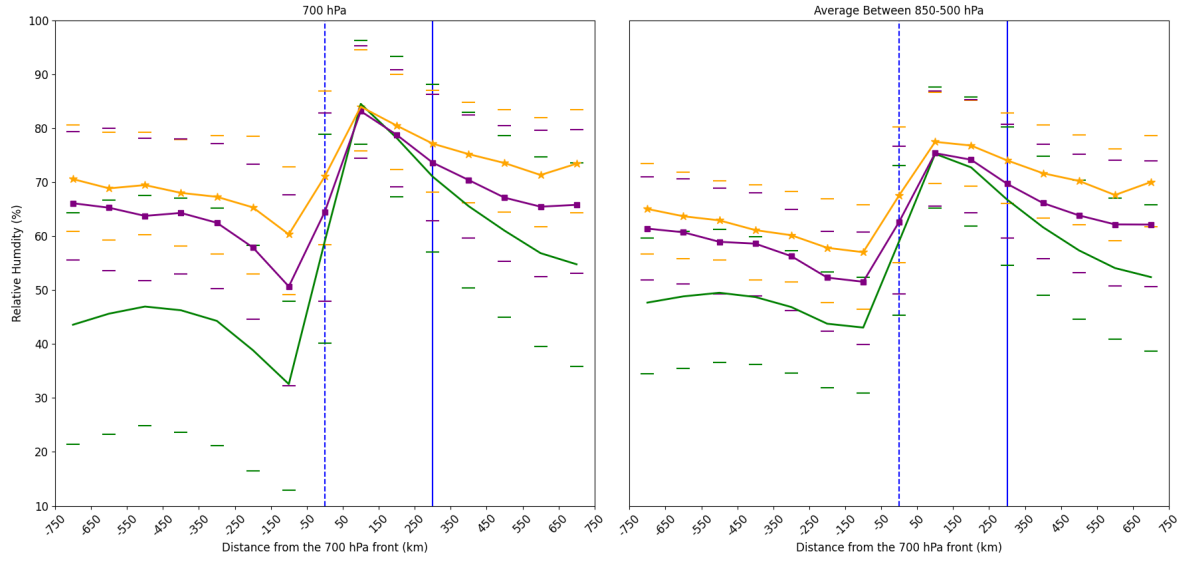
Figure S2: As Figure S1 but for relative humidity at 700 hPa (%) and mean relative humidity between 850–500 hPa.
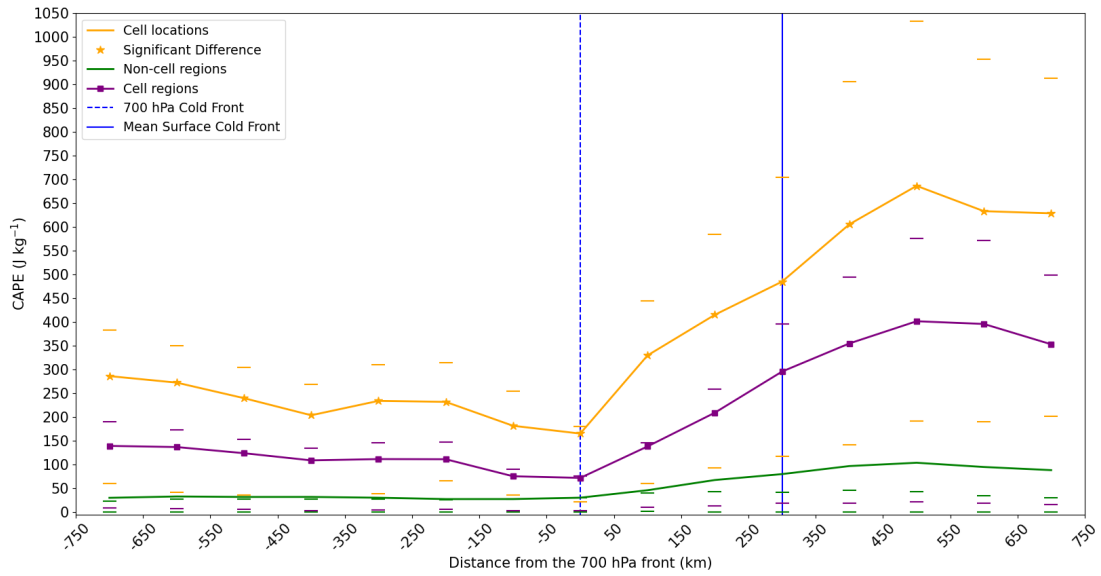


Figure S3: As Figure S1 but for CAPE. The ERA5 CAPE variable uses the parcel with the highest CAPE considering different departure levels below 350 hPa.
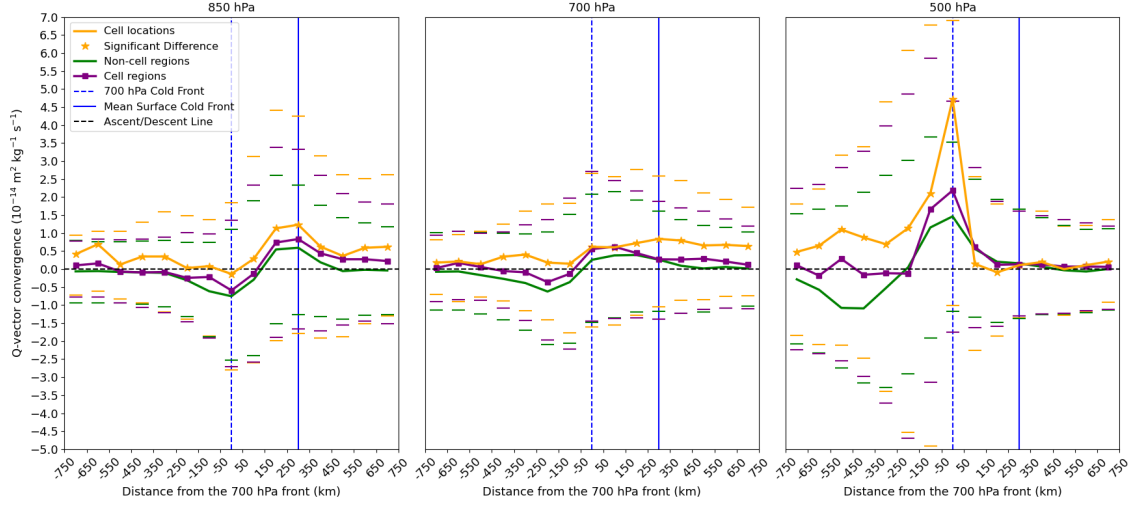
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Figure S4: As Figure S1 but for Q-vector convergence at 850 hPa, 700 hPa and 500 hPa (left to right). Positive and negative values indicate convergence (ascending motion) and divergence (descending motion) of the Q-vector, respectively.
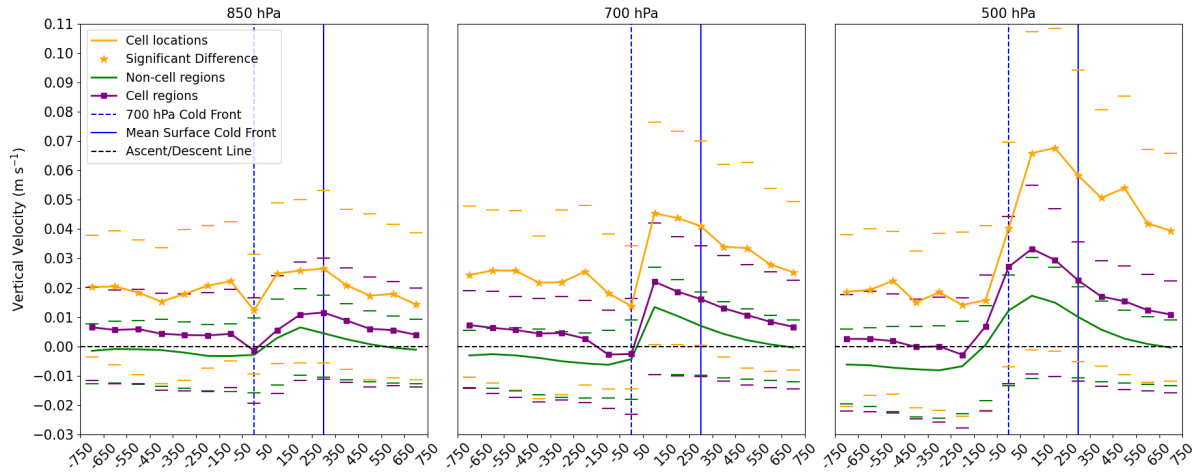


Figure S5: As Figure S1 but for vertical velocity at 850, 700 and 500 hPa. Positive and negative values indicate ascending and descending motion respectively.
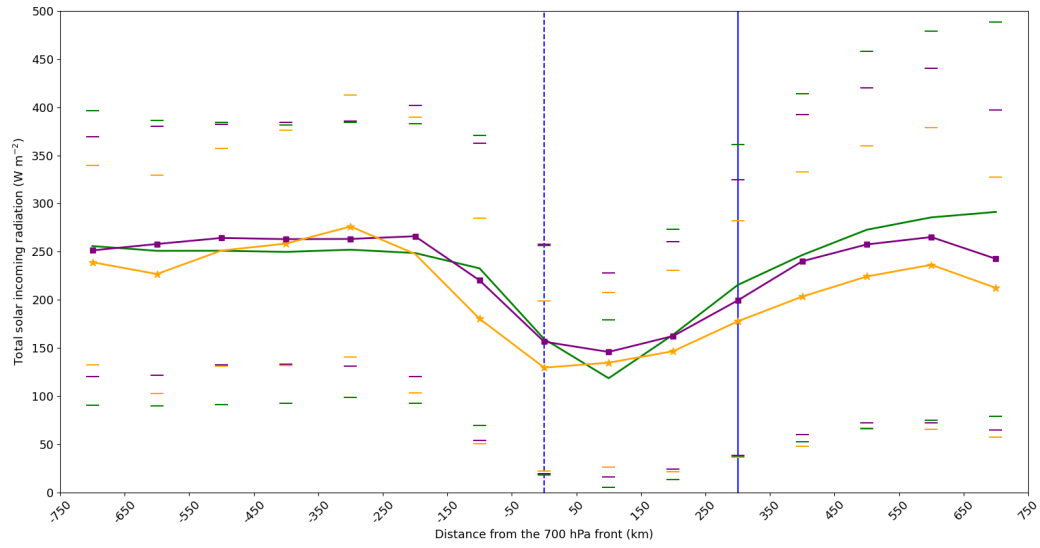
Figure S6: As Figure S1 but for total incoming solar radiation (W m$^{-2}$) only using timesteps between 09–18 UTC.
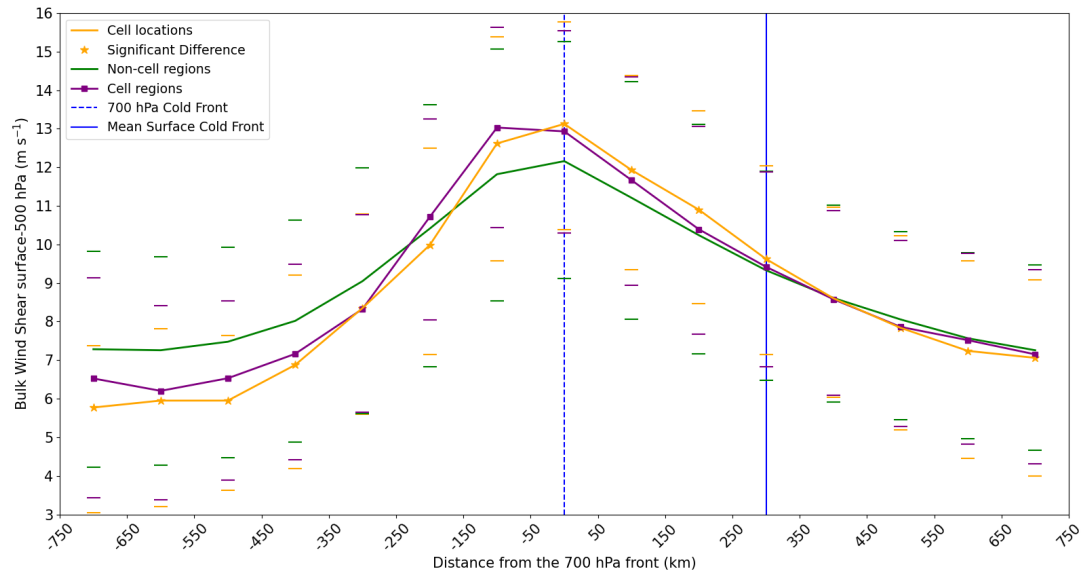


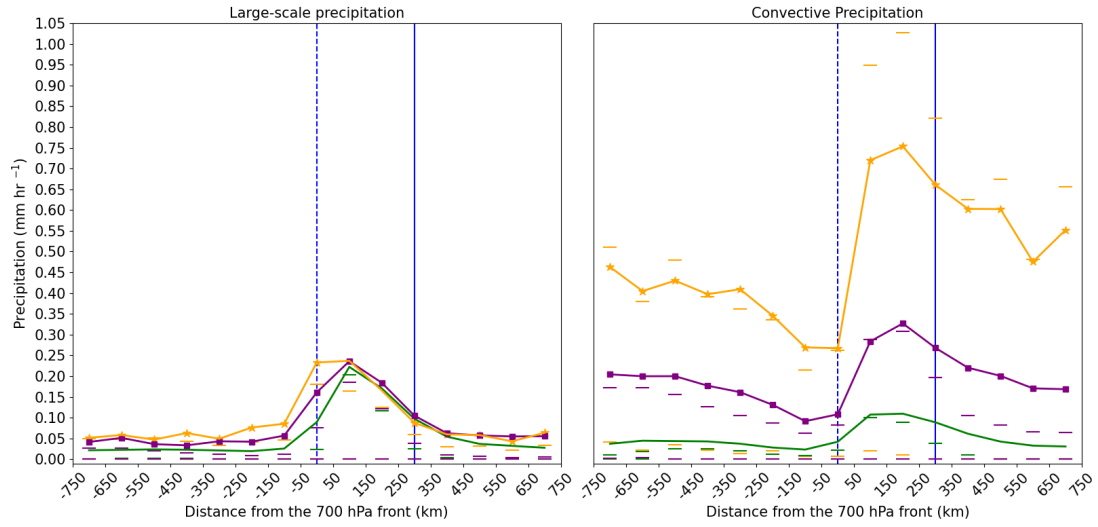Figure S7: As Figure S1 but for wind shear between the surface and 500 hPa.

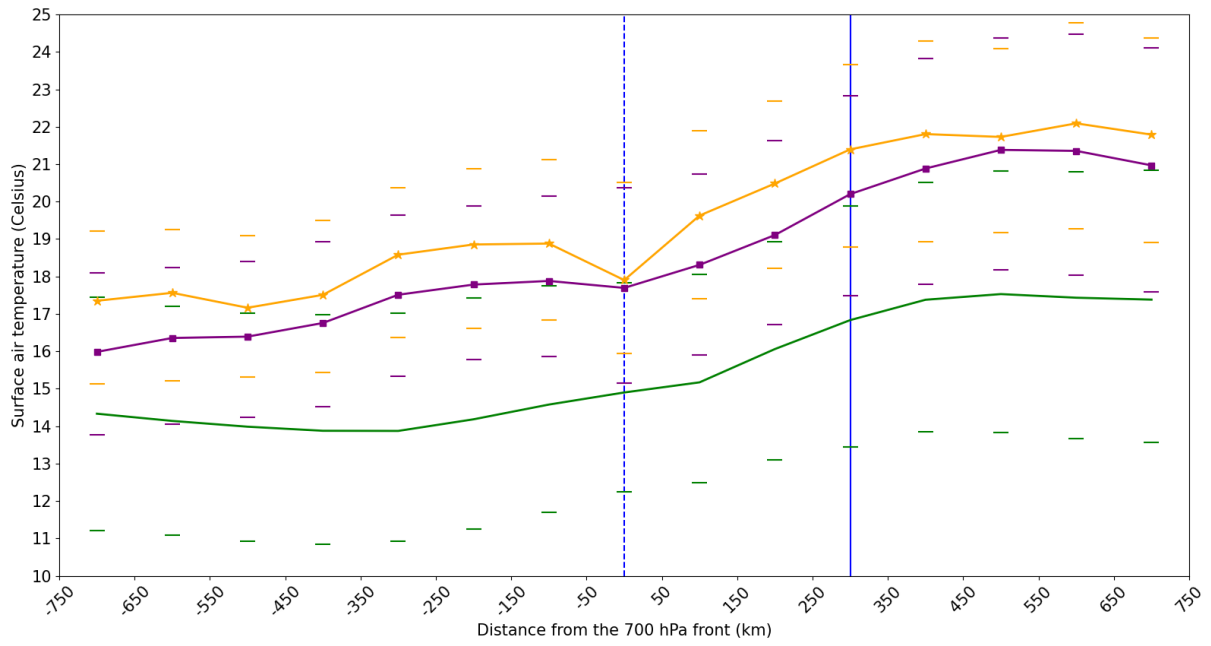Figure S8: As Figure S1 but for large-scale precipitation and convective precipitation.



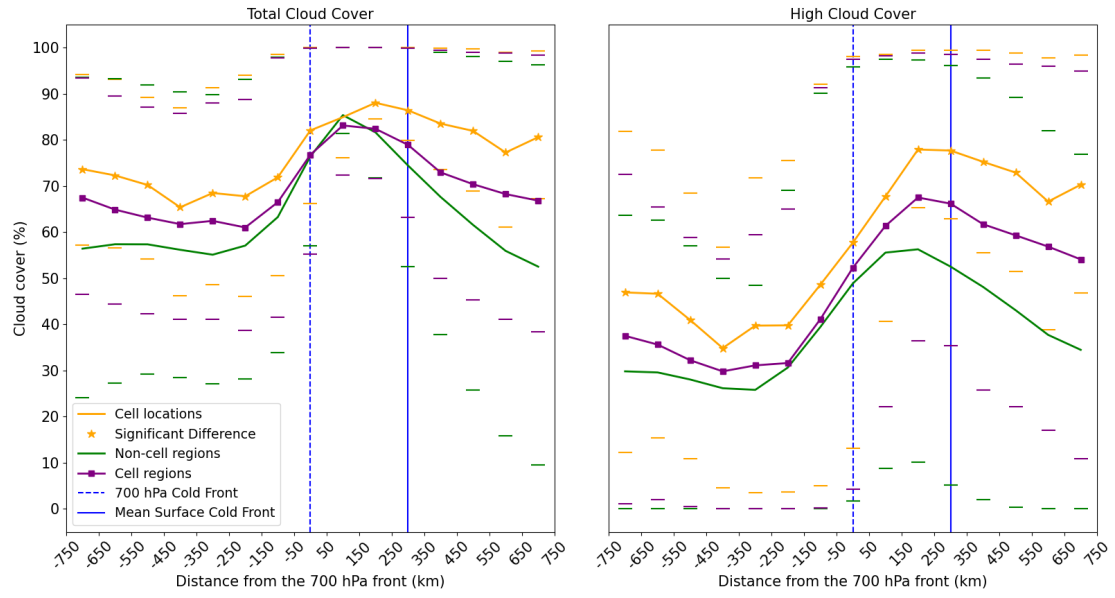Figure S9: As Figure S1 but for surface air temperature.

Figure S10: As Figure S1 but total cloud cover (left) and high-cloud cover (right).