



Supplement of

**The North American CORDEX-CMIP6 WRF evaluation run:
comparing historical simulations from 25 km to
convection-permitting scales**

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1 Supporting Figures S1-S14

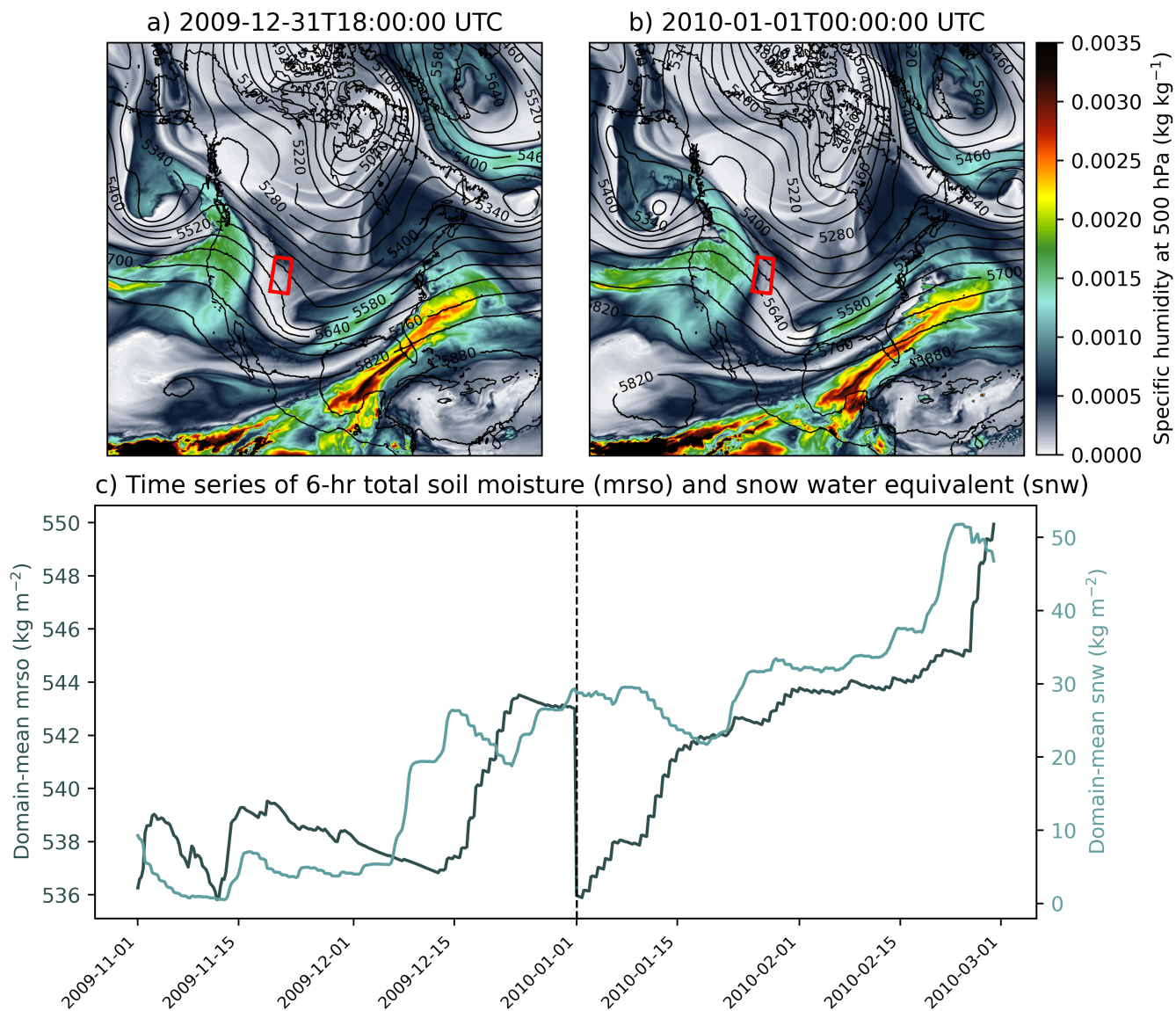


Figure S1. Snapshots of geopotential height and specific humidity at 500 hPa for (a) 2009-12-31 at 18:00 UTC and (b) 2010-01-01 00:00 UTC. (c) Time series of 6-hour total soil moisture (dark blue) and snow water equivalent (light blue) from 2009-11-30 through 2010-02-28.

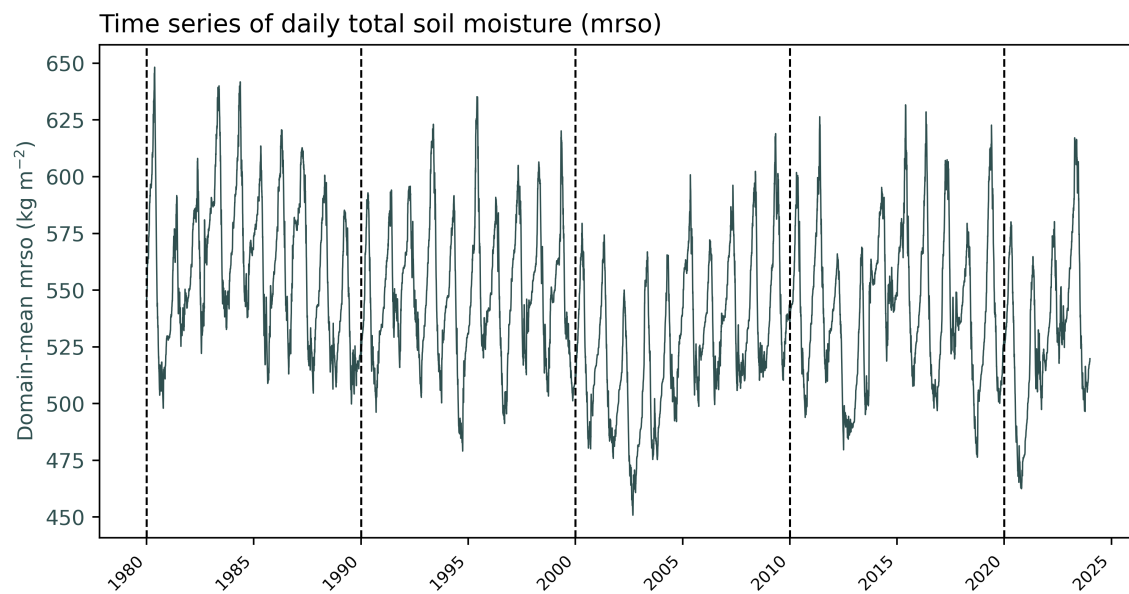


Figure S2. Time series of 6-hour total soil moisture over the Colorado Rockies (109°-105°W and 38°-44°N) from 1980-01-01 through 2023-12-31.

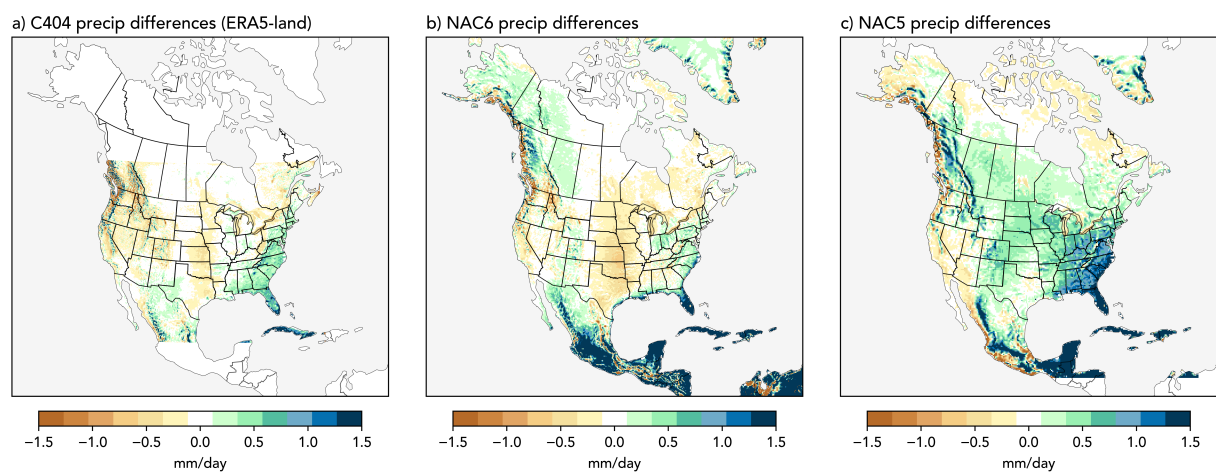


Figure S3. Climatological differences of precipitation for C404 (a), NAC6 (b), and NAC5 (c) using ERA5-Land as a reference dataset from 1980-2010.

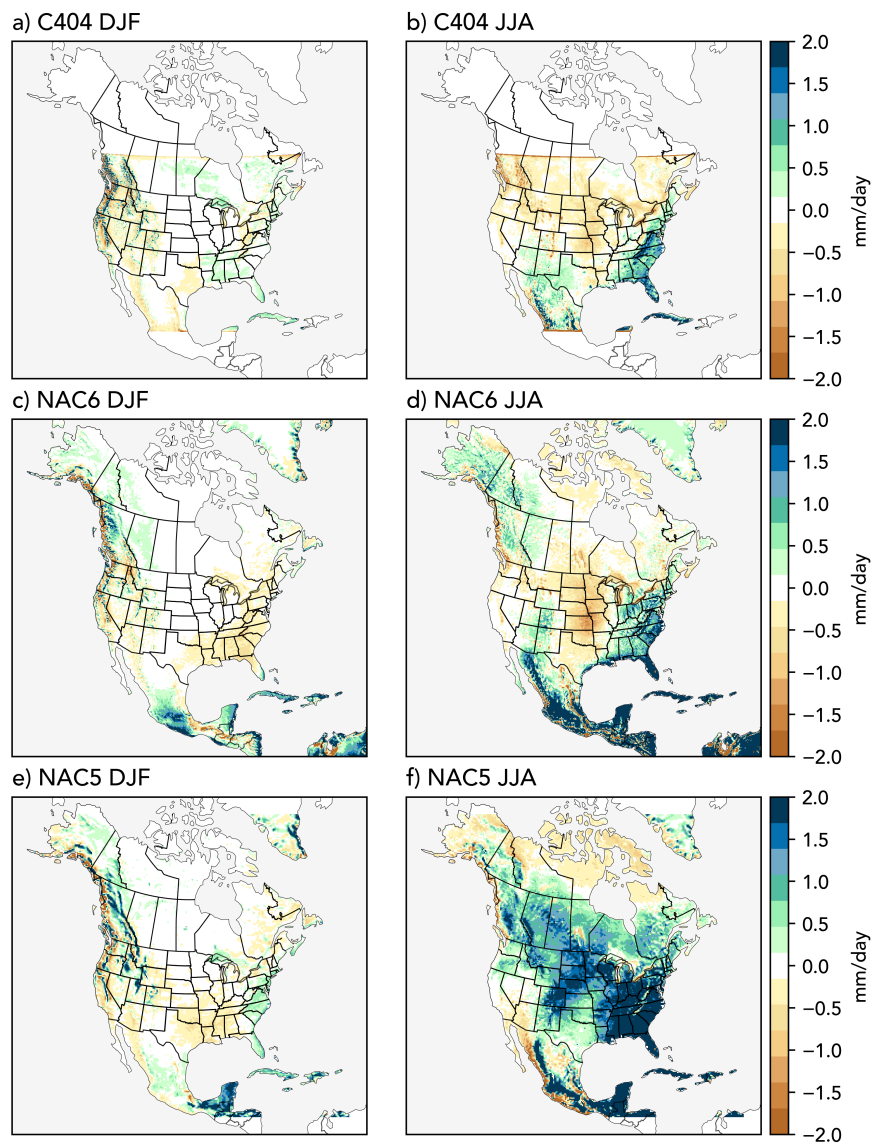


Figure S4. Winter (DJF) and Summer (JJA) climatological differences of precipitation for C404 (a,b), NAC6 (c,d), and NAC5 (e,f) using ERA5-Land as a reference dataset.

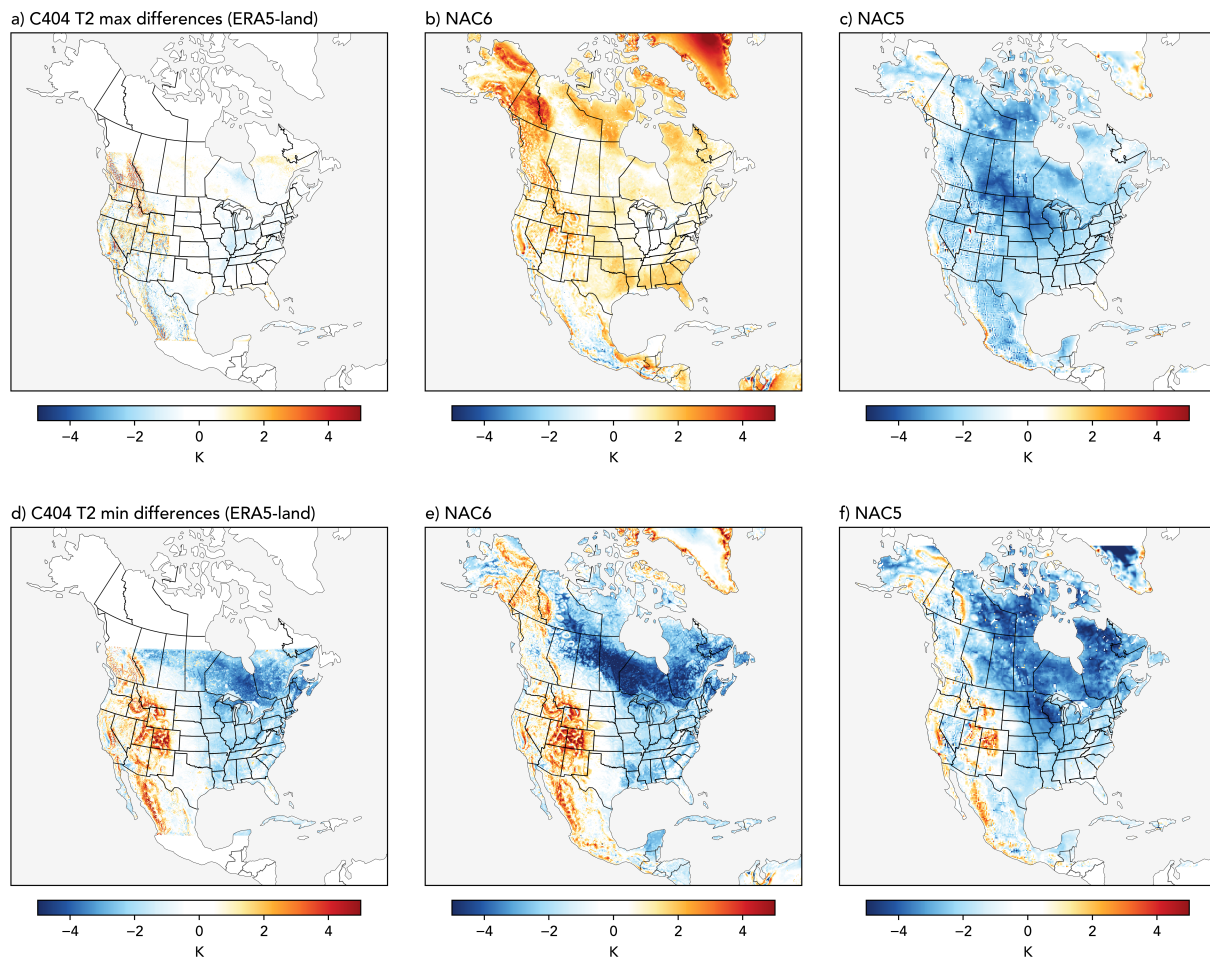


Figure S5. Climatological differences of maximum and minimum daily 2-meter air temperature for C404 (a,d), NAC6 (b,e), and NAC5 (c,f) using ERA5-Land as a reference dataset from 1980-2010

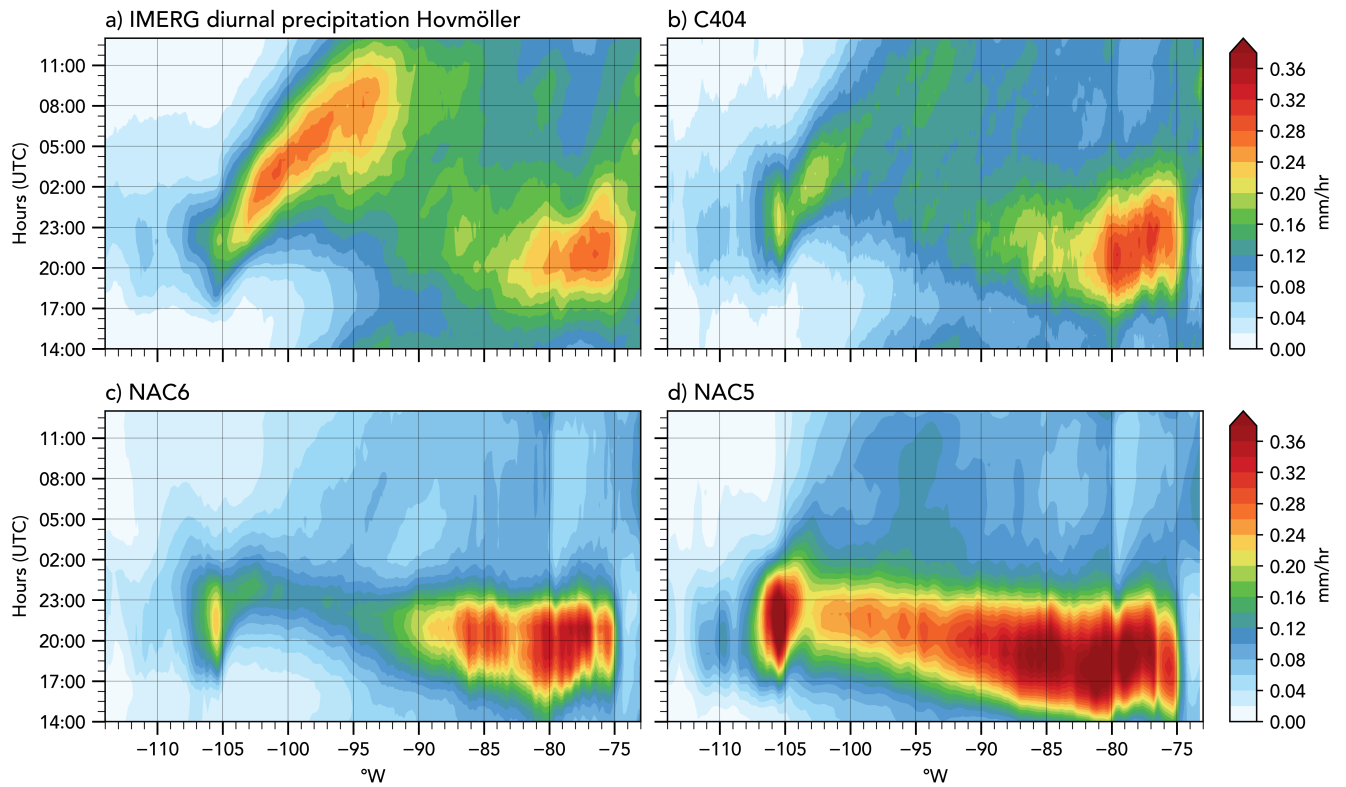
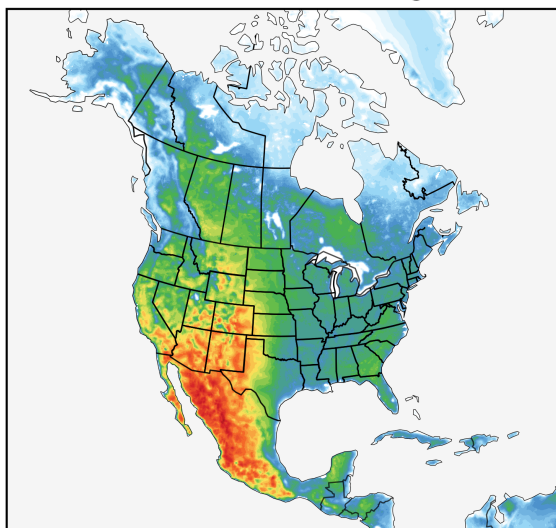
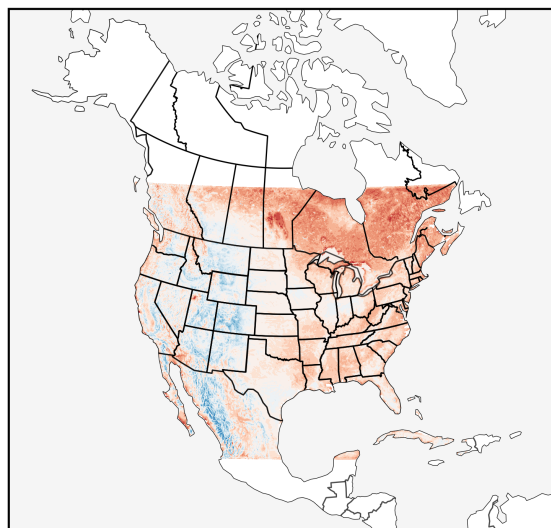


Figure S6. Climatological differences of 2-meter air temperature for C404 (a,b), NAC6 (c,d), and NAC5 (e,f) using PRISM (top row) and Daymet (bottom row) as reference datasets from 1980 through 2010.

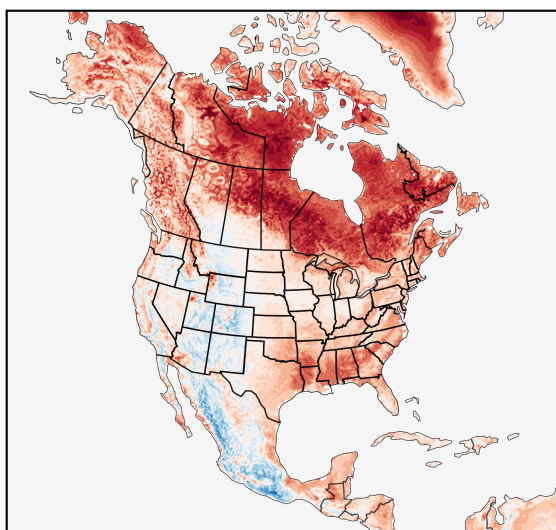
a) ERA5-Land diurnal T2 range



b) C404 minus ERA5-Land



c) NAC6 minus ERA5-Land



d) NAC5 minus ERA5-Land

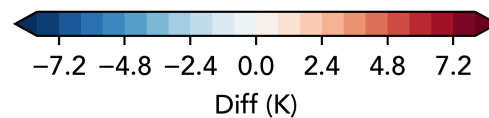
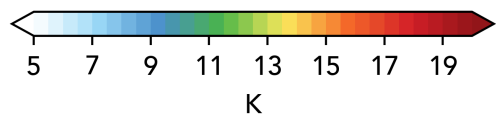
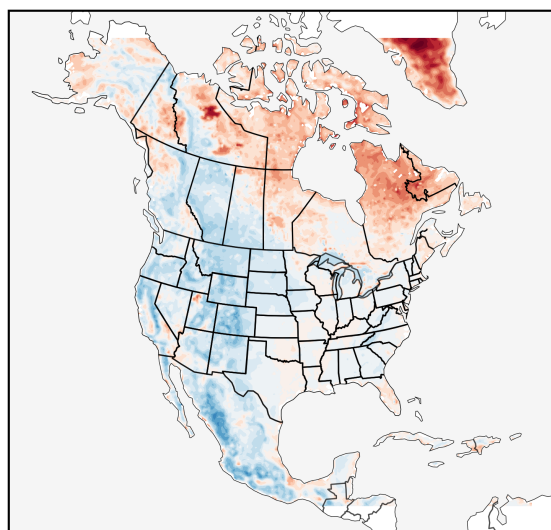


Figure S7. Winter (DJF) and summer (JJA) climatological 2-meter air temperature differences from PRISM and Daymet for C404 (a–d), NAC6 (e–h), and NAC5 (i–l) from 1980 through 2010.

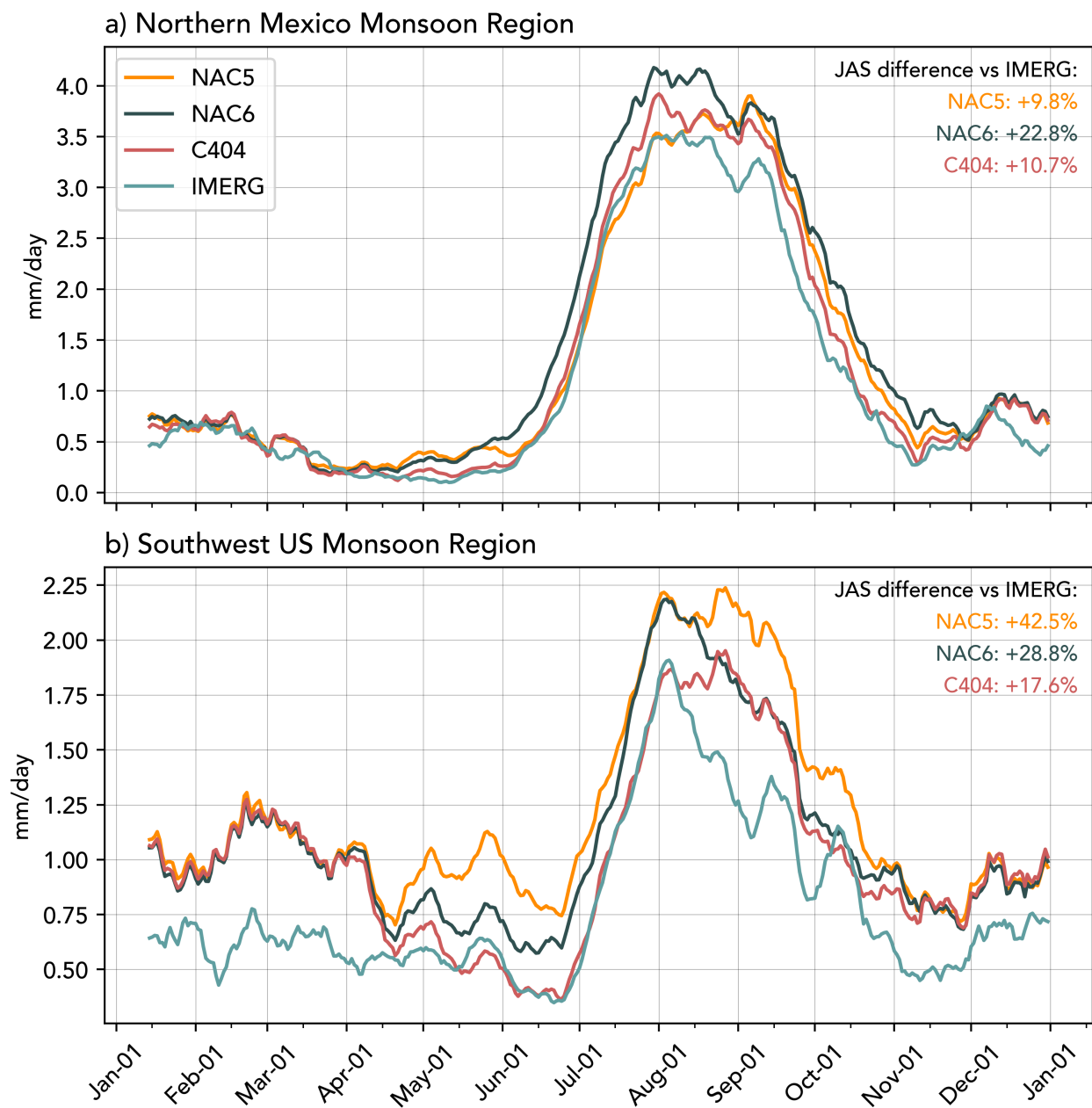


Figure S8. Climatological differences of precipitation for C404 (a,b), NAC6 (c,d), and NAC5 (e,f) using PRISM (top row) and Daymet (bottom row) as reference datasets from 1980 through 2010.

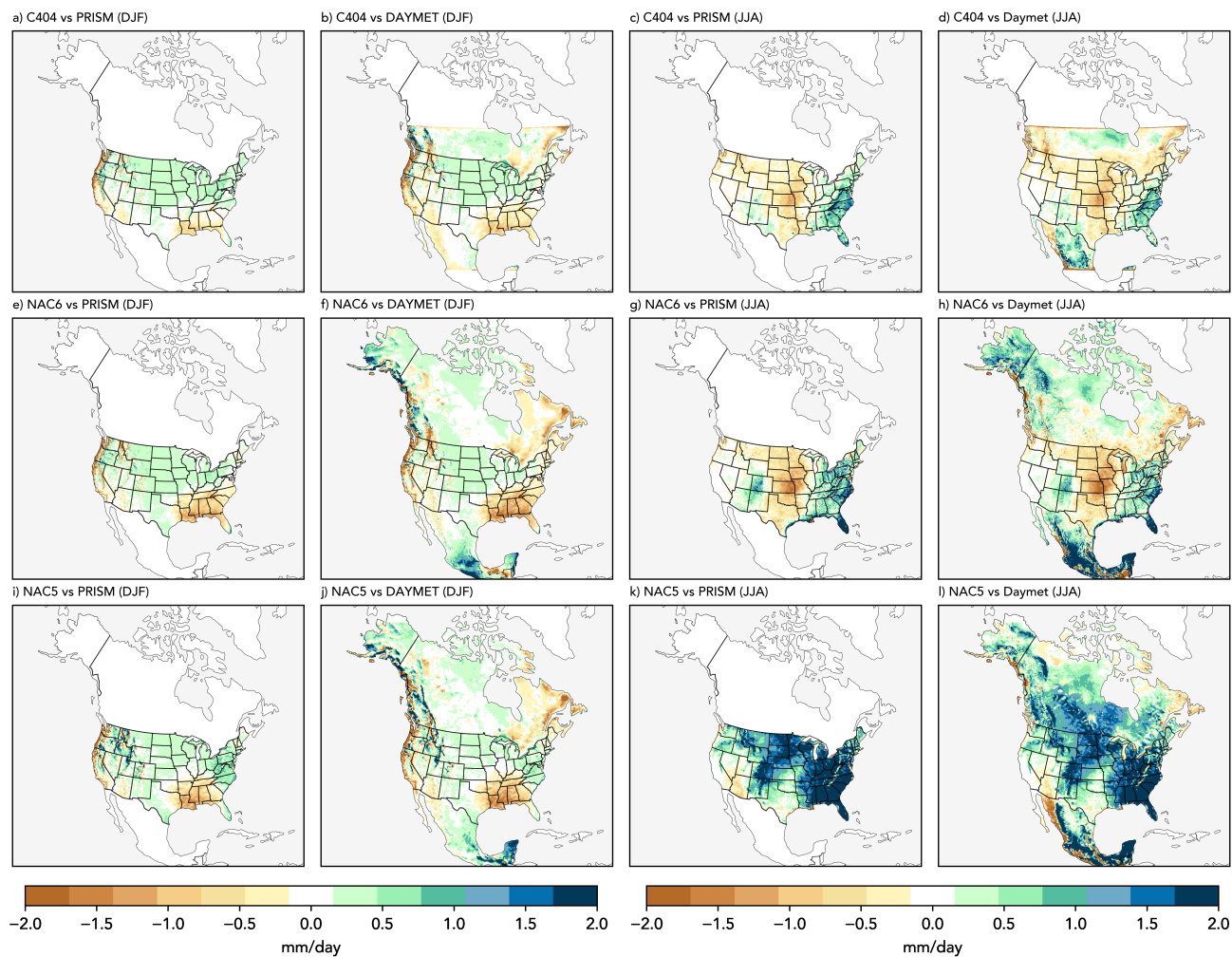


Figure S9. Winter (DJF) and summer (JJA) climatological precipitation differences from PRISM and Daymet for C404 (a–d), NAC6 (e–h), and NAC5 (i–l) from 1980 through 2010.

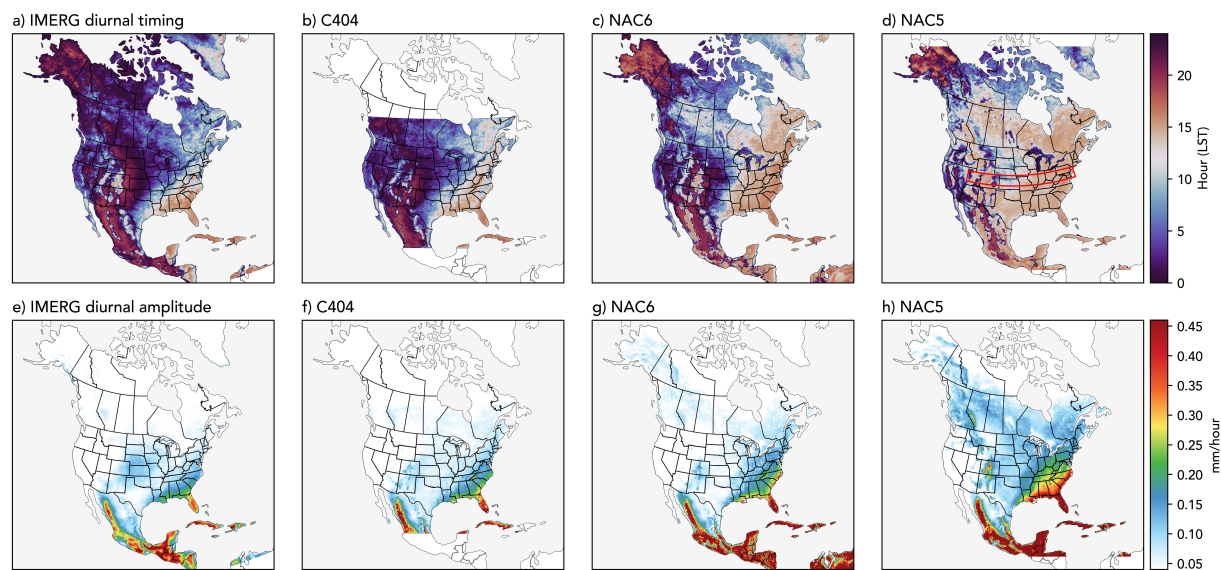


Figure S10. Diurnal precipitation peak time (top row) and magnitude (bottom row) for IMERG (a,e), C404 (b,f), NAC6 (c,g) and NAC5 (d,h) over June, July and August. The domain for the longitude and time Hovmöller diagrams in the next figure is shown in panel (d)

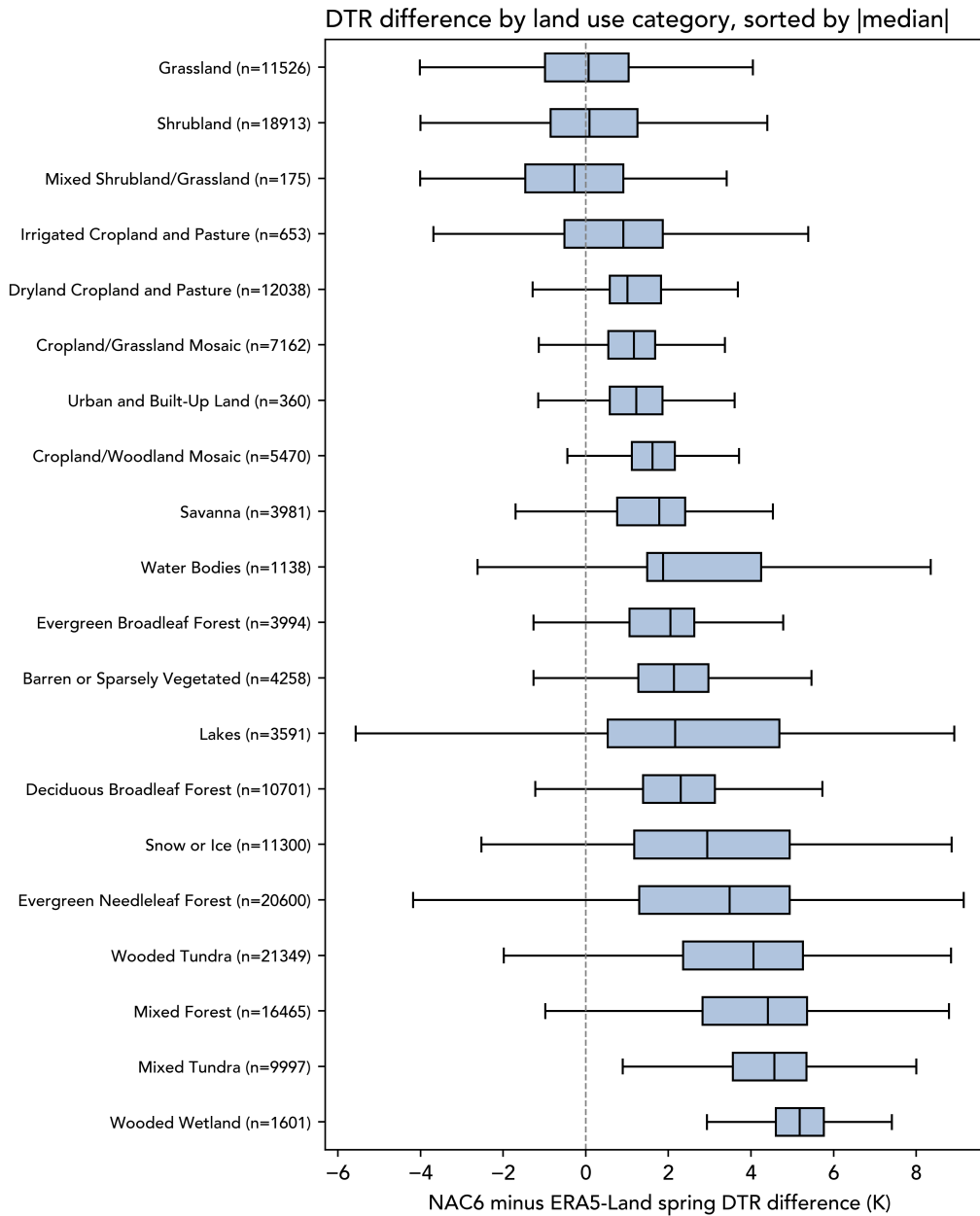


Figure S11. Distribution of spring (MAM) diurnal temperature range differences between NAC6 and ERA5-Land by USGS land use category, sorted by absolute median difference. Boxes show interquartile range with median line; whiskers show 5th–95th percentile. n indicates the number of grid cells per category.

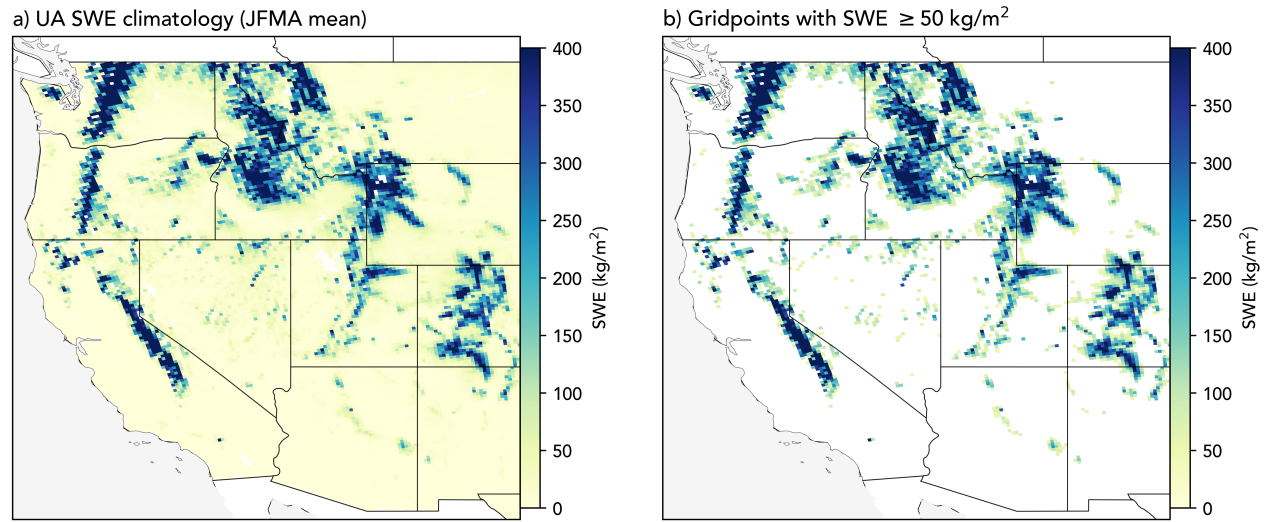


Figure S12. (a) University of Arizona SWE climatology (January–April mean) over the western US. (b) Grid points retained for snow analysis, masked to locations with climatological SWE ≥ 50 kg/m².

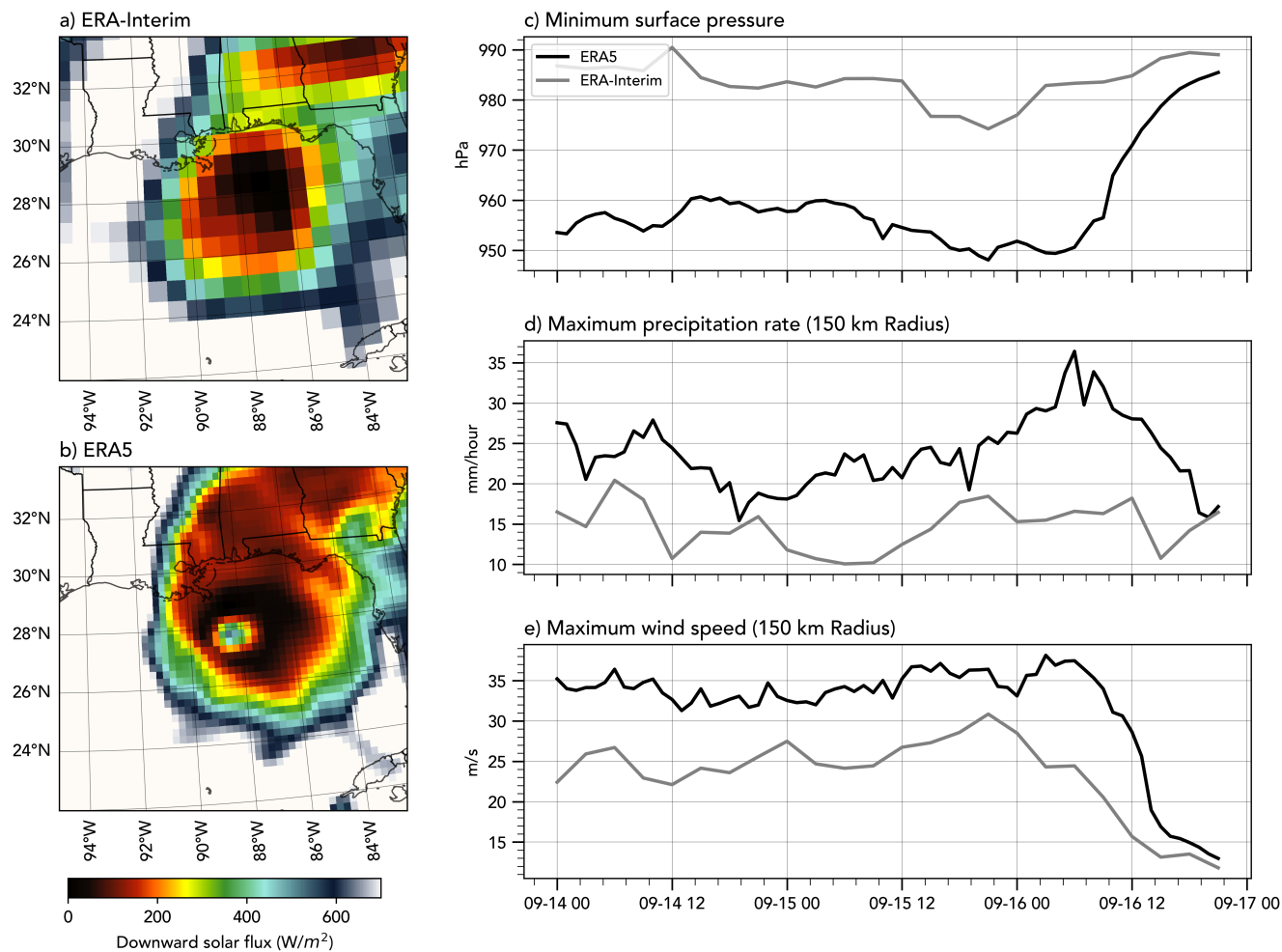


Figure S13. Comparison of Hurricane Ivan structure and intensity between ERA-Interim and ERA5 driving reanalyses. Downward solar flux at 2004-09-15 18:00 UTC for (a) ERA-Interim and (b) ERA5. (c) Minimum surface pressure, (d) maximum precipitation rate, and (e) maximum wind speed within a 150 km radius of the storm center from September 14–17, 2004.

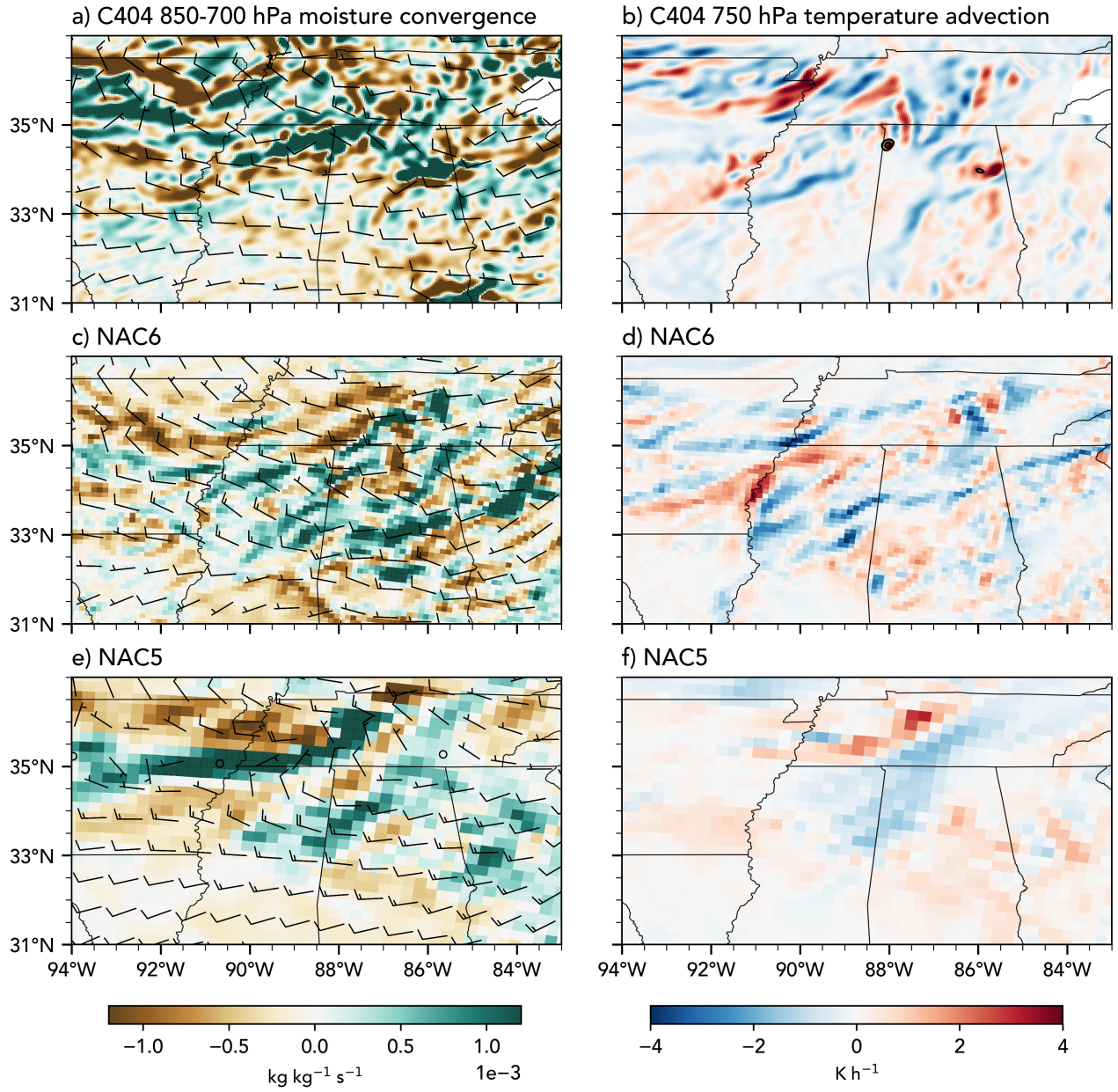


Figure S14. 925-700 hPa moisture convergence and 850 hPa temperature advection across the southern Great Plains on July 22, 2003 at 18z.

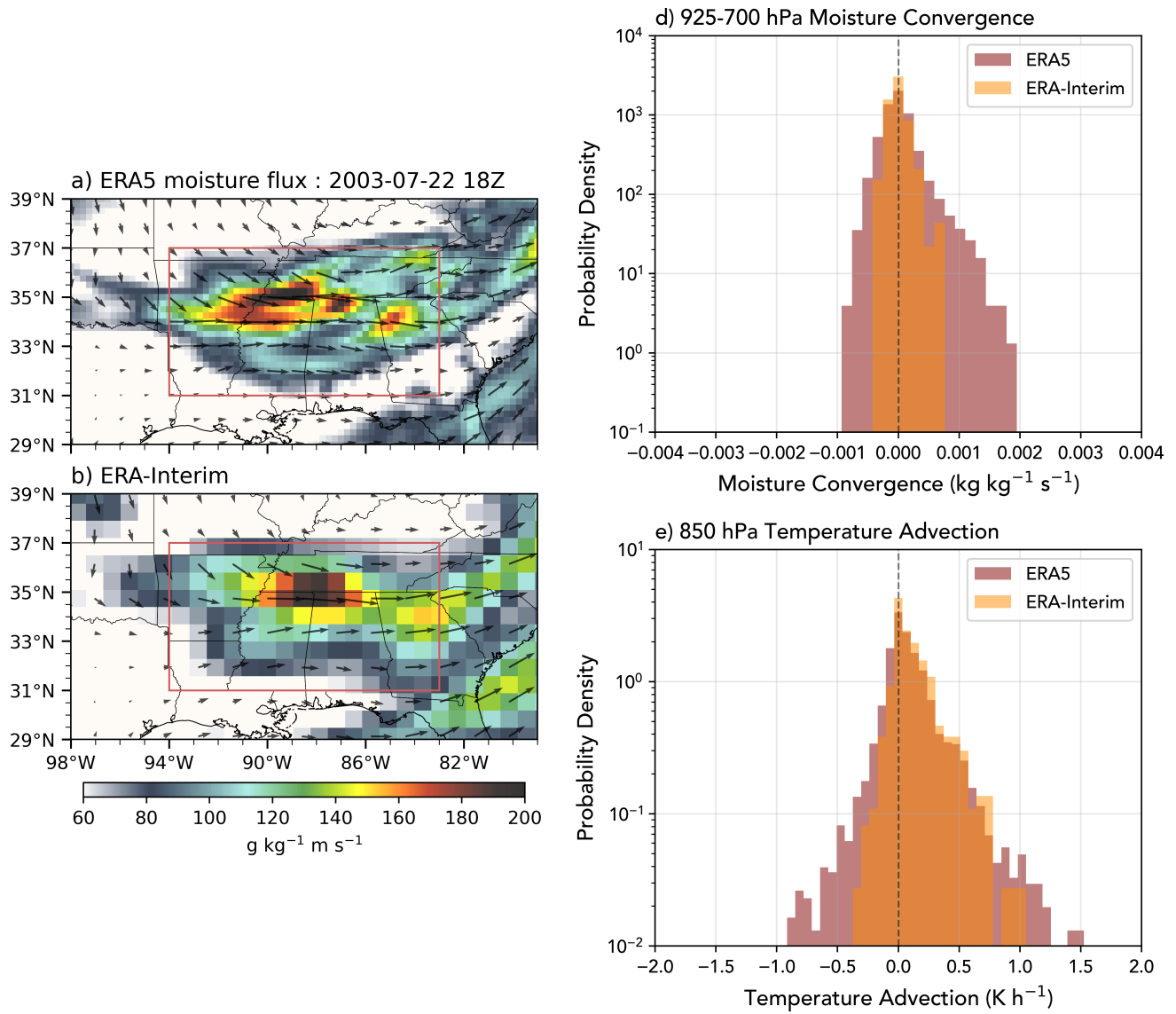


Figure S15. Comparison of Mid-South Derecho environment between (a) ERA5 and (b) ERA-Interim driving reanalyses. 850 hPa horizontal moisture flux and wind vectors at 2003-07-22 18:00 UTC; red box denotes the analysis region shown in Figure 1. (c) Probability density of 925–700 hPa moisture flux convergence and 850 hPa temperature advection within the analysis region.