Supplementary

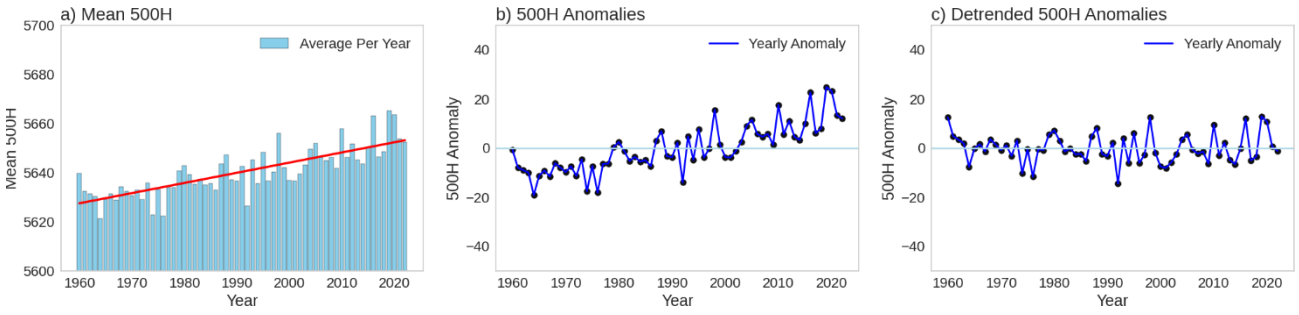

Fig. S1: Annual 500 hPa geopotential heights averaged over the warm-season (April-July) and Northern Hemisphere. a) Annual trend without considering the climatological mean; b) Annual anomalies over time with y = 0 representing the mean; c) Detrended anomalies over time.

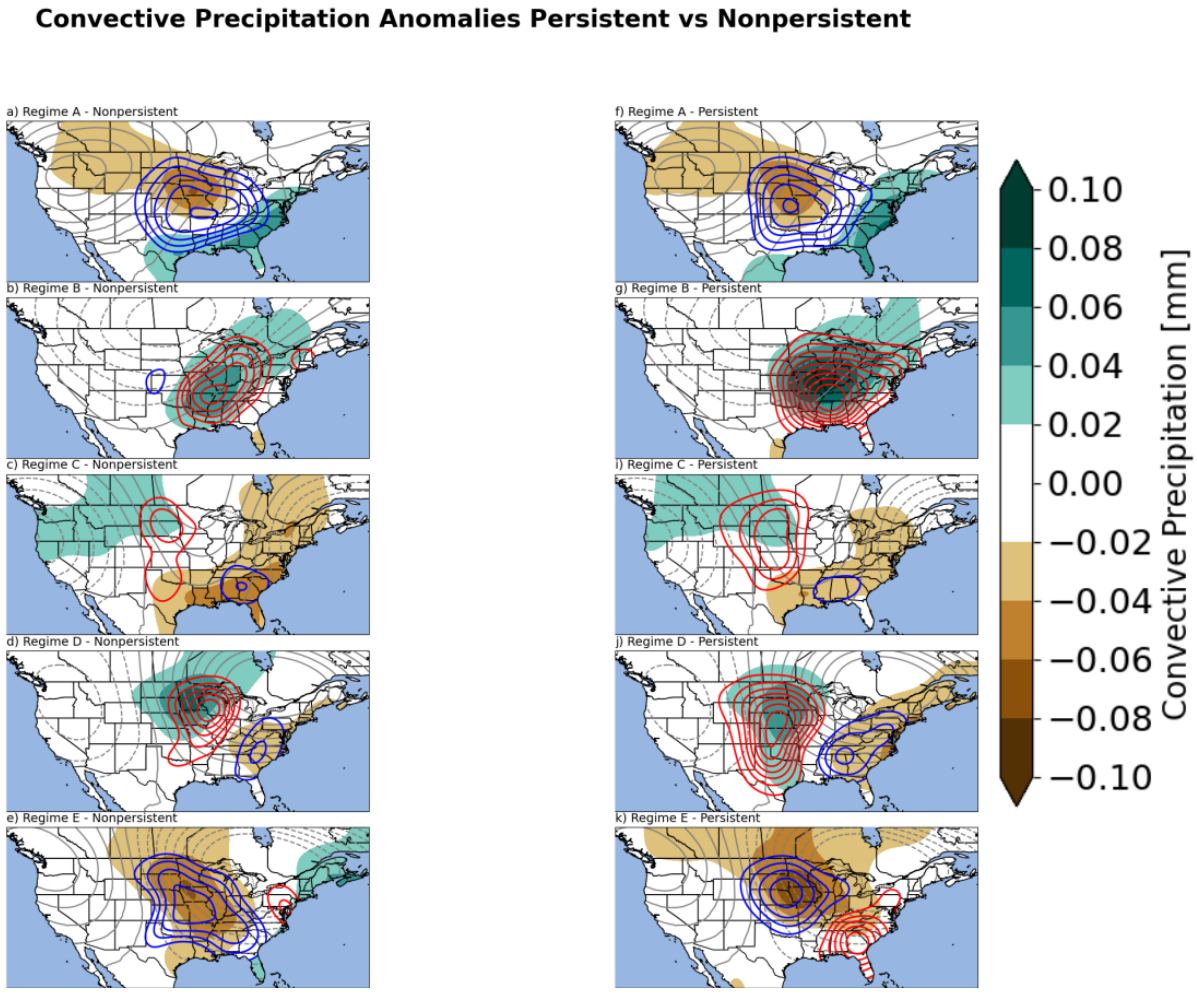

Fig. S2: Non-persistent (left column) and persistent (right column) composite anomalies of convective precipitation and TD probabilities.

Regime	Total Nonpersistent WR Days	Nonpersistent WR Days with a TO	Total Persistent WR Days	Persistent WR Days with a TO
A	486	7	1305	22
B	479	39	1255	120
C	463	28	1267	68
D	385	20	1009	70
E	224	6	813	35

Table S1 Counts of total non-persistent and persistent WR days.

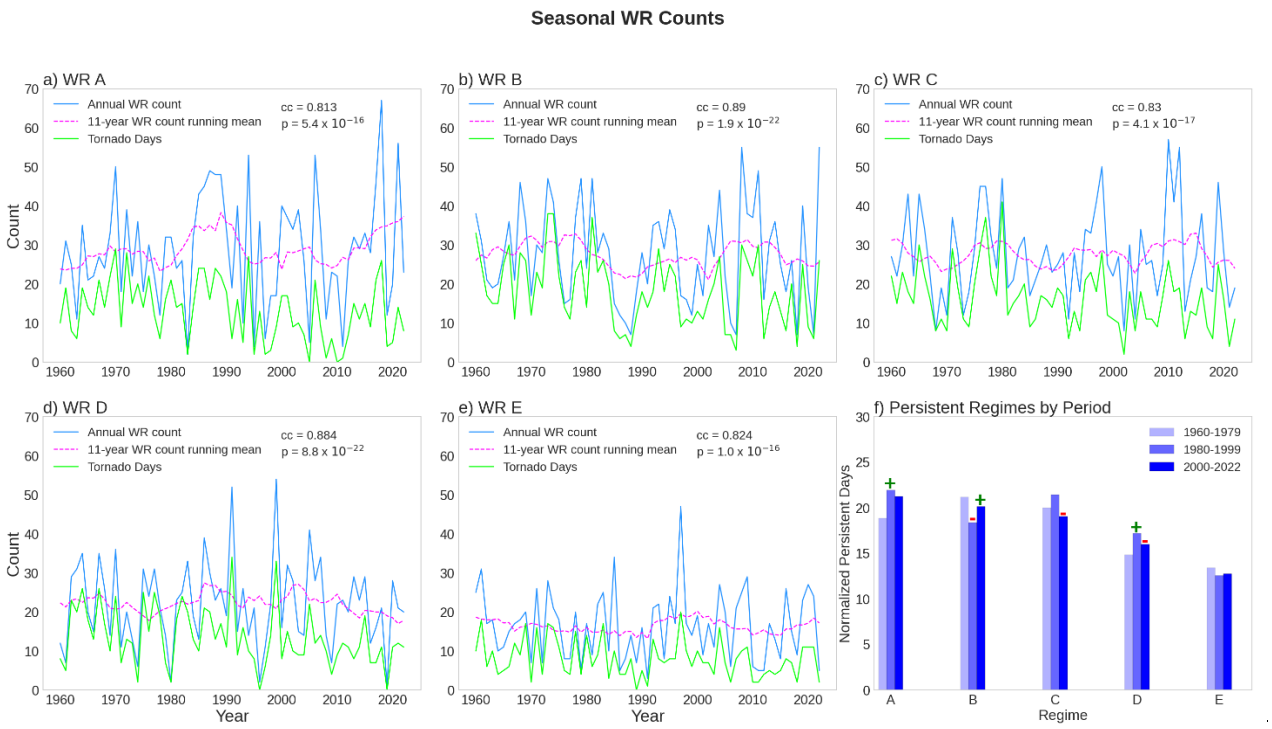

Fig. S4:-a-e) Annual WR counts, 11-year WR count running mean, and WR TD time series with Pearson correlation coefficient and p-value between the annual WR count and WR TD time series; f) Persistent regime days per period normalized by number of years in each period. +'s and – 's indicate significant increases and decreases from the previous period, respectively, using Student's t test (≥ 95 % confidence).

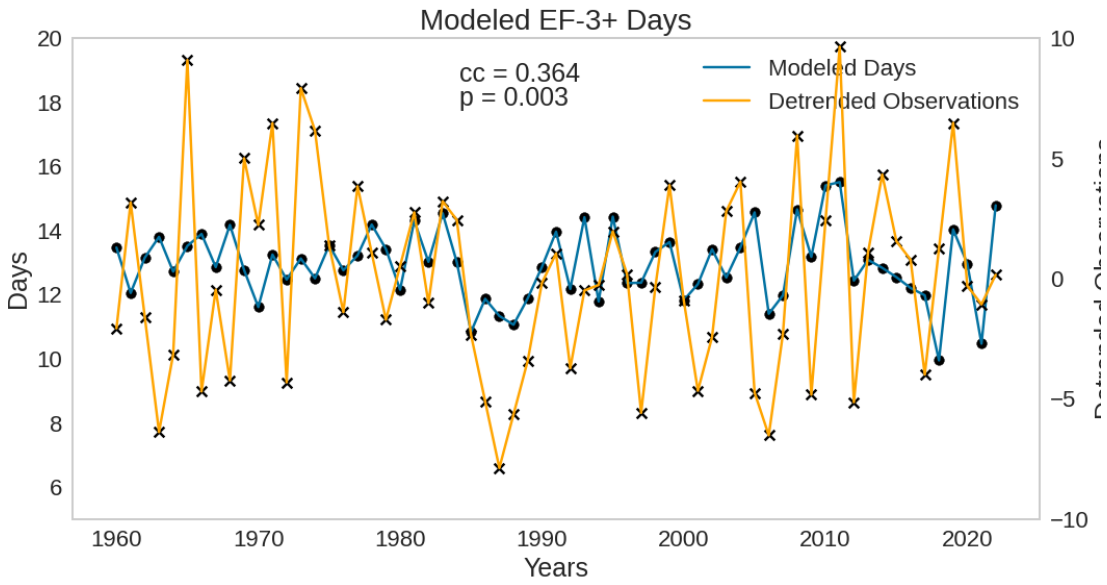

Fig. S5: The modeled EF-3+ days (blue) during 1960-2022 along with the detrended EF-3+ days from observation (yellow). The Spearman rank correlation coefficient (CC) and p-value of the two time series are also shown.

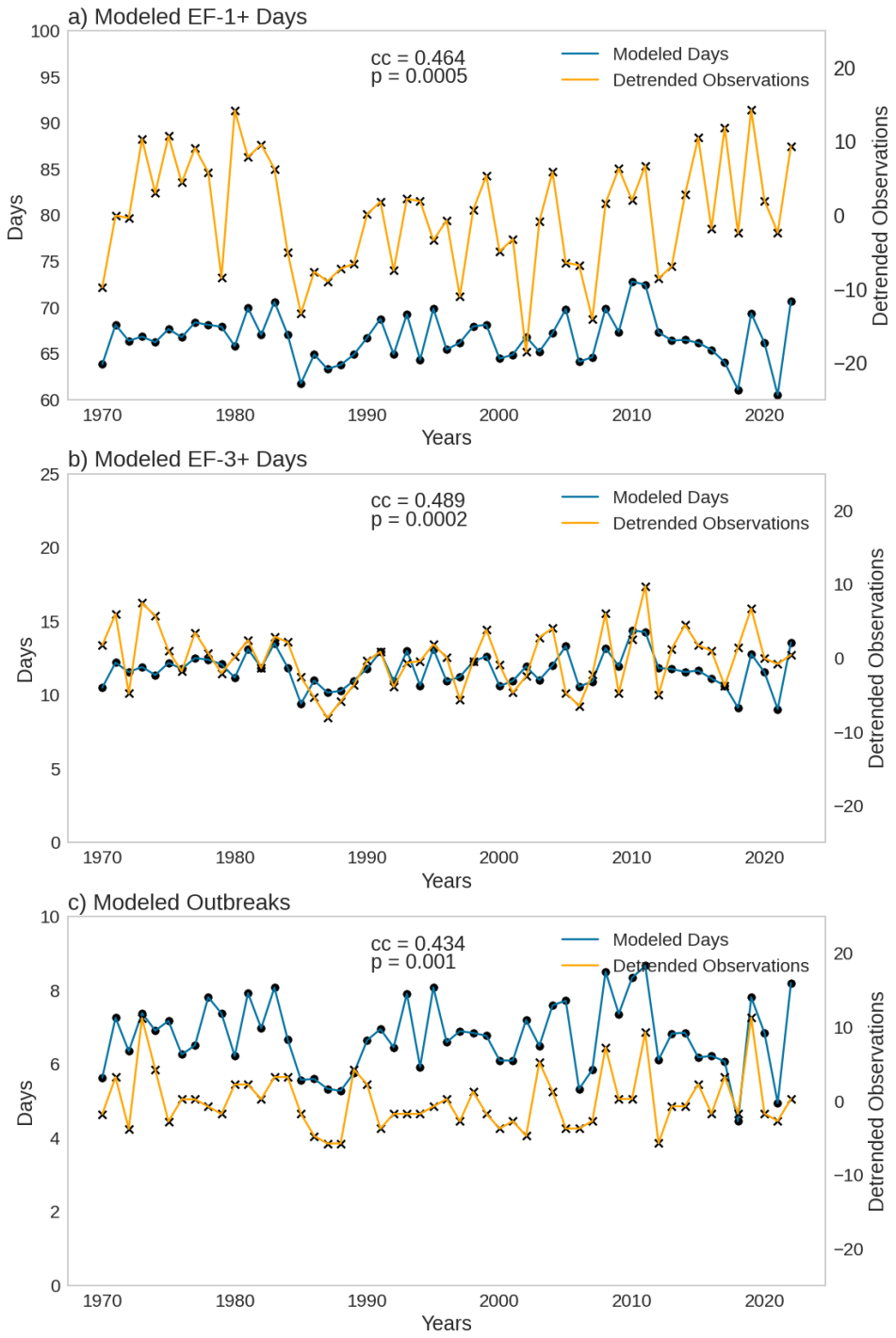

Fig. S6: The modeled (blue) and the observed (detrended, yellow) tornado indices during 1970-2022, along with the corresponding Spearman rank correlation coefficient (CC) and p-value.

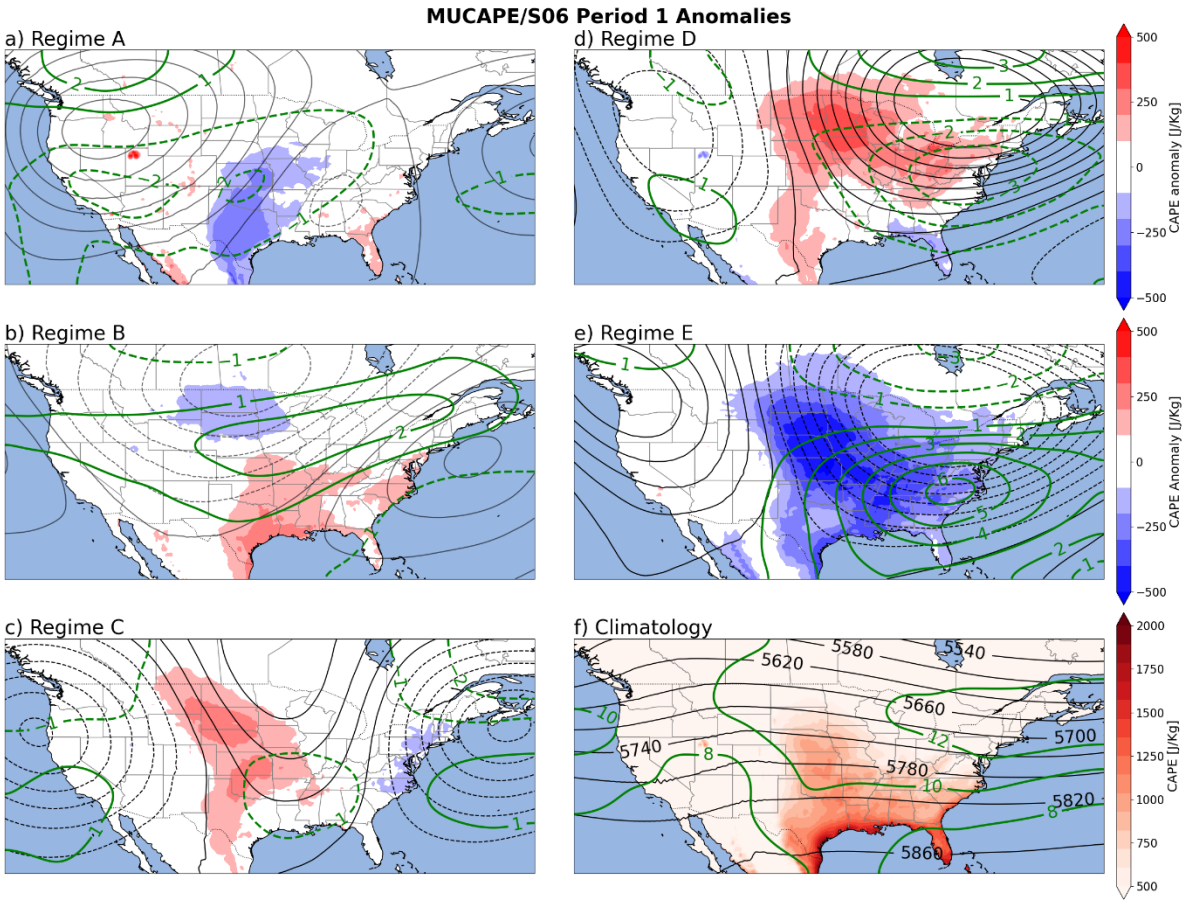

Fig. S7: Same as Fig. 1, but only for 1960-1979 (Climatology represents 1960-1979)

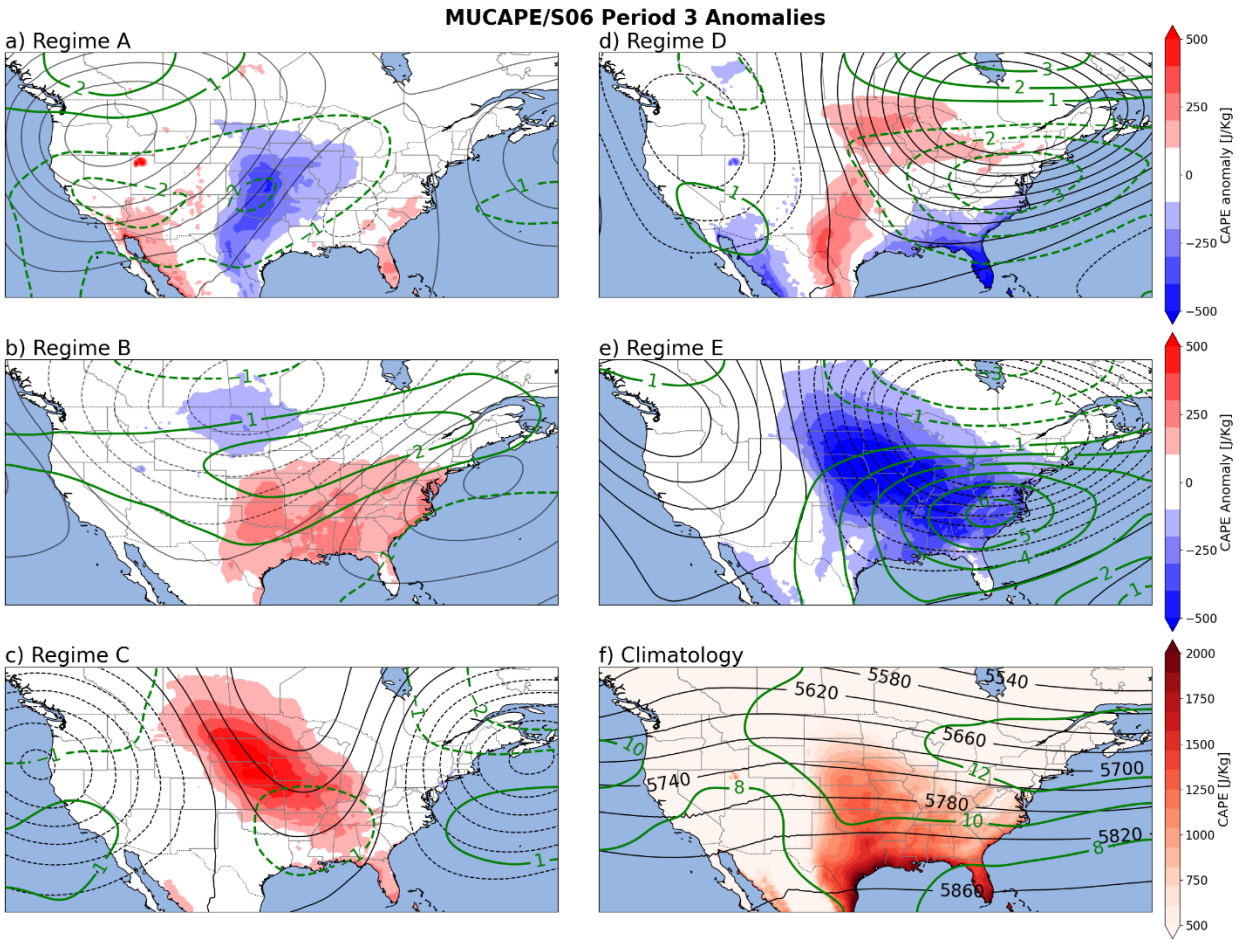

Fig. S8: Same as Fig. 1, but only for 2000-2022 (Climatology is for 2000-2022).