Supplementary information

Kilometer-scale modeling projects a tripling of Alaskan convective storms in future climate

Basile Poujol[1], Andreas F. Prein[2], and Andrew J. Newman[2]

[1]*Département de Géosciences, École Normale Supérieure, PSL Res. Univ., Paris, France*
[2]*National Center for Atmospheric Research, Boulder, Colorado, USA*

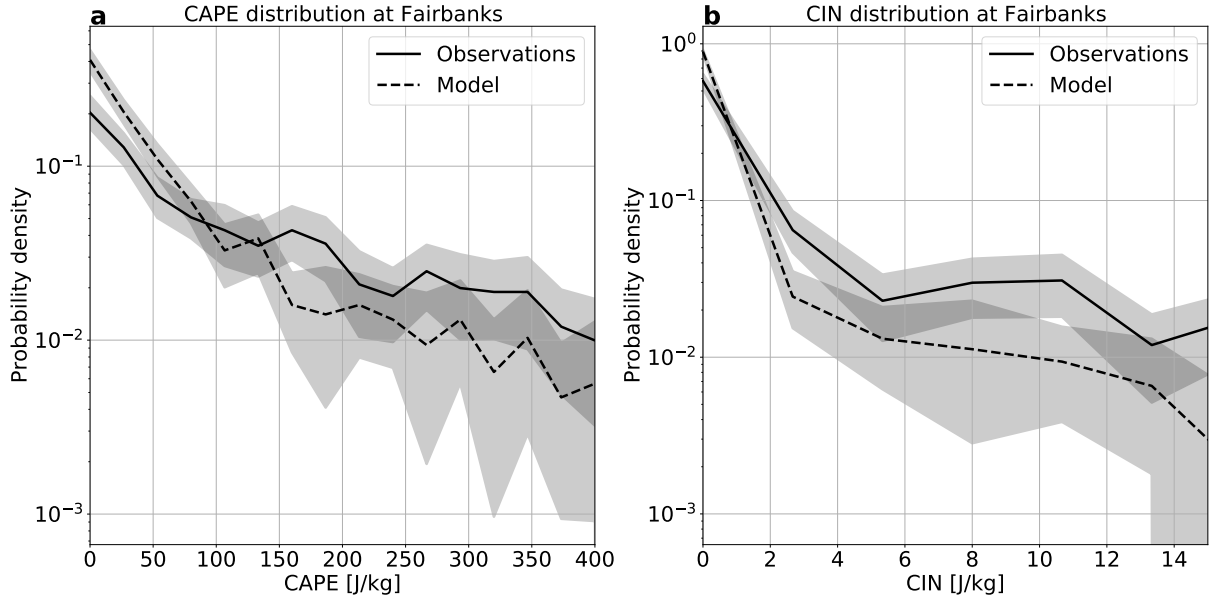

Figure S1: **a**: Normalized distribution of CAPE and CIN in radiosonde observations from Fairbanks and in the model's nearest gridpoint at 16:00 local time during the summer (May-August). Note the vertical logarithmic scale. Only days with an unstable sounding were accounted for. **b**: Same, for CIN distributions. Shadings shwo the result of a two-tailed bootstrap test with 98% confidence.

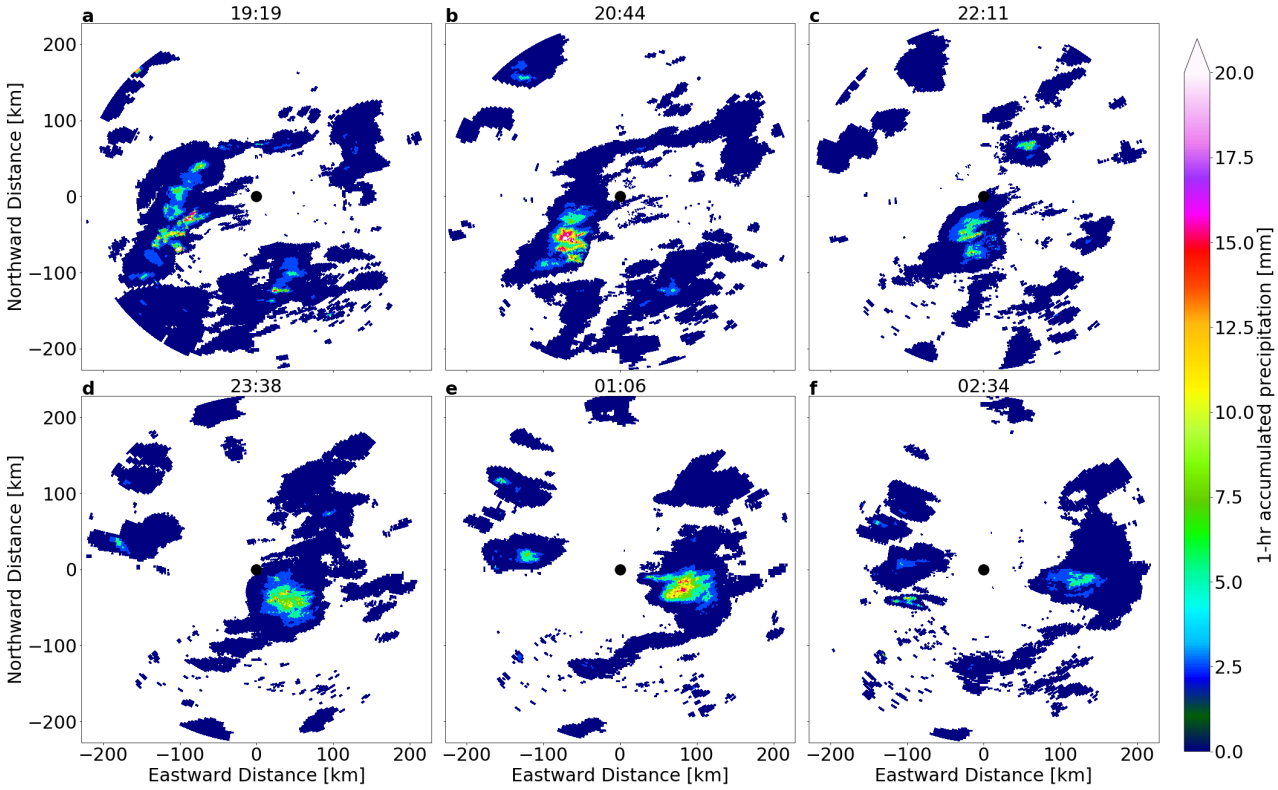

Figure S2: Same as fig.4 but on July 4th-5th, 2005.

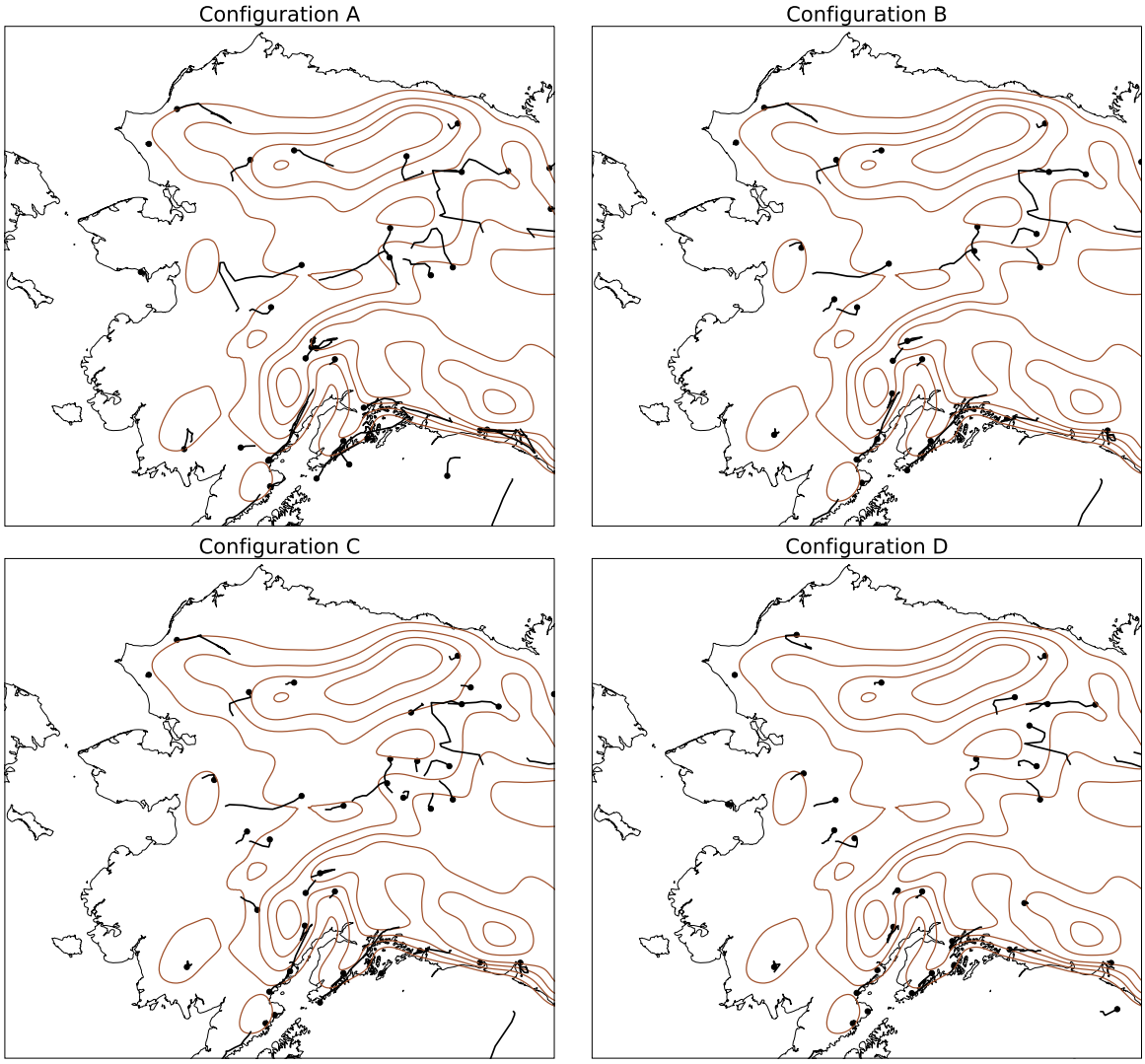

Figure S3: Tracks identified for the different configurations tried for the algorithm, for the month of July 2015. Each panel represents the tracks (solid black lines) and the locations of the storm genesis (black dots) for each configuration, as indicated in the titles. Brown contours show the smoothed topography.

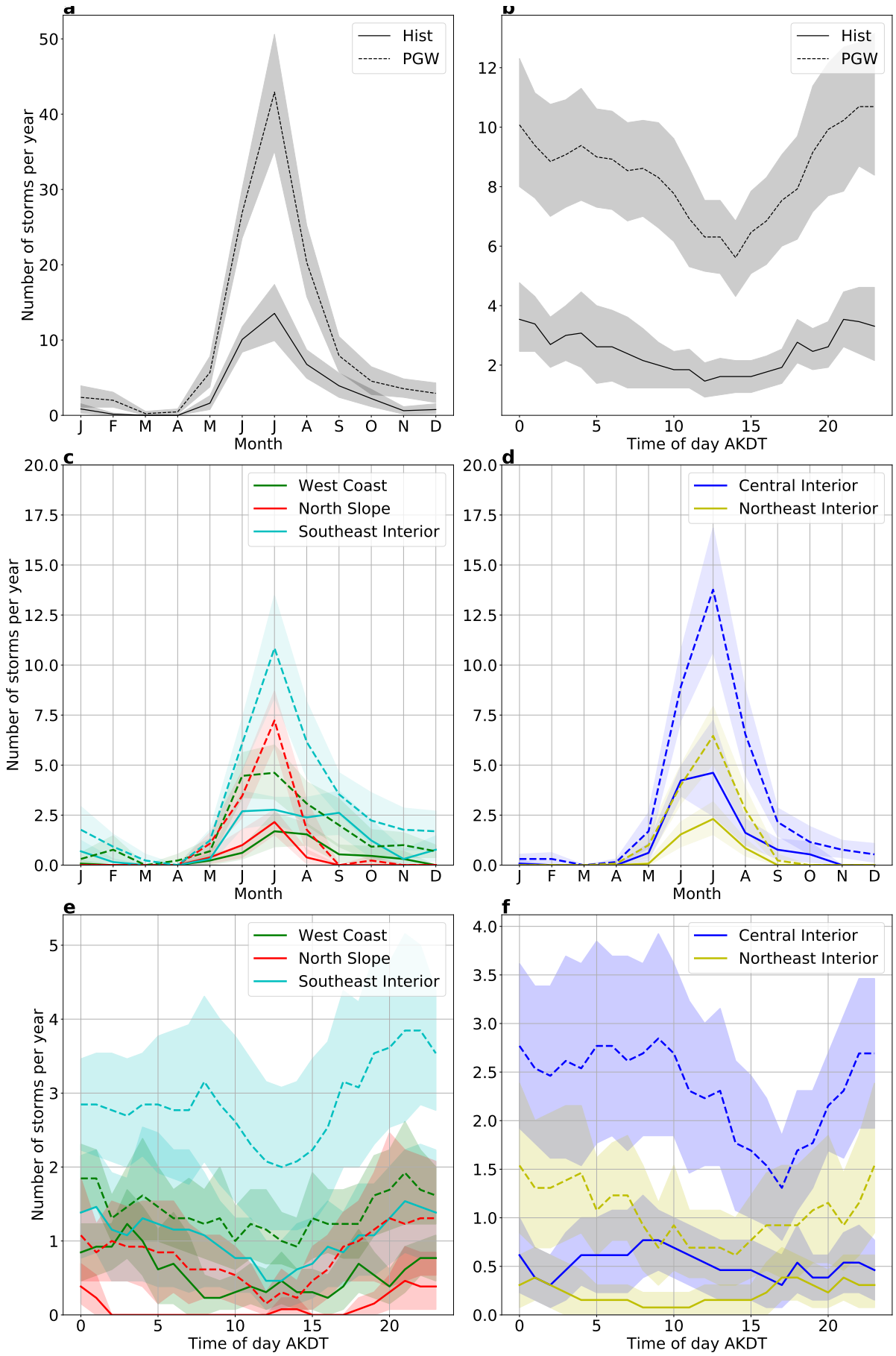

Figure S4: **a** : Annual cycle of storms in the region of interest, for the control (solid) and PGW (dashed) simulations. **b** : Same for the diurnal cycle, during the summer months (MJJA) only. **c-d** : Same than panel a, but separated by climate region. **e-f** : Same than panel b, but separated by climate region. Shadings show the results of a bootstrap two-tailed 90% uncertainty test.

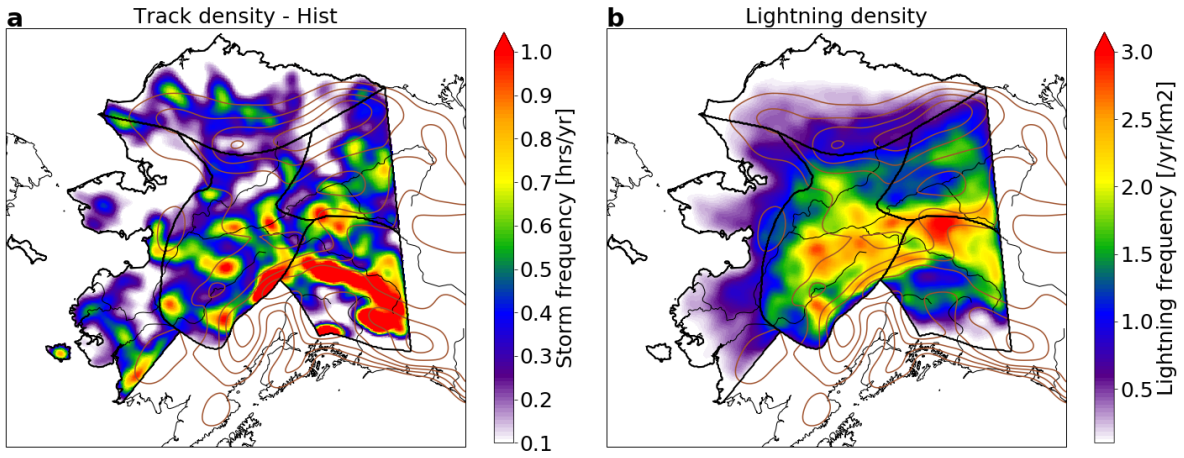

Figure S5: **a** : As in figure 8a of the main article, but with a linear colorbar. **b** : Lightning density during the simulation period from the Alaska Lightning Detection Network. The frequency was calculated on the model grid, and then the same spatial smoothing that was applied to storm track density was applied on lightning data as well.

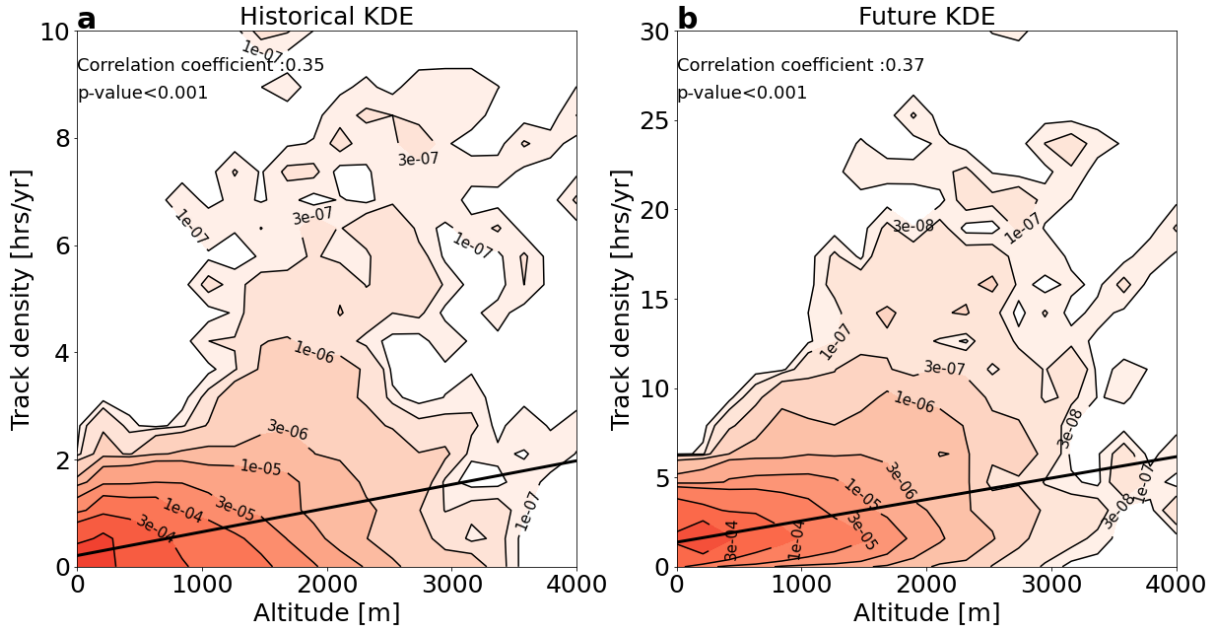

Figure S6: **a**: Shadings: Gaussian kernel density estimation of the topography/storm density distribution in the historical simulation. The black line shows a linear regression, and the Pearson correlation coefficient and p-value are indicated in the top left corner. **b**: Same, for the PGW simulation.