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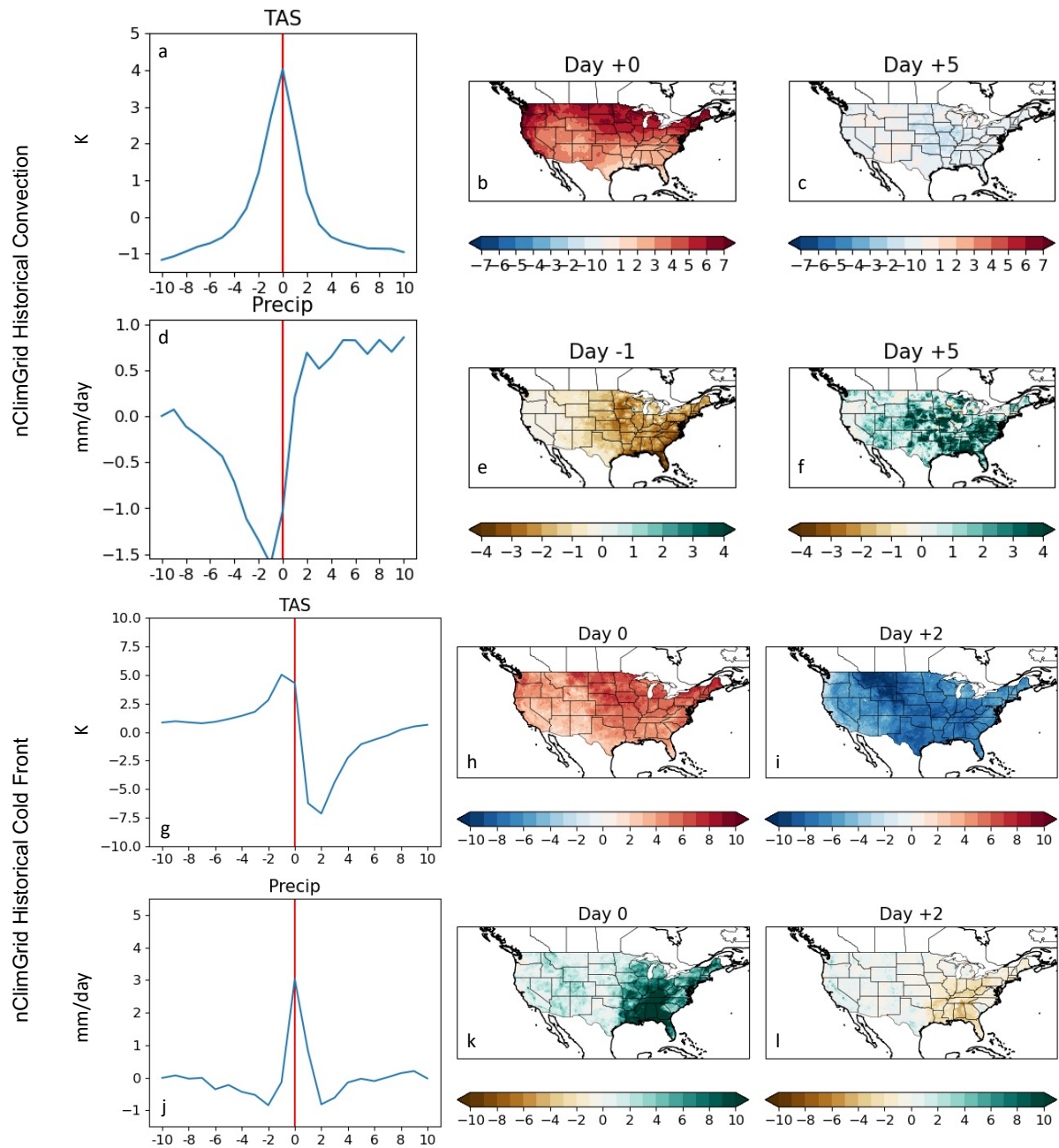
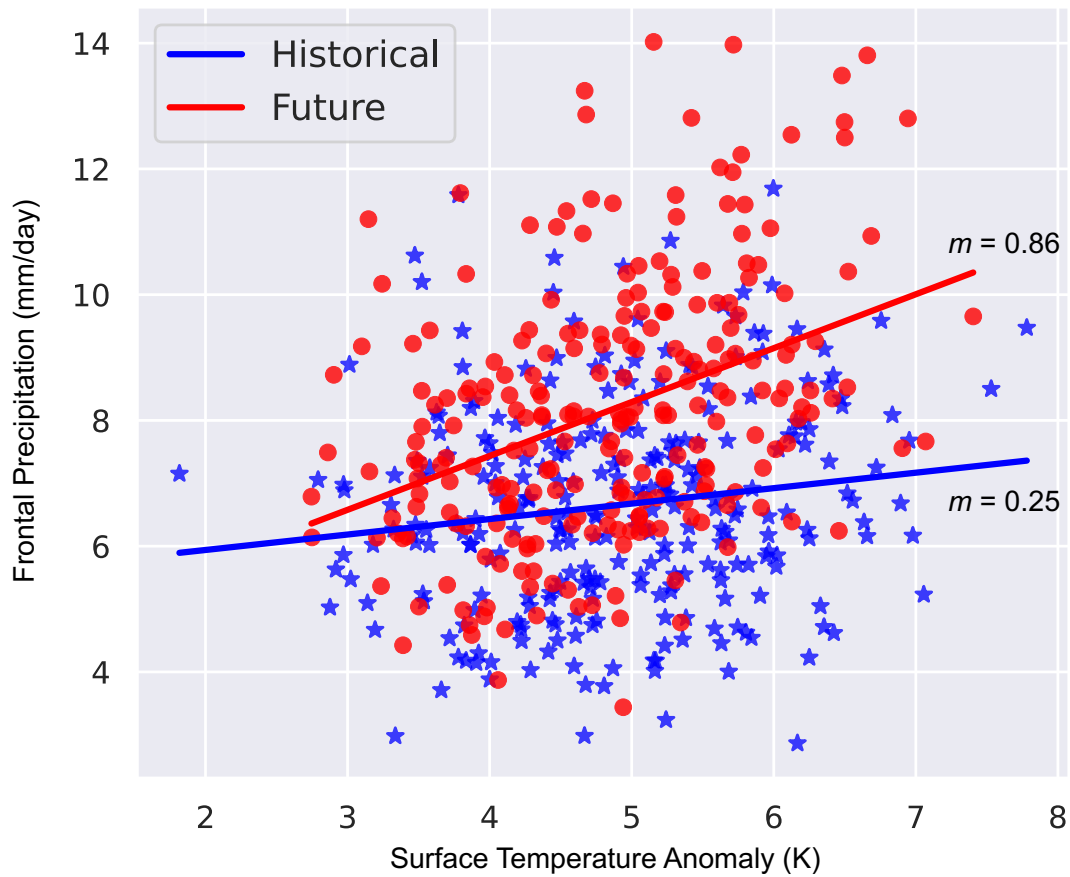
Supplemental Figure 1: (a) 21-day composite time series of CONUS surface temperature centered around the day of convective precipitation using Livneh data over the 1980-2014 interval. **(b)** Spatial composite of surface temperature on the day of convective precipitation **(c)** Spatial composite of surface temperature 5 days after convective precipitation. **(d)** 21-day composite time series of CONUS precipitation centered around the day of convective precipitation using Livneh data over the 1980-2014 interval. **(e)** Spatial composite of precipitation on the day prior to convective precipitation **(f)** Spatial composite of surface temperature 5 days after convective precipitation. **(g)** 21-day composite time series of CONUS surface temperature centered around the day of frontal precipitation using Livneh data over the 1980-2014 interval. **(h)** Spatial composite of surface temperature on the day of frontal precipitation. **(i)** Spatial composite of surface temperature two days after convective precipitation. **(j-l)** Same as (g-i) but for precipitation.

415

Supplemental Figure 2: Same as Supplemental Figure 1 but for the nClimGrid-Daily data over 1980-2005.

420

Supplemental Figure 3: Scatterplots of surface temperature and frontal precipitation centered on the day of greatest surface temperature drop for raw CMIP6 models over (red) 1980-2014 and (blue) 2065-2099. A linear regression model (slope indicated by *m*) is fitted using all the different models together over the two periods.

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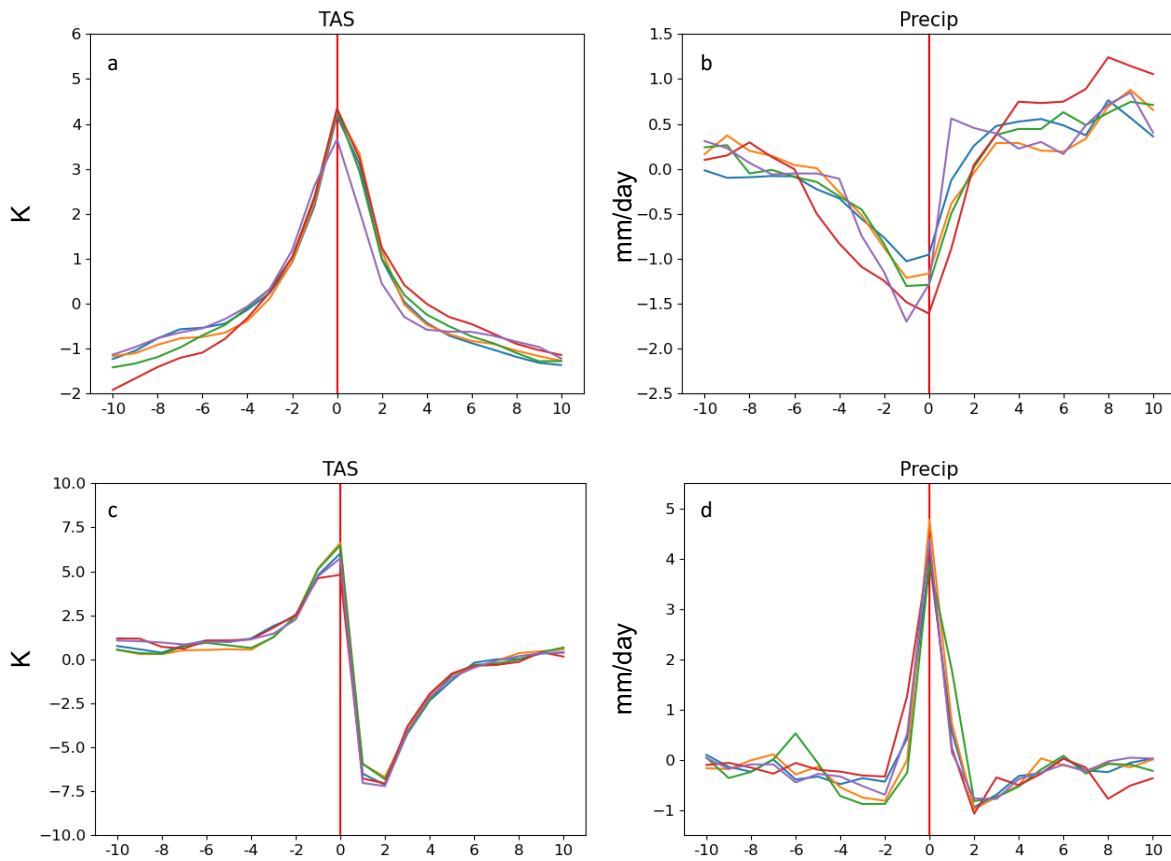
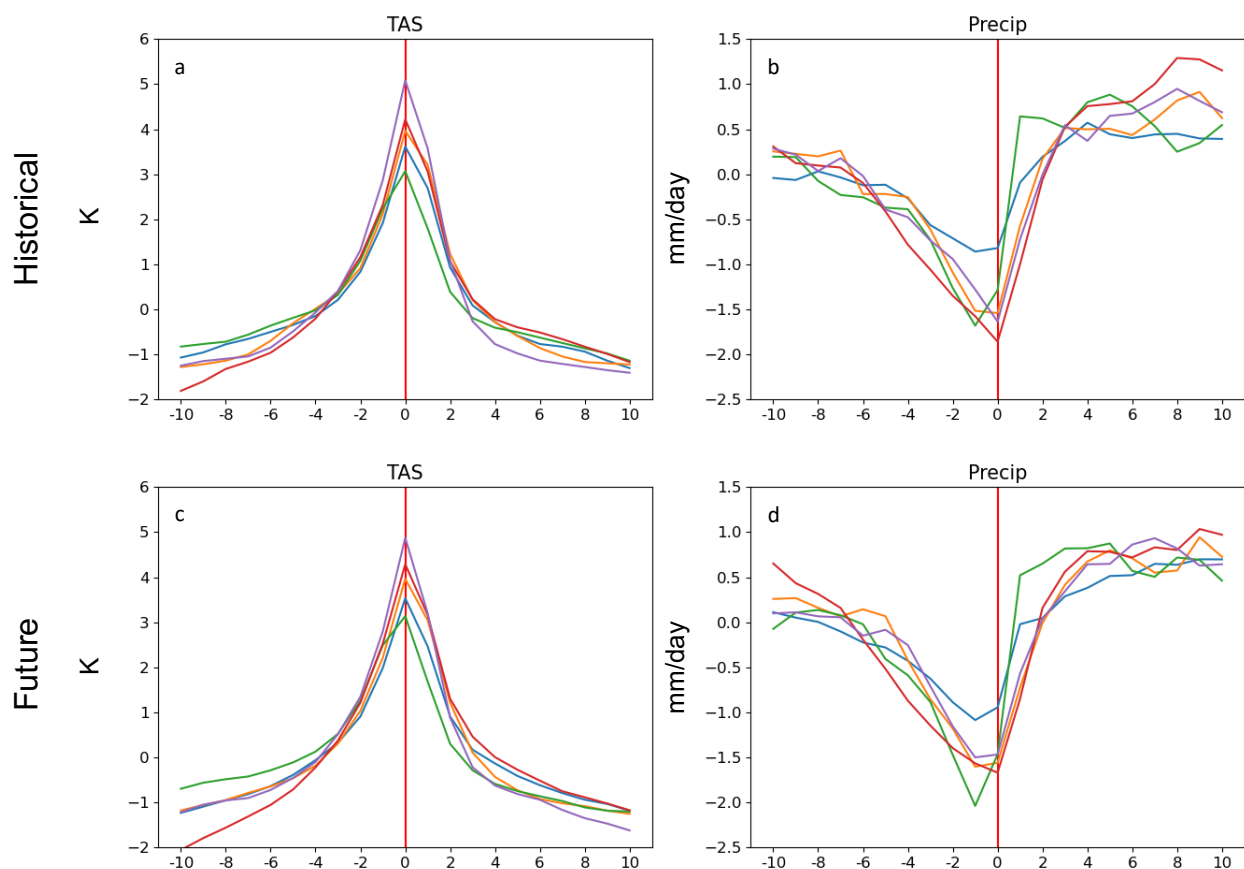
ERA5 Dynamical Downscaling

Supplemental Figure 4: 21-day composite time series of CONUS **(a)** surface temperature and **(b)** precipitation anomalies centered around the day of convective precipitation using dynamical downscaling of ERA5-Interim data over the 1980-2014 interval. **(c-d)** Same as (a-b) but for frontal precipitation.

430

Supplemental Figure 5: 21-day composite time series of CONUS **(a)** surface temperature and **(b)** precipitation anomalies centered around the day of convective precipitation using dynamical downscaling of ERA5-Interim data over the 1980-2014 interval. **(c-d)** Same as (a-b) but for the future interval over 2065-2098 under RCP8.5 forcing.

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