



Supplement of

Evaluating downscaled products with expected hydroclimatic co-variances

Seung H. Baek et al.

Correspondence to: Seung H. Baek (baek1@llnl.gov)

The copyright of individual parts of the supplement might differ from the article licence.

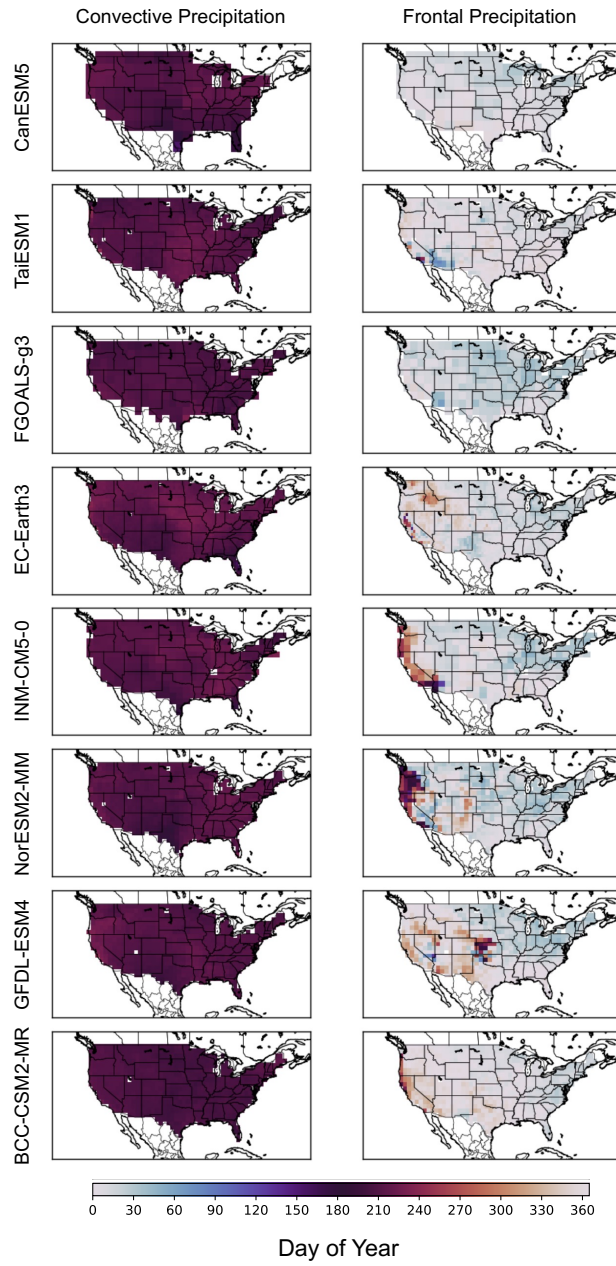
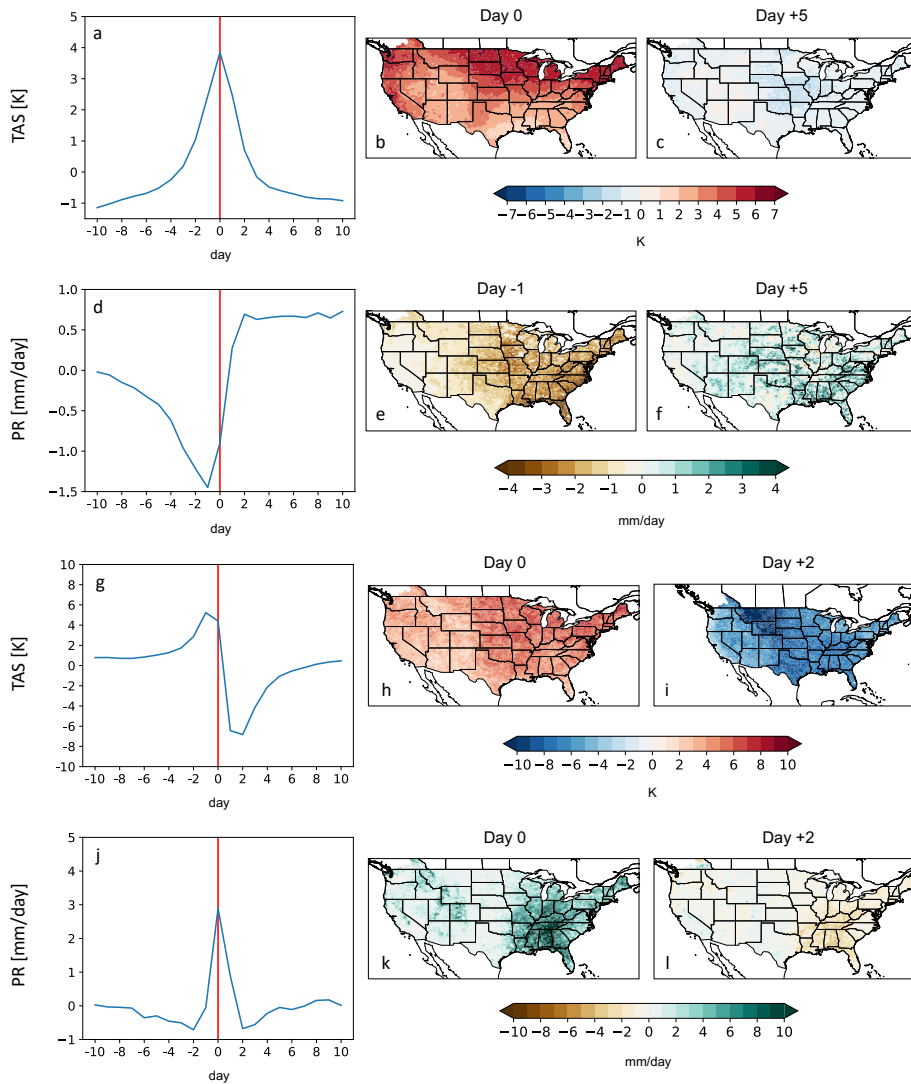


Figure S1: Same as Figure 3 but for the 8 raw CMIP6 GCMs.



5

Figure S2: (a) 21-day composite (spatially averaged over CONUS domain) time series of surface temperature anomalies (relative to 21 day average) centered around the day of convective precipitation using Livneh data over the 1980-2014 interval. (b) Spatial composite of surface temperature anomalies on the day of convective precipitation (c) Spatial composite of surface temperature anomalies 5 days after convective precipitation. (d) 21-day composite time series of CONUS precipitation anomalies (relative to 21 day average) centered around the day of convective precipitation using Livneh data over the 1980-2014 interval. Note that these are anomalies relative to the 21 day window examined, yielding both positive and negative values. (e) Spatial composite of precipitation anomalies on the day prior to convective precipitation (f) Spatial composite of surface temperature anomalies 5 days after convective precipitation. (g) 21-day composite time series of CONUS surface temperature anomalies (relative to 21 day average) centered around the day of frontal precipitation using Livneh data over the 1980-2014 interval. (h) Spatial composite of surface temperature anomalies on the day of frontal precipitation. (i) Spatial composite of surface temperature anomalies two days after convective precipitation. (j-l) Same as (g-i) but for precipitation.

10

15

20

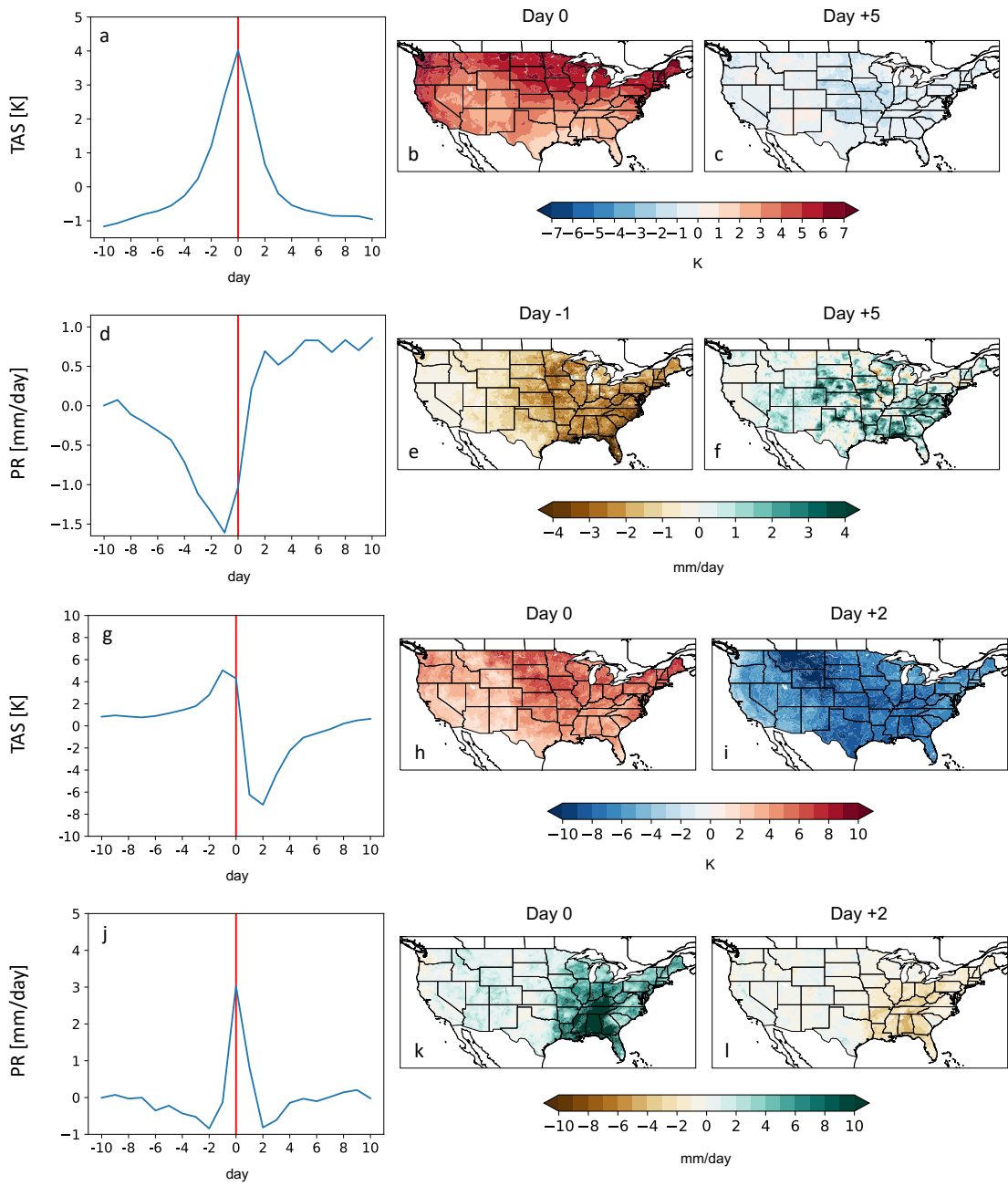


Figure S3: Same as Figure S2 but for the nClimGrid-Daily data over 1980-2005.

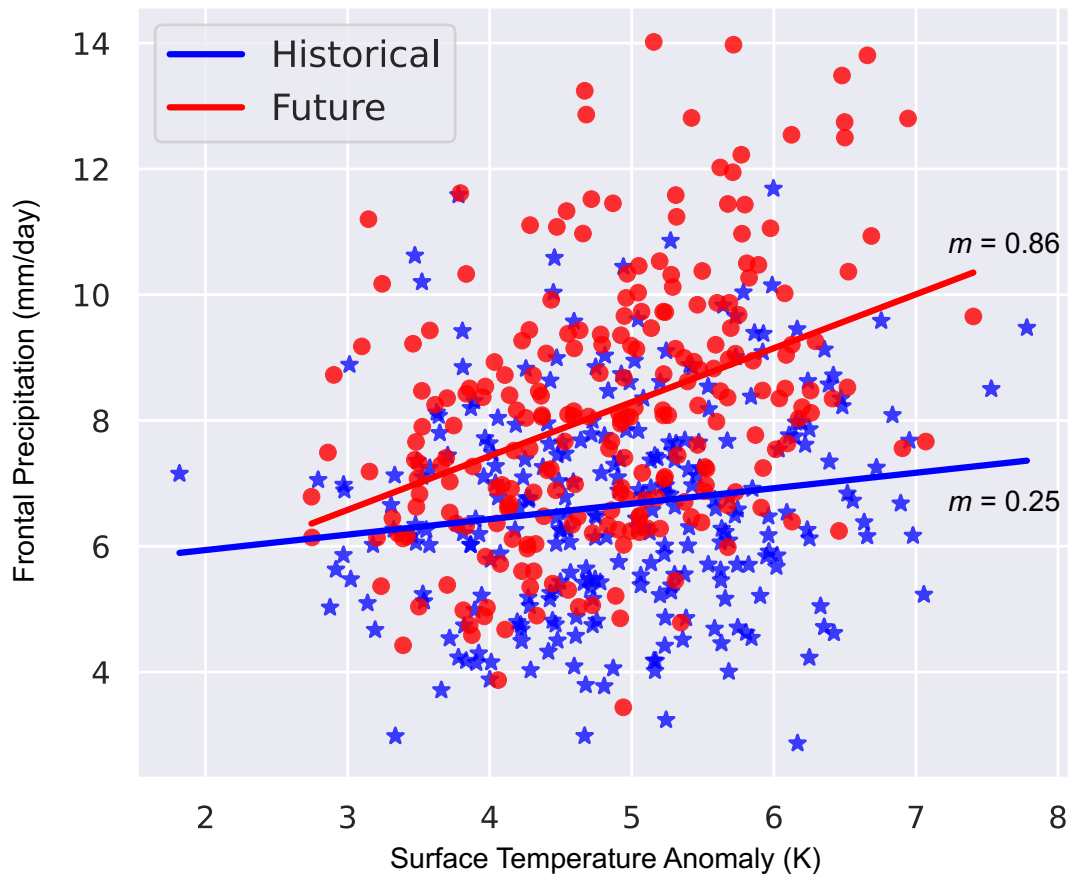


Figure S4: Scatterplots of surface temperature and frontal precipitation centered on the day of greatest surface temperature drop for raw CMIP6 models over (red) 1980-2014 and (blue) 2065-2099. A linear regression model (slope indicated by m) is fitted using all the different models together over the two periods.

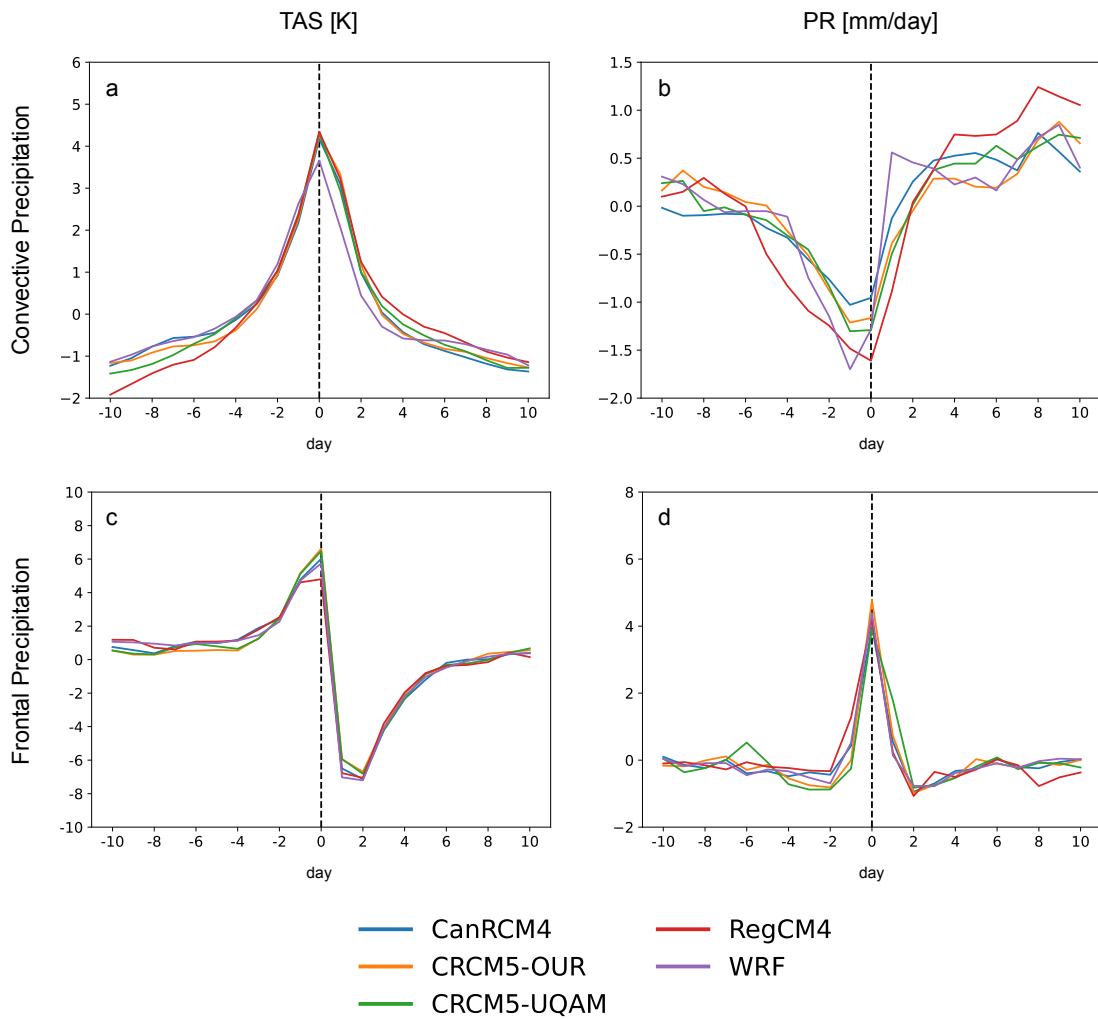
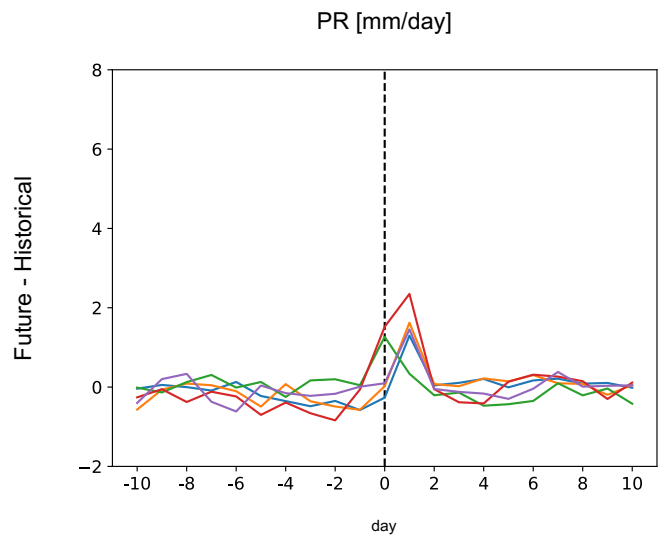


Figure S5: 21-day composite time series of CONUS (a) surface temperature and (b) precipitation anomalies (relative to 21 day average) centered around the day of convective precipitation using dynamical downscaling of ERA-Interim data over the 1989-2009 interval. (c-d) Same as (a-b) but for frontal precipitation. Colored lines show the regional climate model driving the downscaling of ERA-Interim data.



40 **Figure S6:** Difference between Figure 12d and Figure 12b.