CAUSES:

Clouds Above the United States and Errors at the Surface

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Introduction

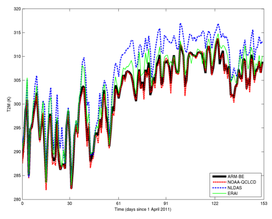
•There is a warm bias in screen temperature (T2M) over the US in summer in many models' climate mean.

• It also shows up within a few days when running the same climate models from analyses in NWP mode.

•In order to help focus parametrization development, we aim to identify which physical processes contributes to the growth of the surface temperature bias in a number of GCMs.

• Our first experiment consists in running a series of 5-day hindcasts, starting from 00Z analyses 24 hours apart. The dates correspond to the Midlatitude Continental Convective Cloud Experiment (**MC3E**, 22 April to 6 June 2011) for which there is a particularly rich observational dataset at and around the ARM site at SGP .

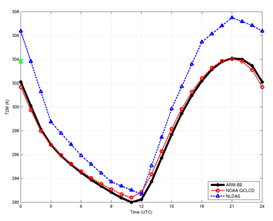
• Data here is time-step level time-series of screen-level temperature from each GCM extracted at the grid-box nearest to the **ARM SGP** site (36.61 N, 97.49W), or hourly data re-gridded to 1 deg x 1deg.



5 month time series of 00Z screen temperature at SGP from ARM-BE, NOAA, NLDAS and ERA-Int.

5 month time series of hourly screen temperature at SGP from ARM-BE and NOAA.

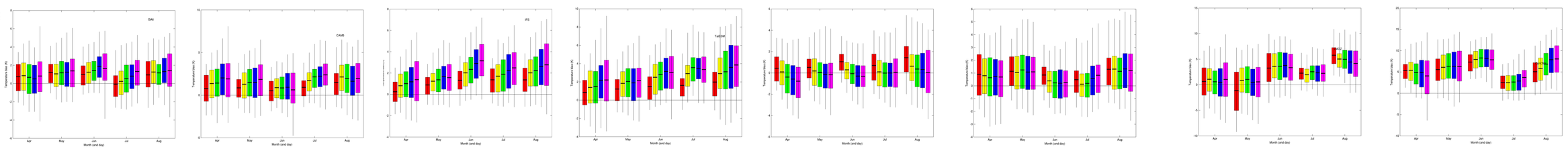
Mean diurnal cycle (over 5 months) of screen temperature at SGP from ARM-BE, NOAA & NLDAS.



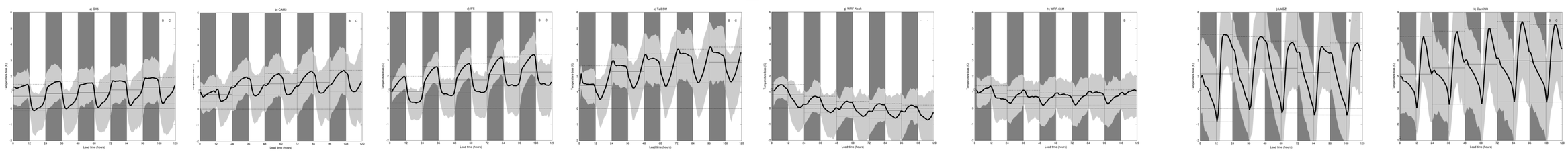
Mean diurnal cycle at SGP.

Obs	MetOffice
CAM5	ECMWF
TaiESM	WRF-Noah
LMDZ	WRF-CLM
CanCM4	CNRM-NWP
CAM5-IPHOC	CNRM-CM

Mean, 5th, 25th, 75th & 95th centiles of T2M error in day 1,2,3,4,5 hindcasts for April, May, June, July & August

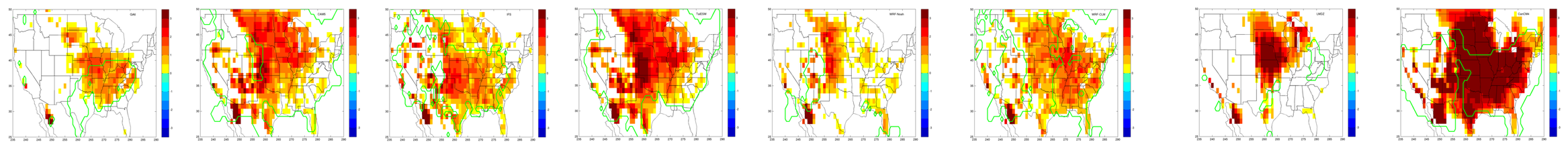


Mean evolution over 5 days



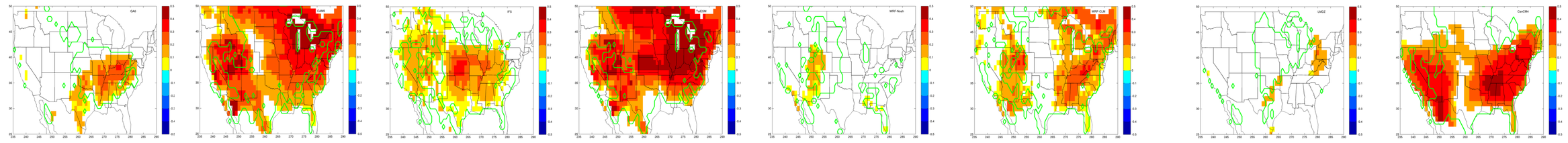
Mean bias (K)

Where statistically significant (95% confidence level)

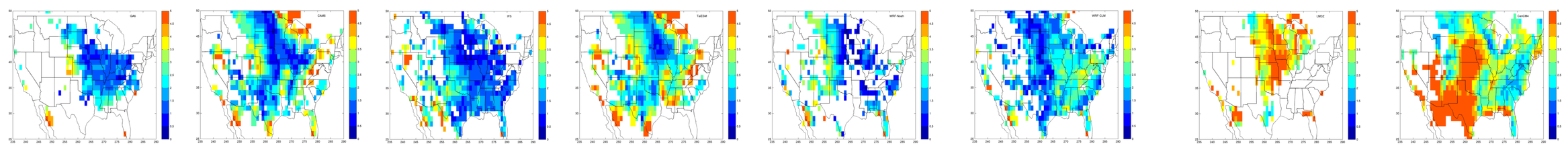


Mean bias change day 1 to day 5 (K/day)

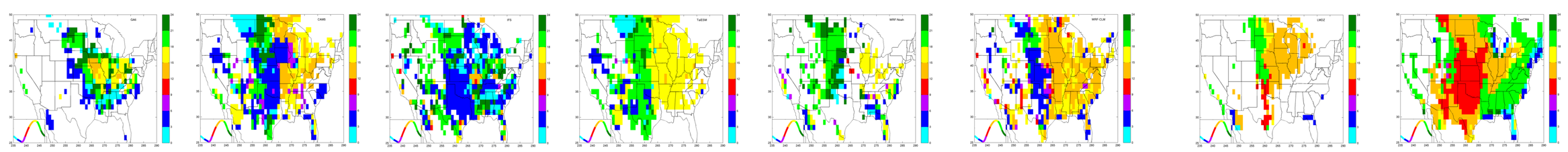
Where statistically significant (95% confidence level)



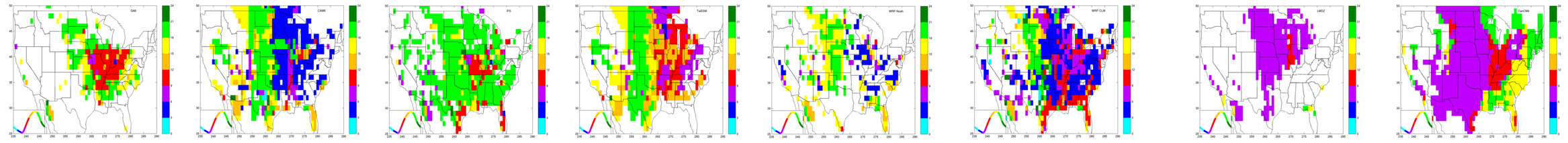
Mean diurnal range of bias (K)



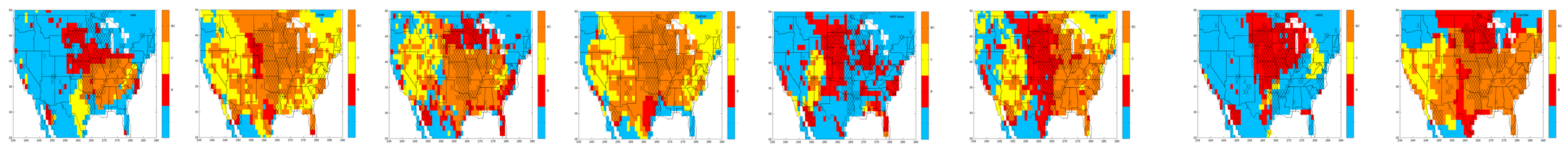
Local time of largest bias



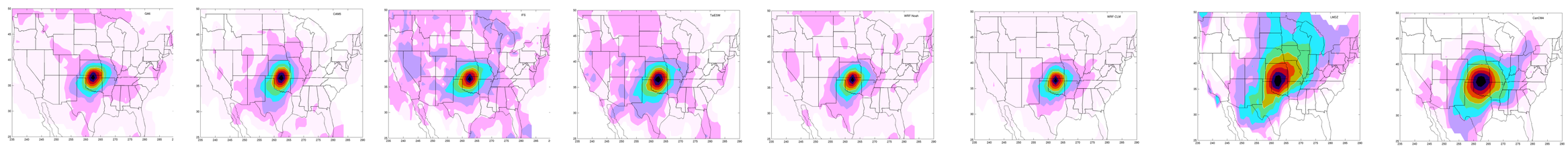
Local time of steepest bias growth



Stat sig bias, bias growth, both hatched where ERA-I is biased.



Correlation of bias at any location with bias at SGP (Contour Interval 0.1)



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