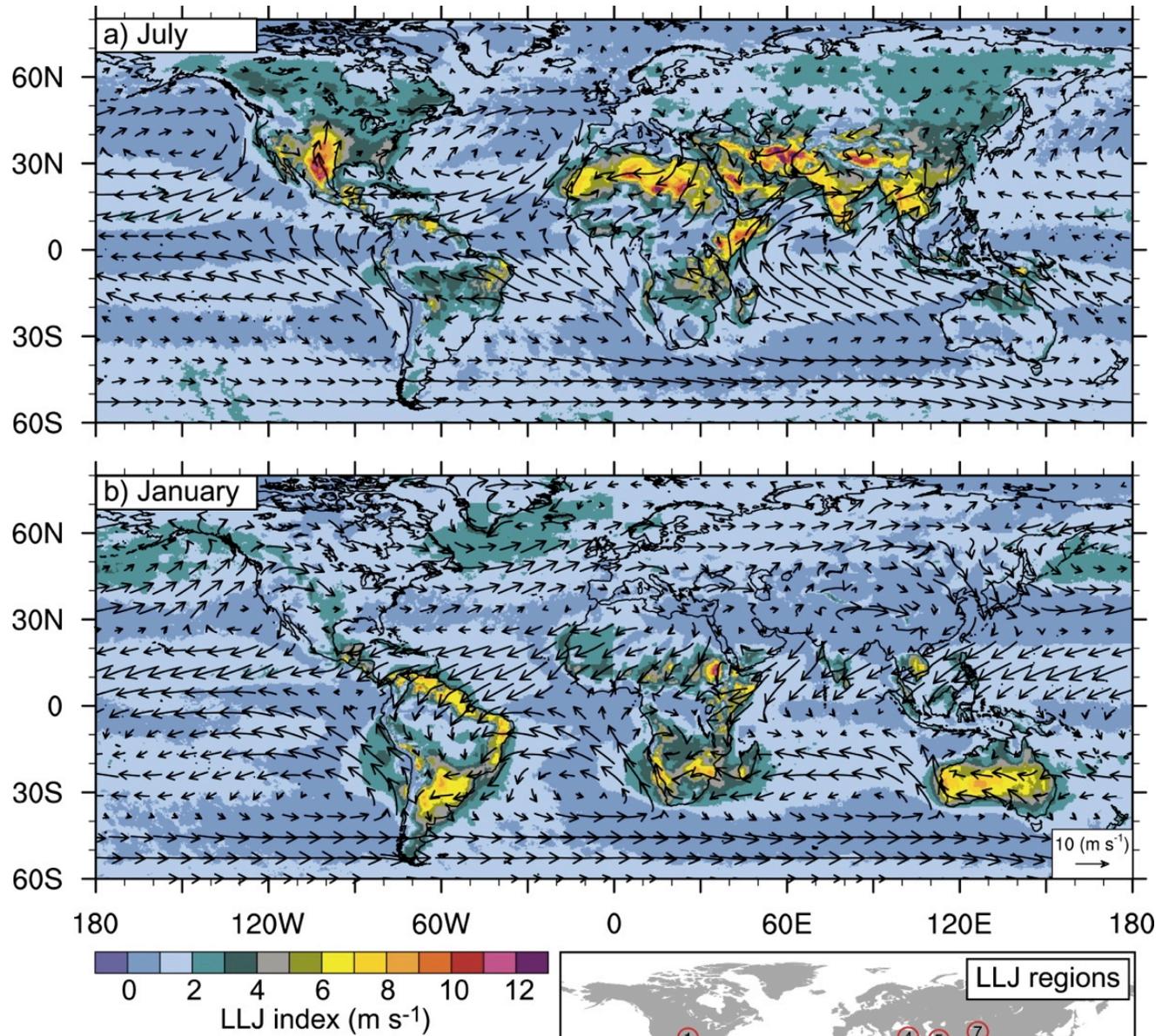


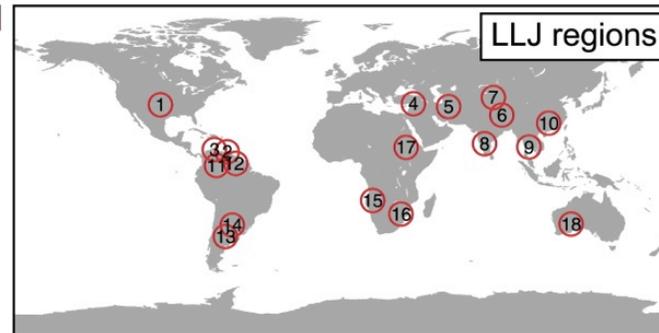
Climatic Role of North American Low-Level Jets on U.S. Regional Tornado Activity

Scott Weaver
Stephen Baxter
Emily Riddle
Arun Kumar

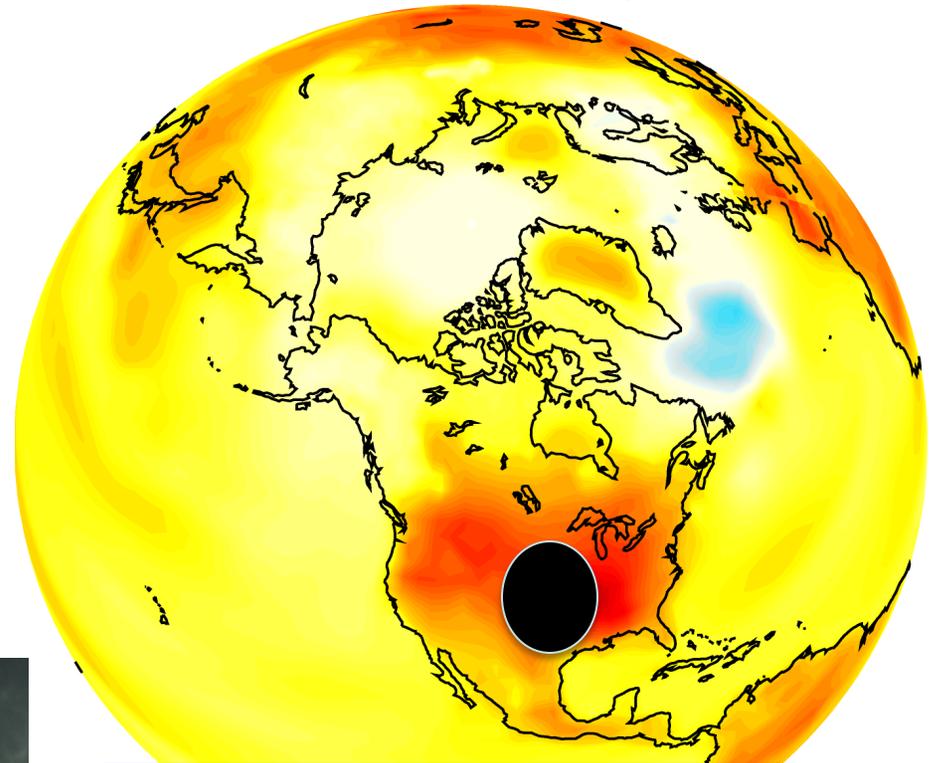
NOAA Climate Prediction Center



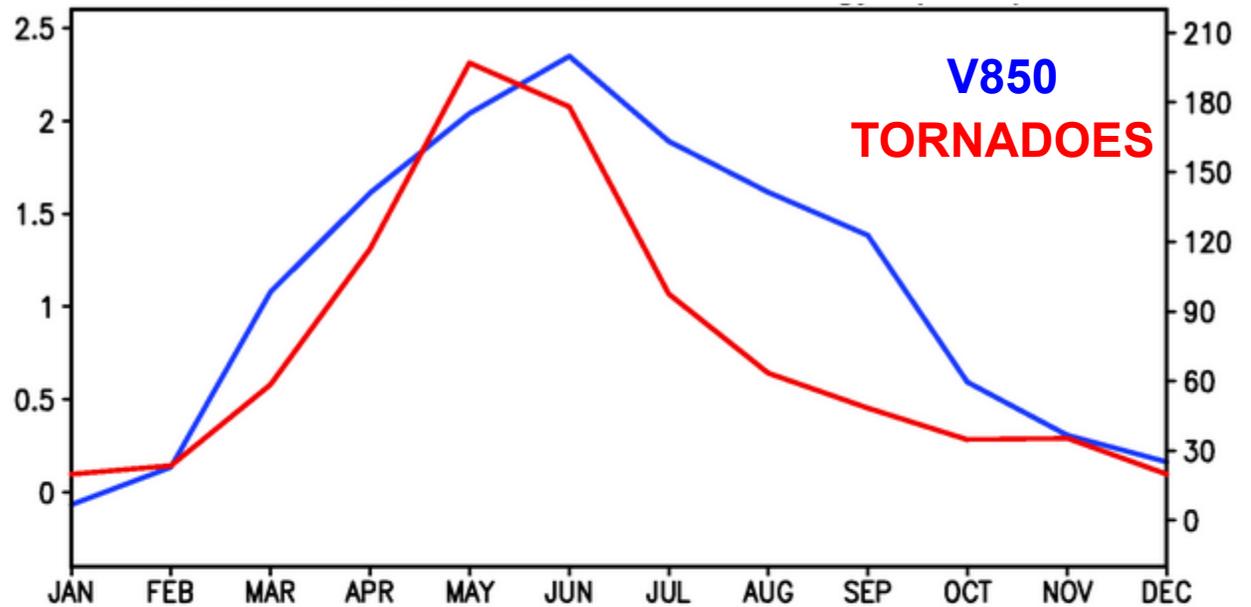
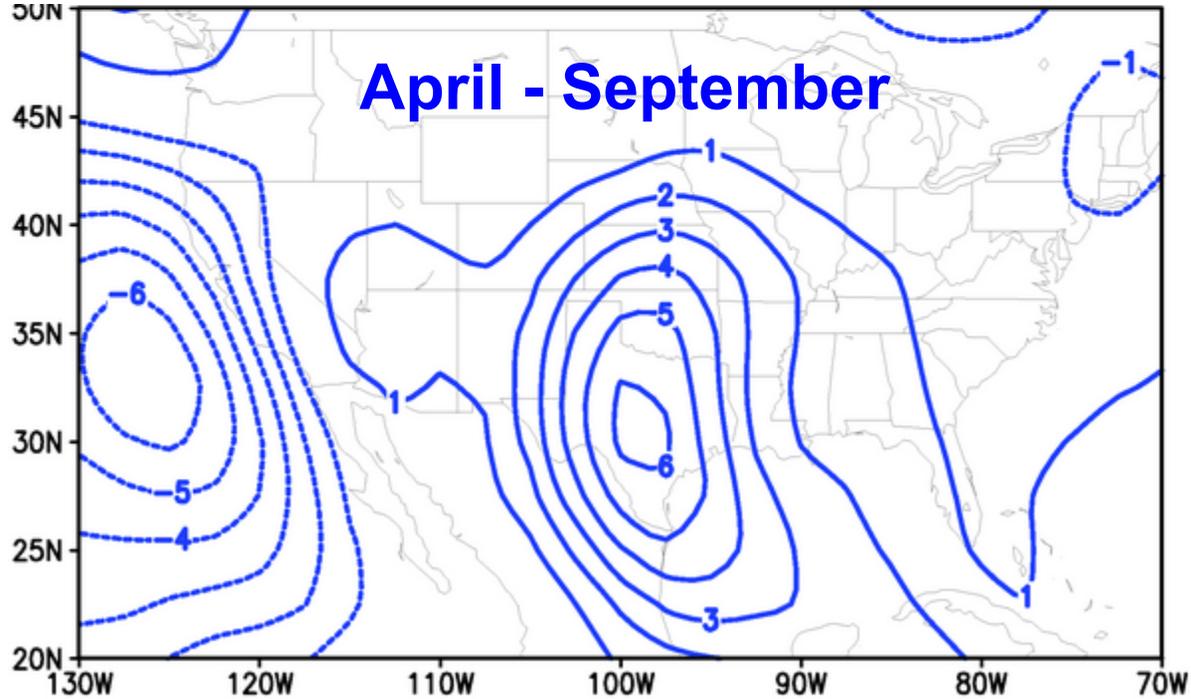
Monaghan et al. 2010



Societal Impacts of NALLJ Variability



Climatology and Seasonal Cycle 1950-2010

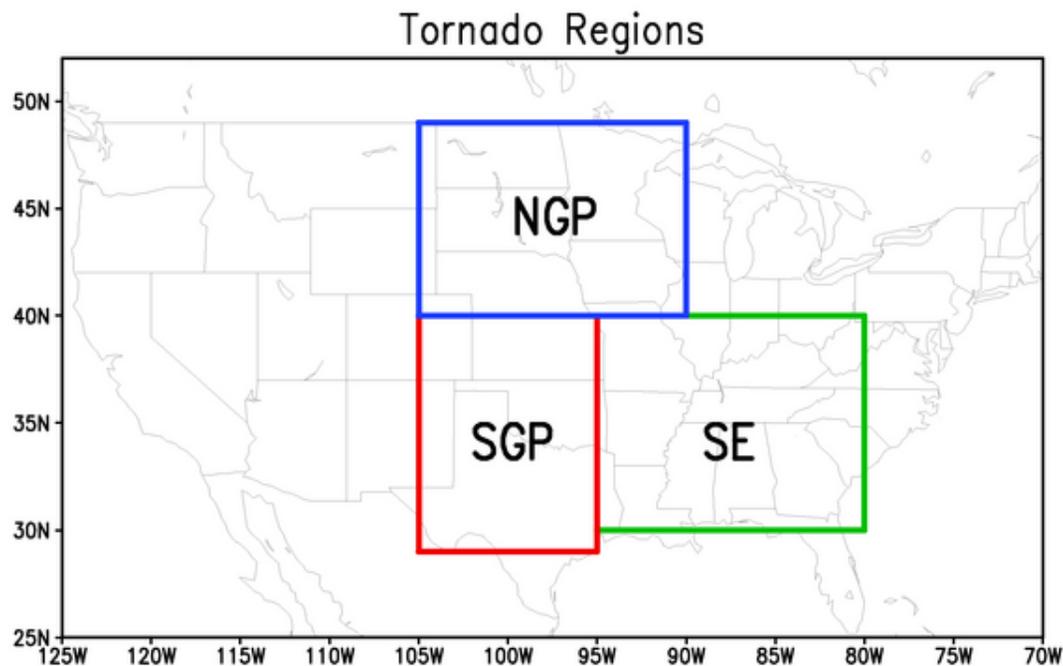


Tornado Regions

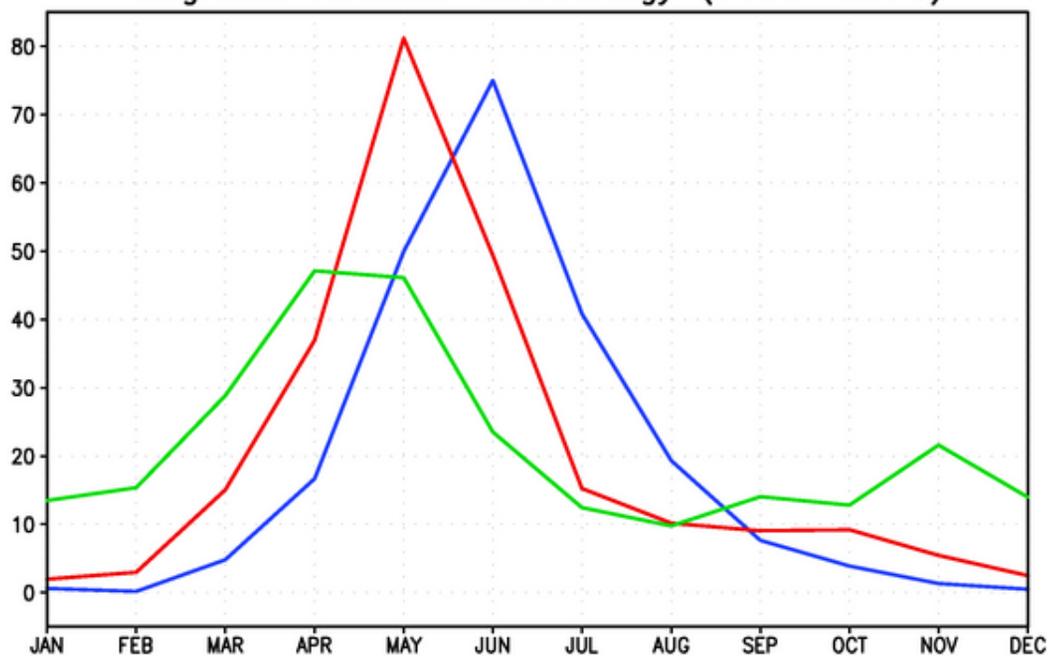
NGP: 40-49N 105-90W

SGP: 29-40N 105-95W

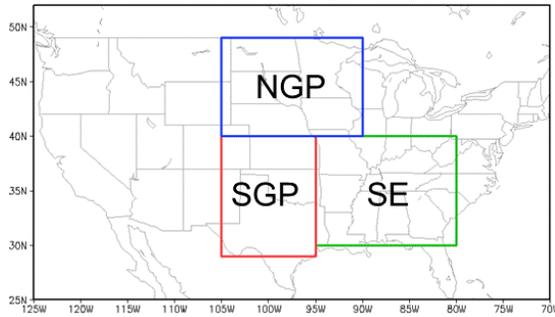
SE: 30-40N 95-80W



Regional Tornado Climatology (1950–2010)



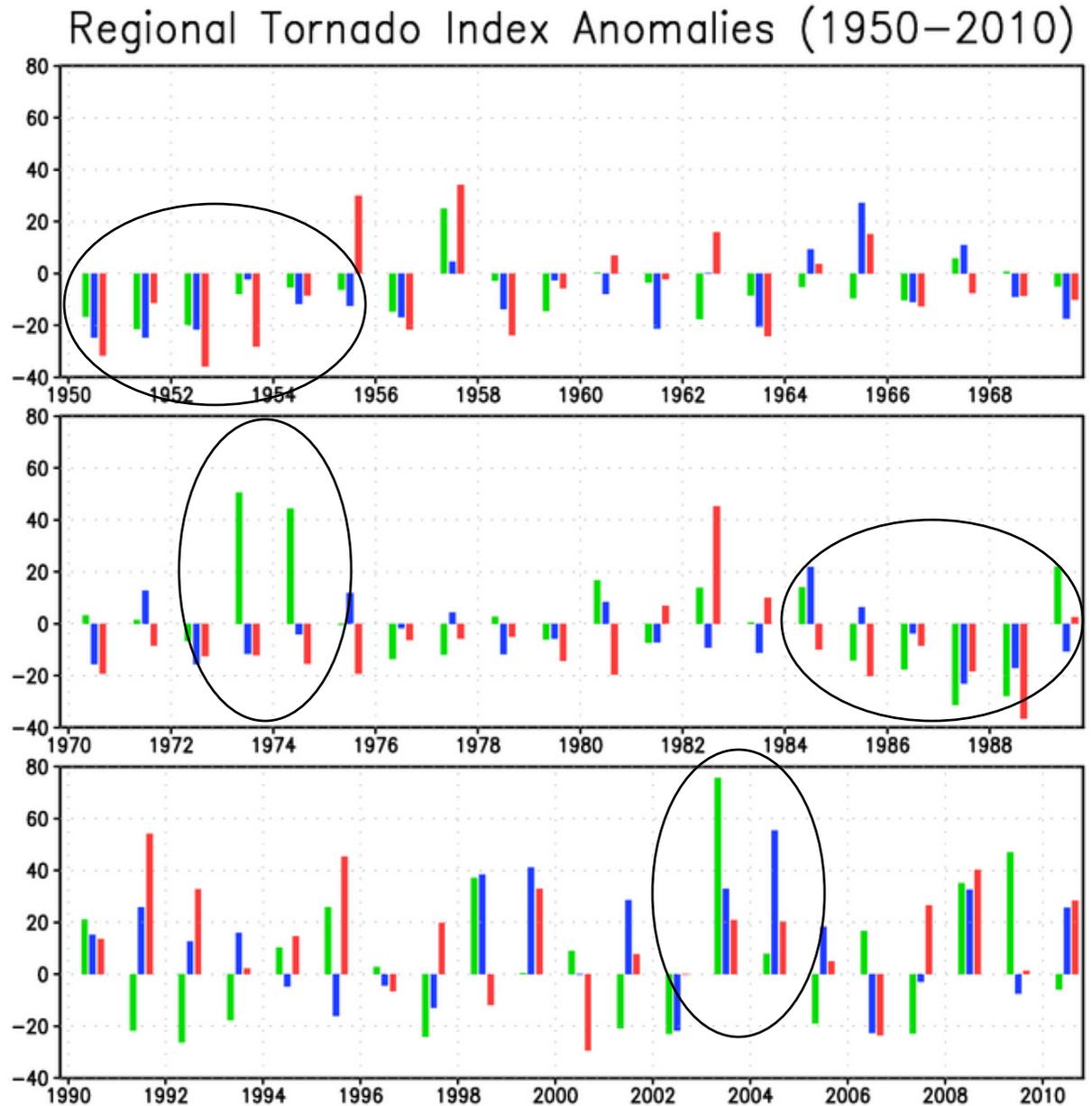
SE SGP NGP



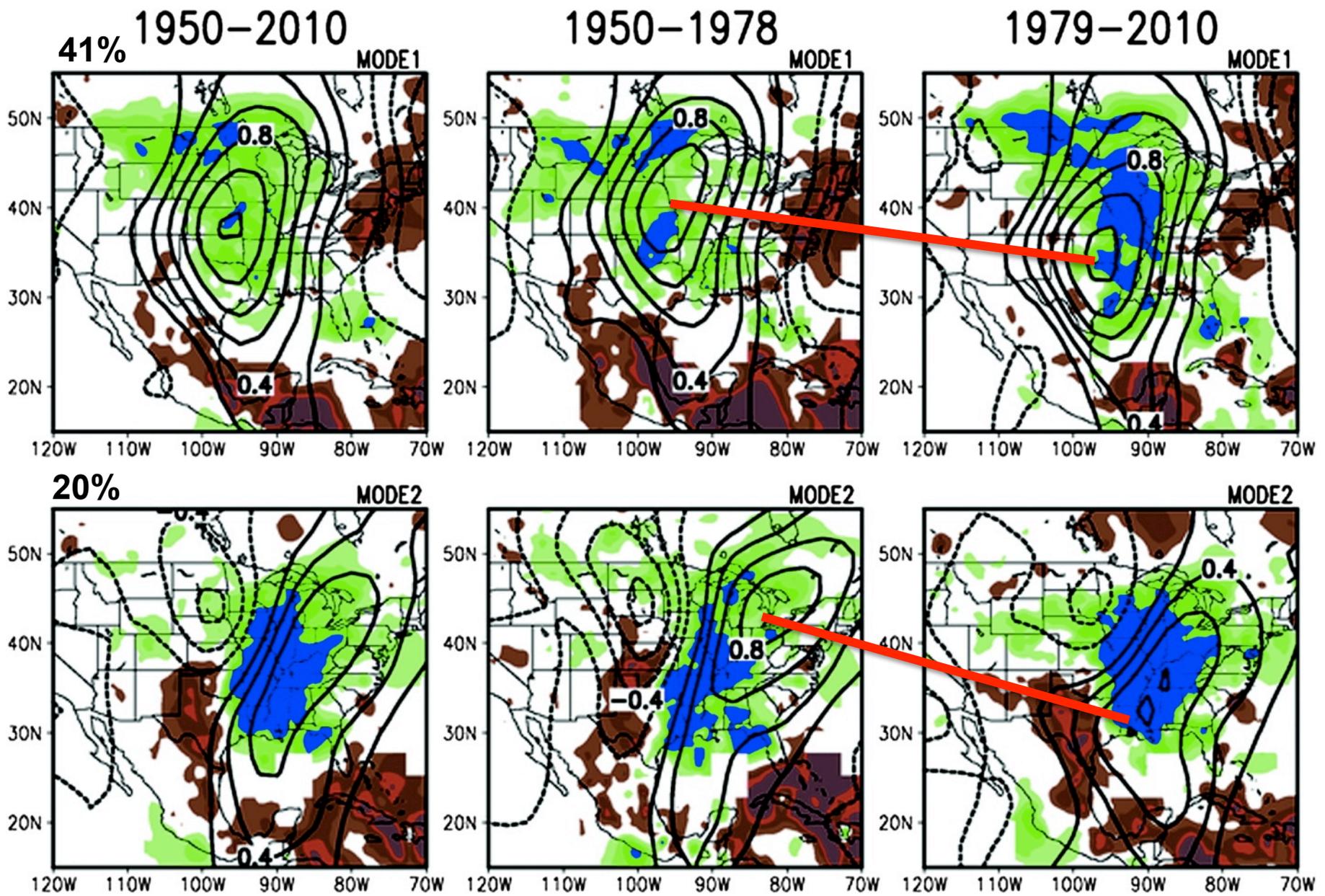
Early period mostly negative especially early 1950's

1974 Super Outbreak

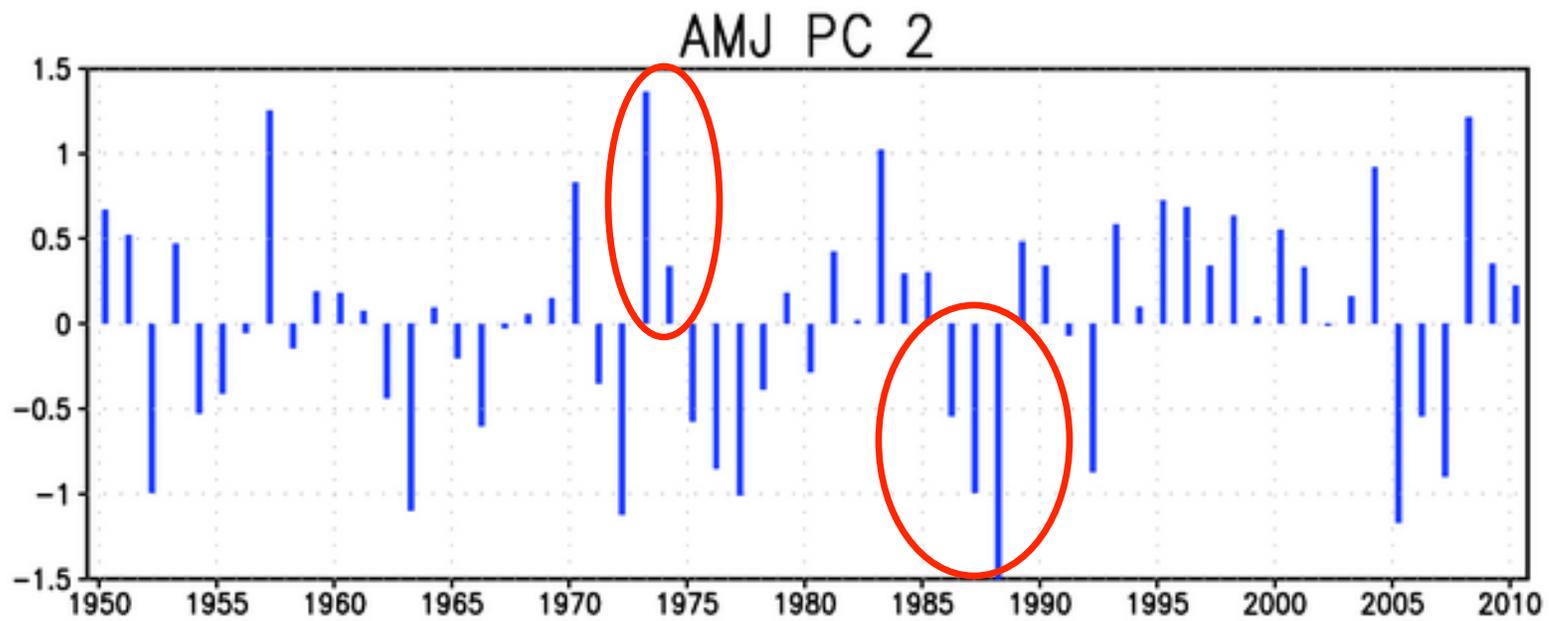
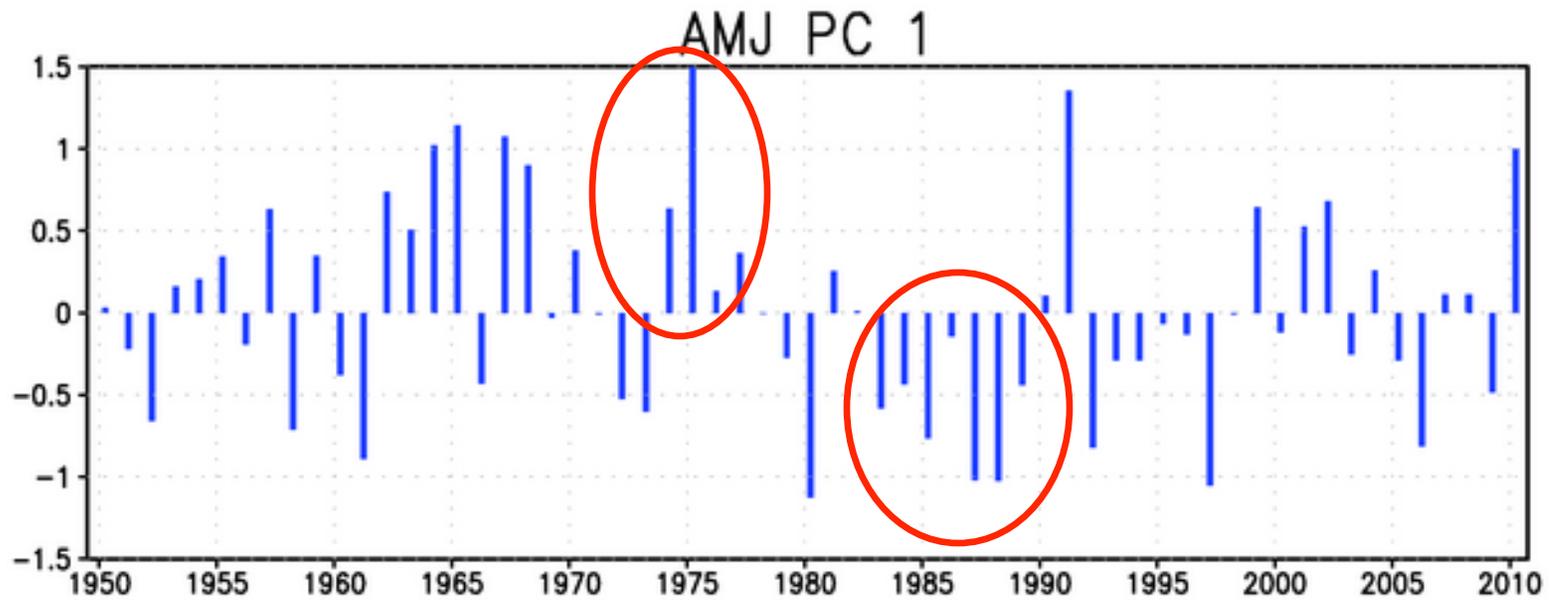
Late period more active
Save late 1980's



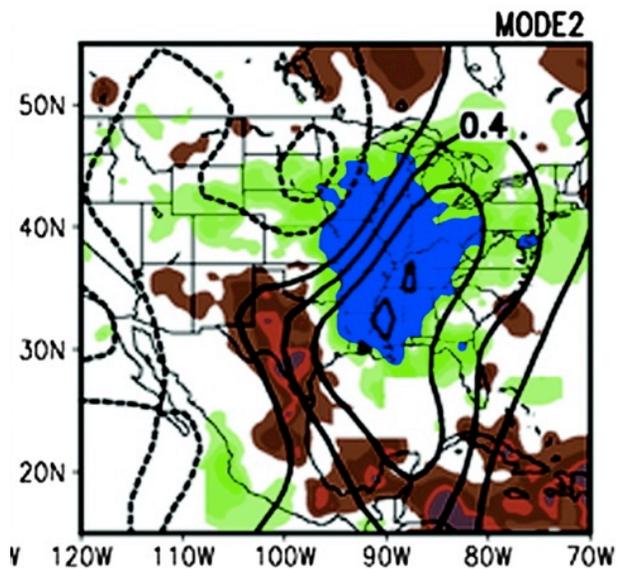
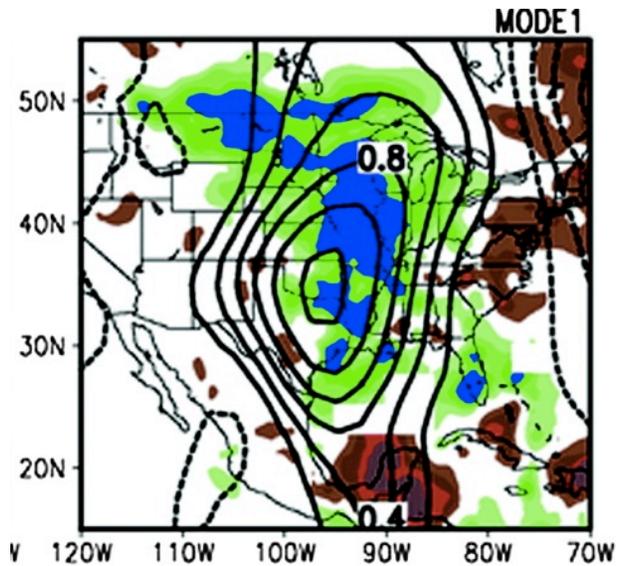
NALLJ Variability Modes & Precipitation



NALLJ PC Time Series



NALLJ PC & Tornado Timeseries Correlations



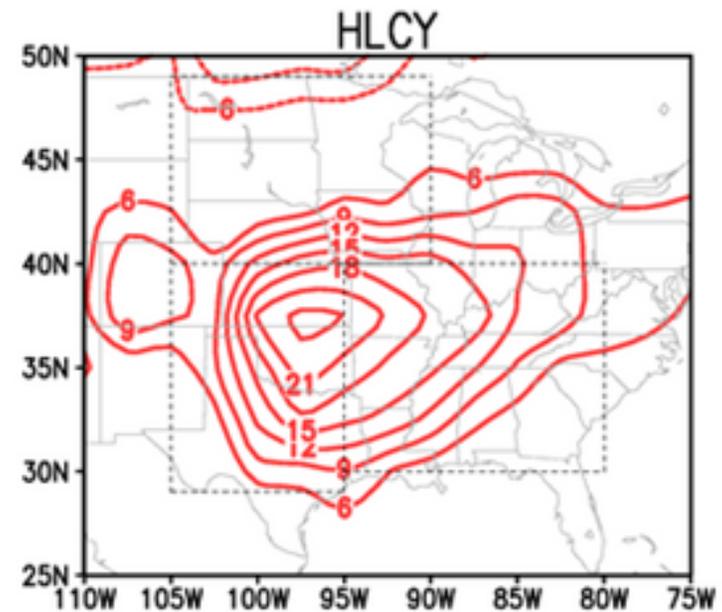
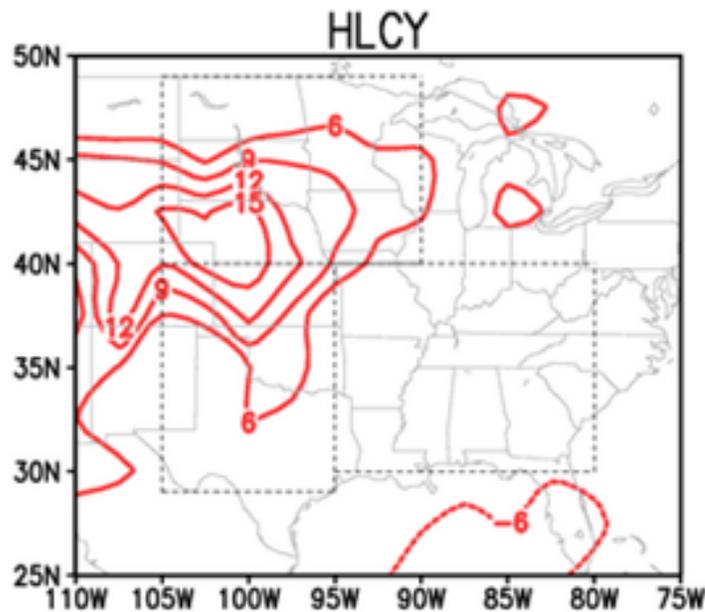
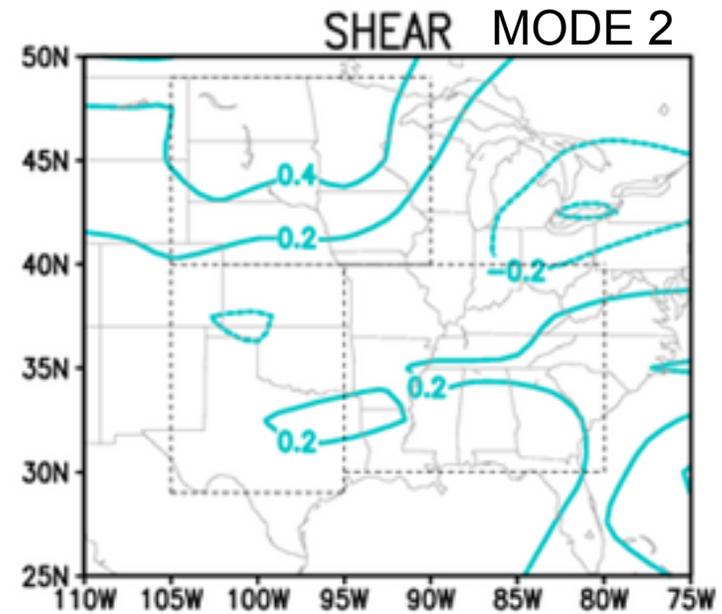
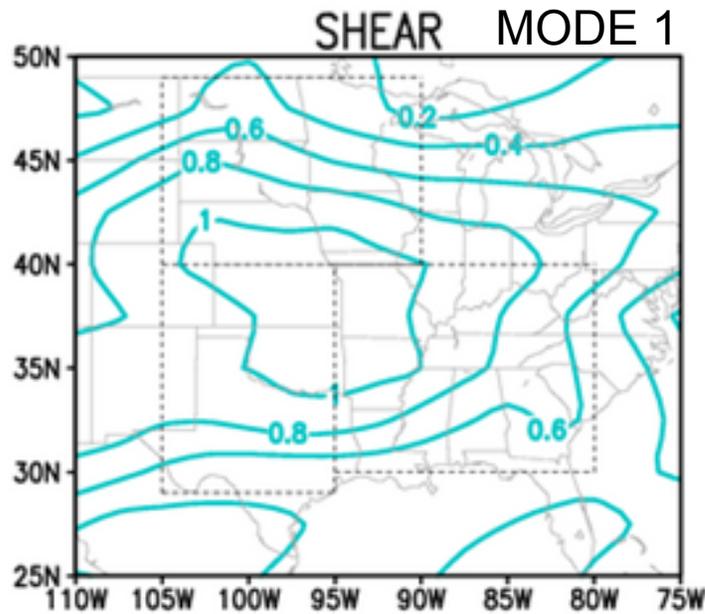
	PC 1	PC 2
SE 50-10	-0.02	0.50
50-78	0.06	0.53
79-10	0.03	0.47
NP 50-10	0.35	0.24
50-78	↓ 0.65	0.05
79-10	0.49	0.28
SP 50-10	0.30	0.24
50-78	↑ 0.31	0.13
79-10	0.57	0.25

Combined Influence of NALLJ Modes 1 & 2

Seasons where both PC1 & PC2 are both Positive (Negative) and Tornado anomaly is also Positive (Negative)	PC1 & PC2 Both Positive	PC1 & PC2 Both Negative
At least one Region	14/18 + 78%	13/13 - 100%
All Regions	4/18 + 22%	9/13 - 69%

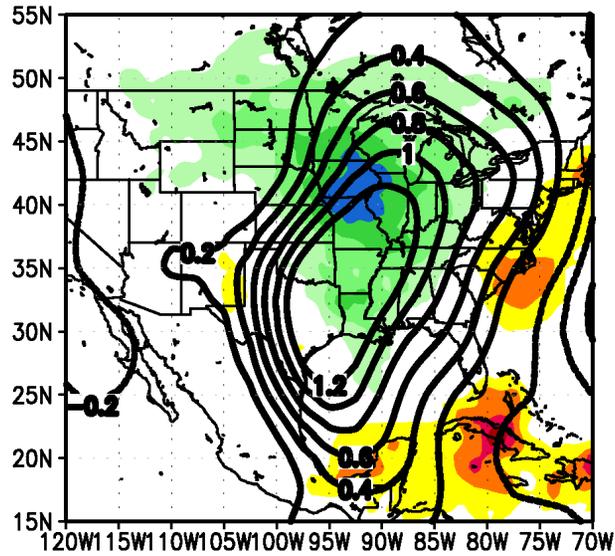
NALLJ PC Regressions to CFSR Tornadic Parameters

1979-2010

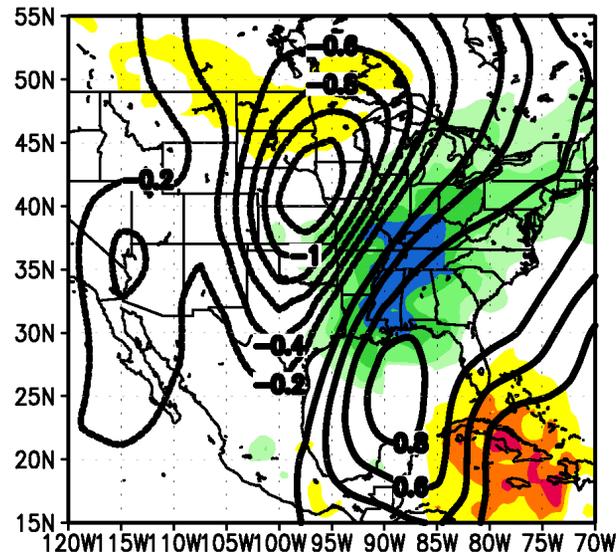


EOF's 1 & 2 of AMJ NALLJ Contours (V850 winds), Shading (PCP)

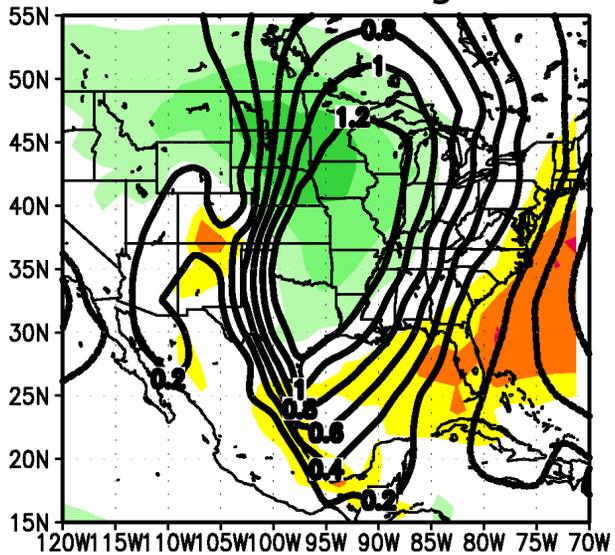
CFSR Mode 1



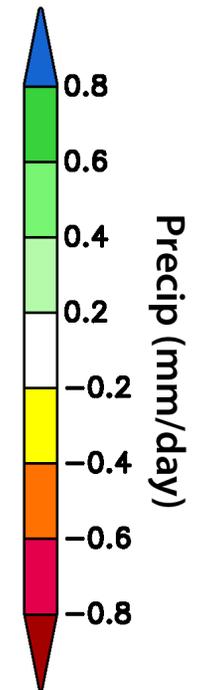
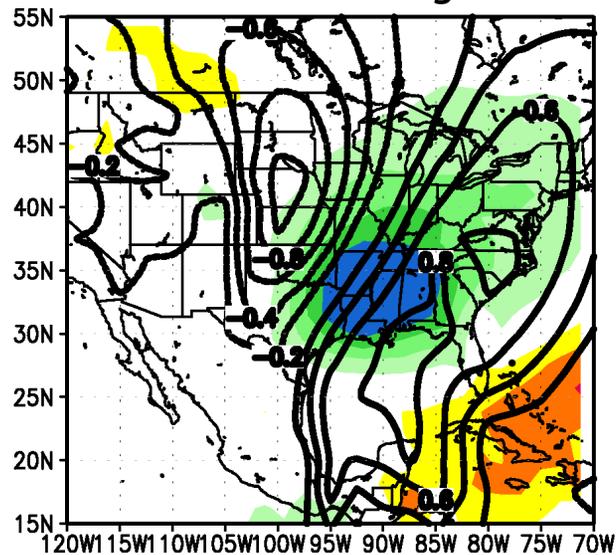
CFSR Mode 2



CFSv2 Mode 1 172 Ens. Average

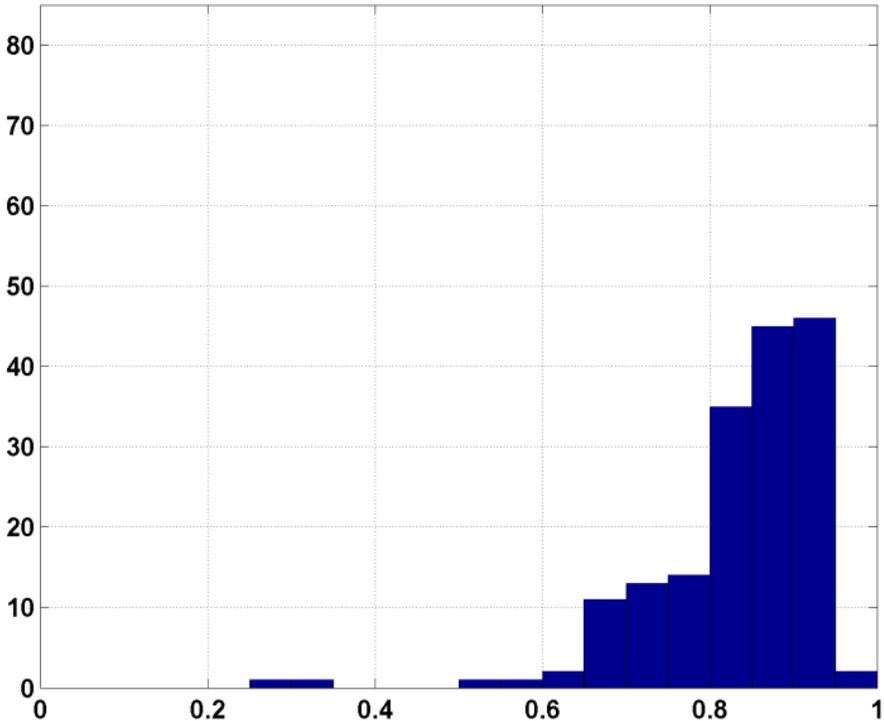


CFSv2 Mode 2 172 Ens. Average

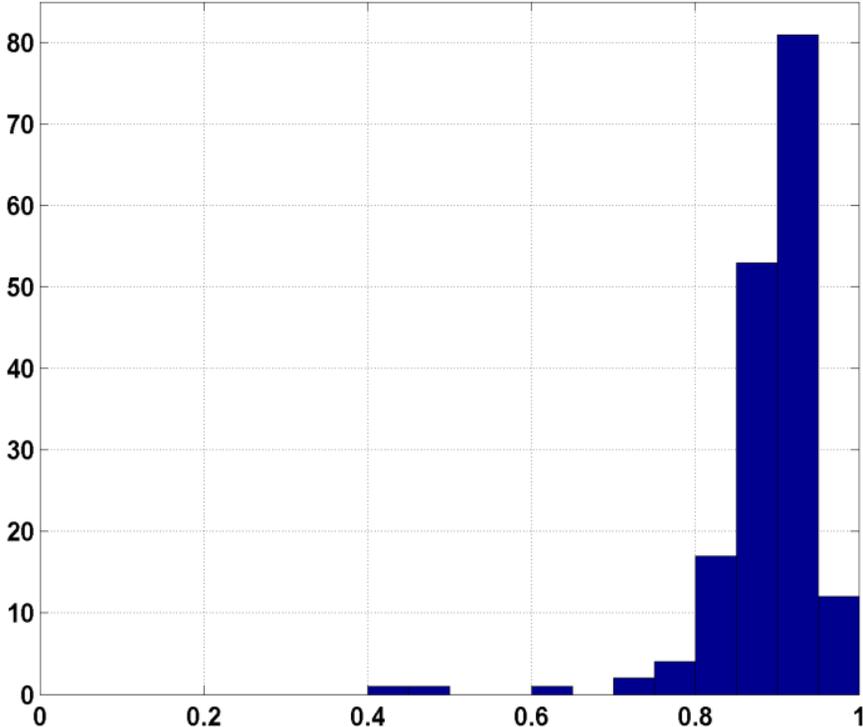


Pattern Correlations Between CFSv2 (172 runs) Loading Patterns and CFSR

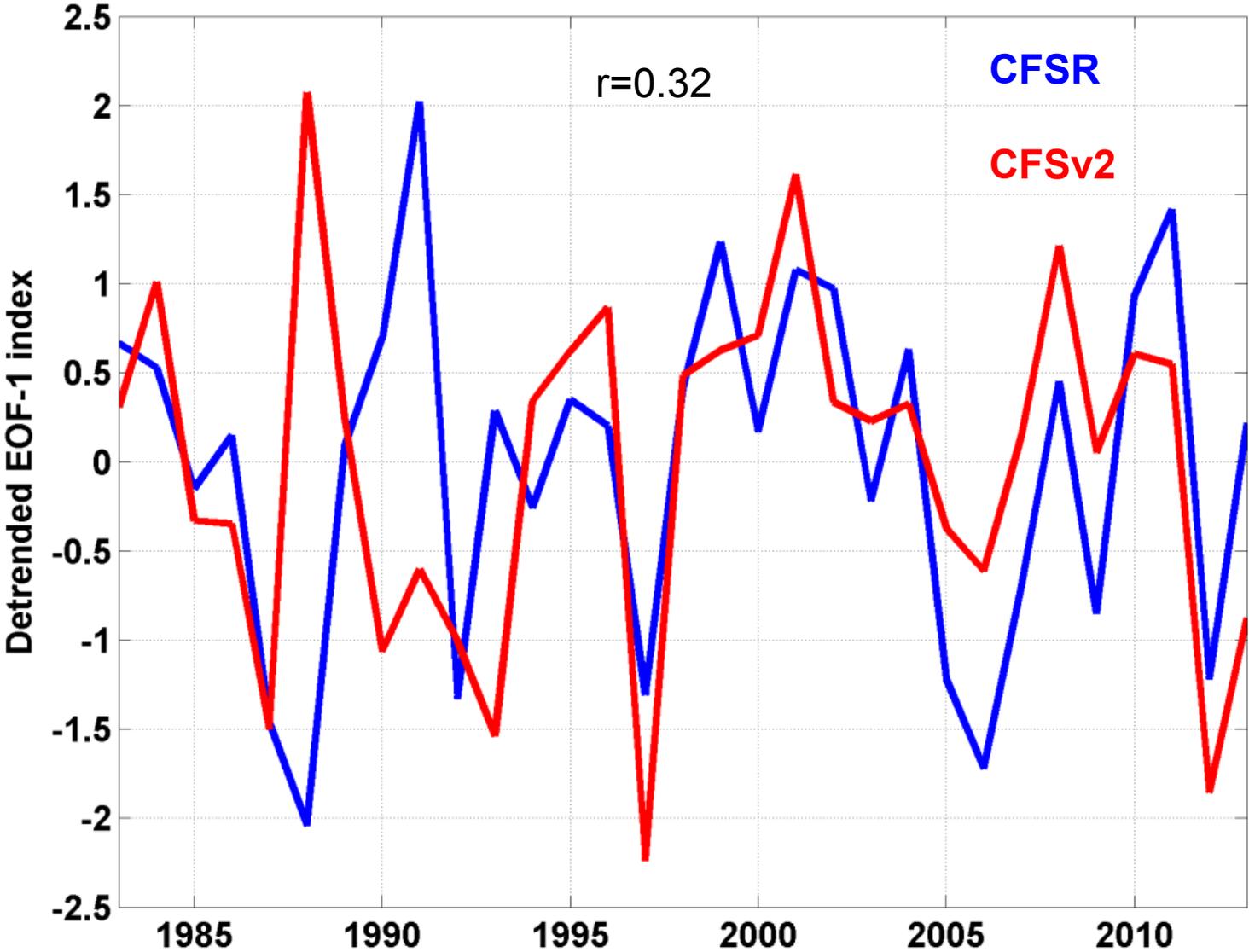
EOF-1



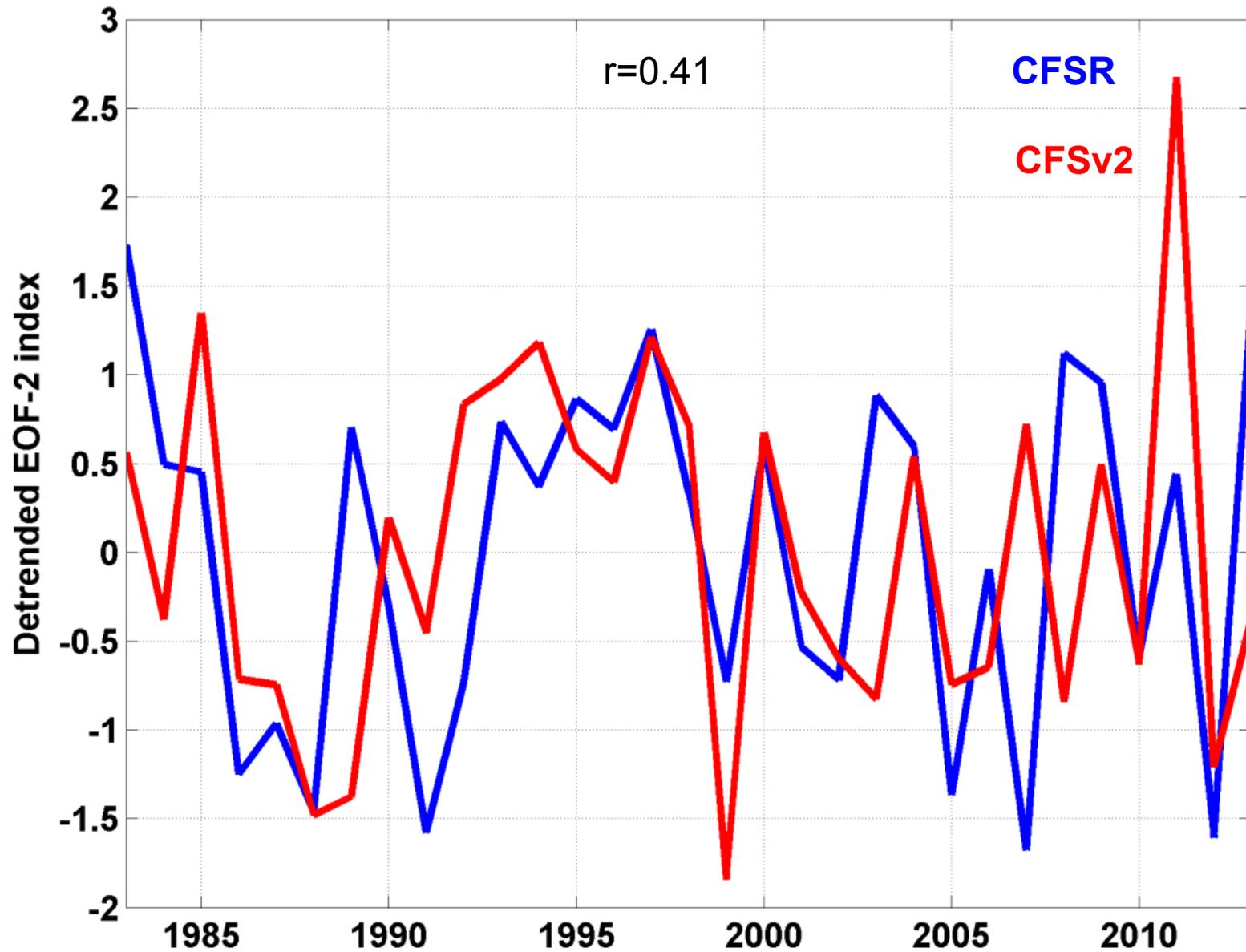
EOF-2



CFSv2 0-month lead 20-member forecast of AMJ NALLJ Mode 1



CFSv2 0-month lead 20-member forecast of AMJ NALLJ Mode 2

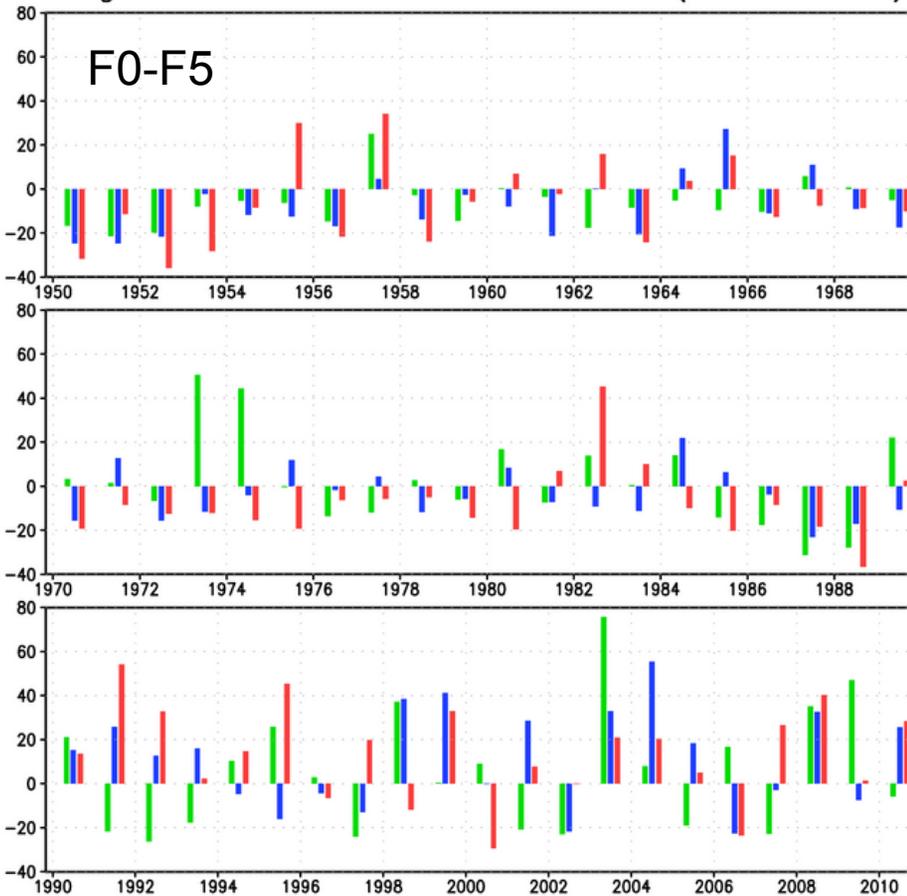


Thank You

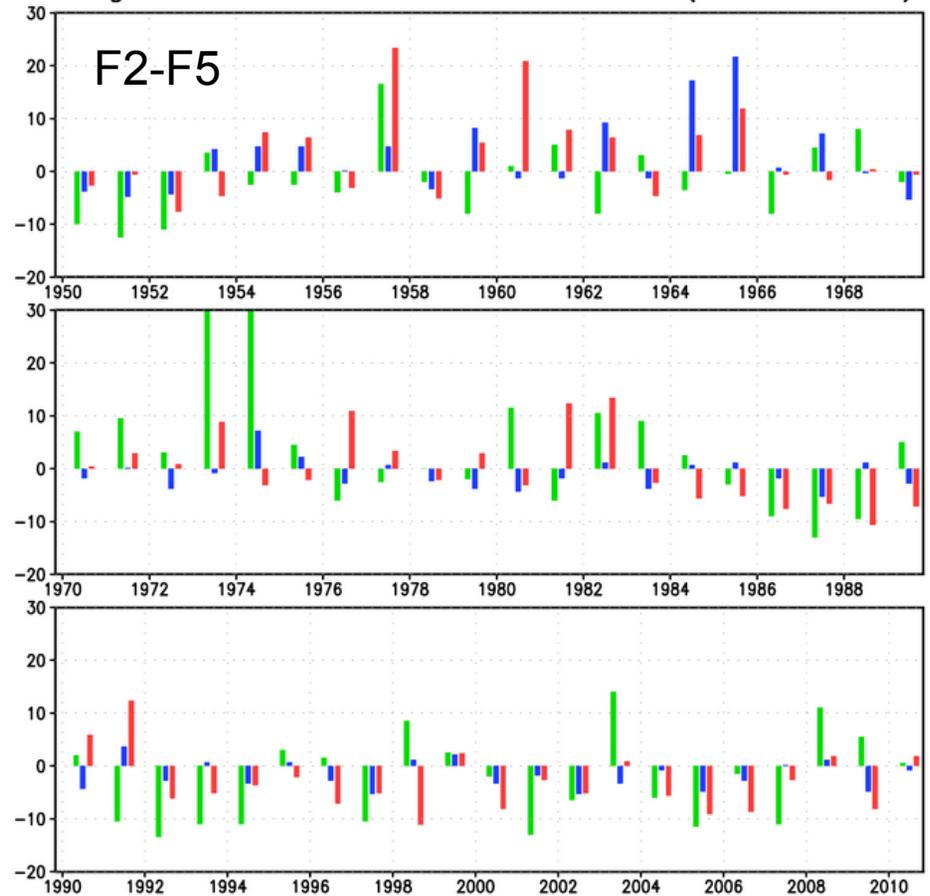
scott.weaver@noaa.gov

Backup Slides

Regional Tornado Index Anomalies (1950–2010)

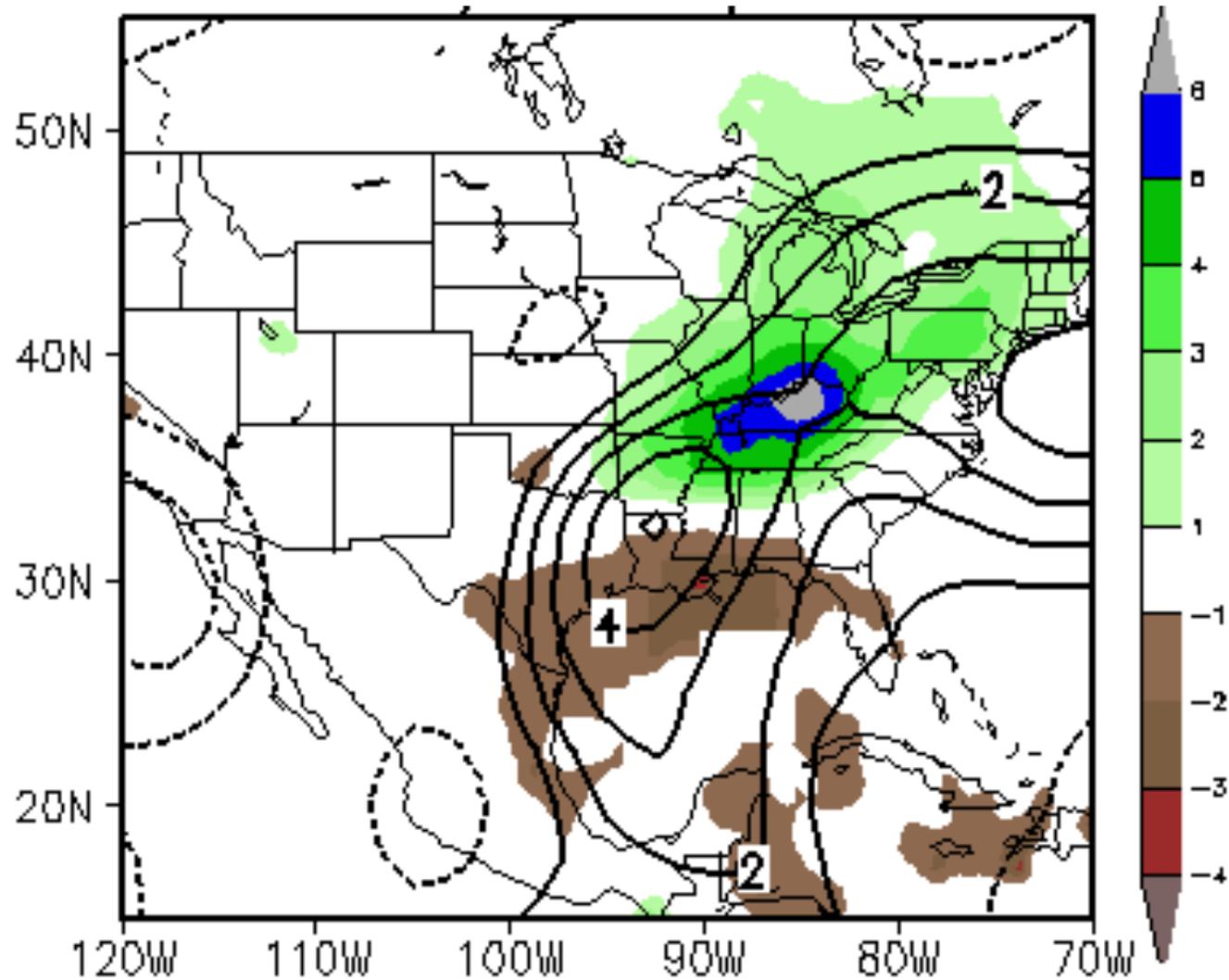


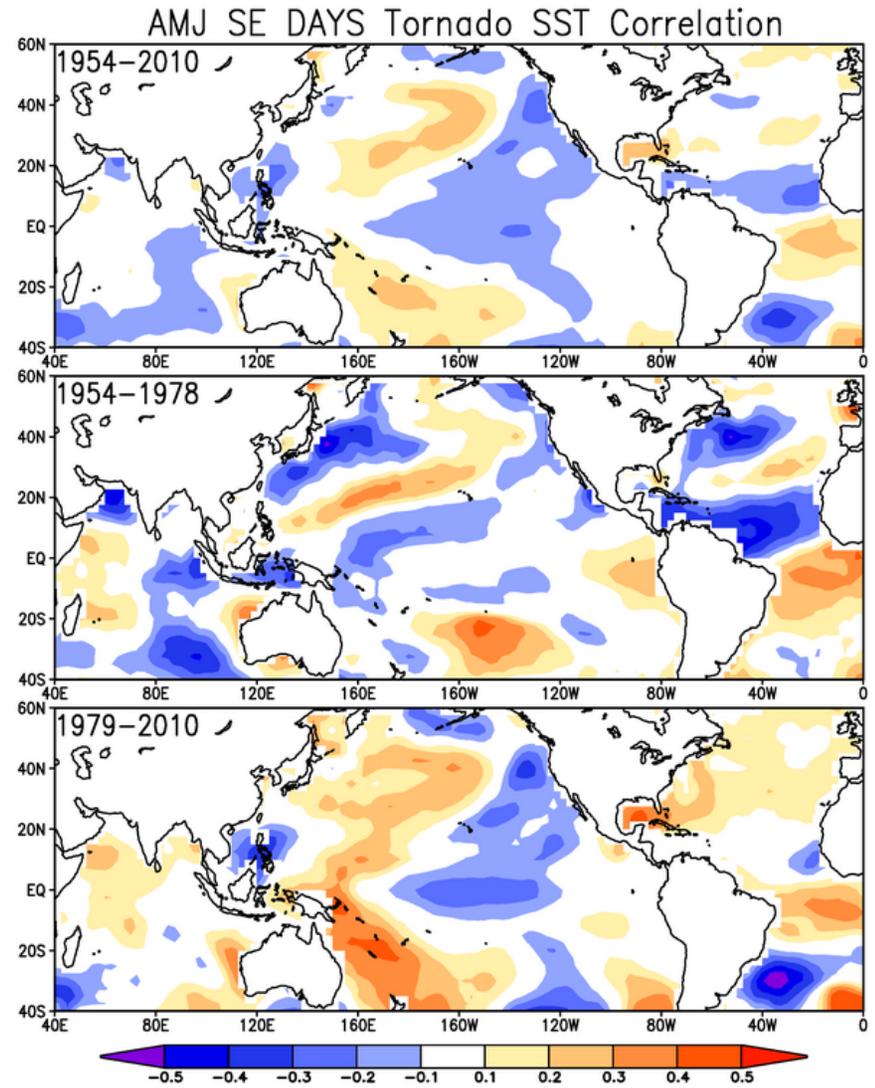
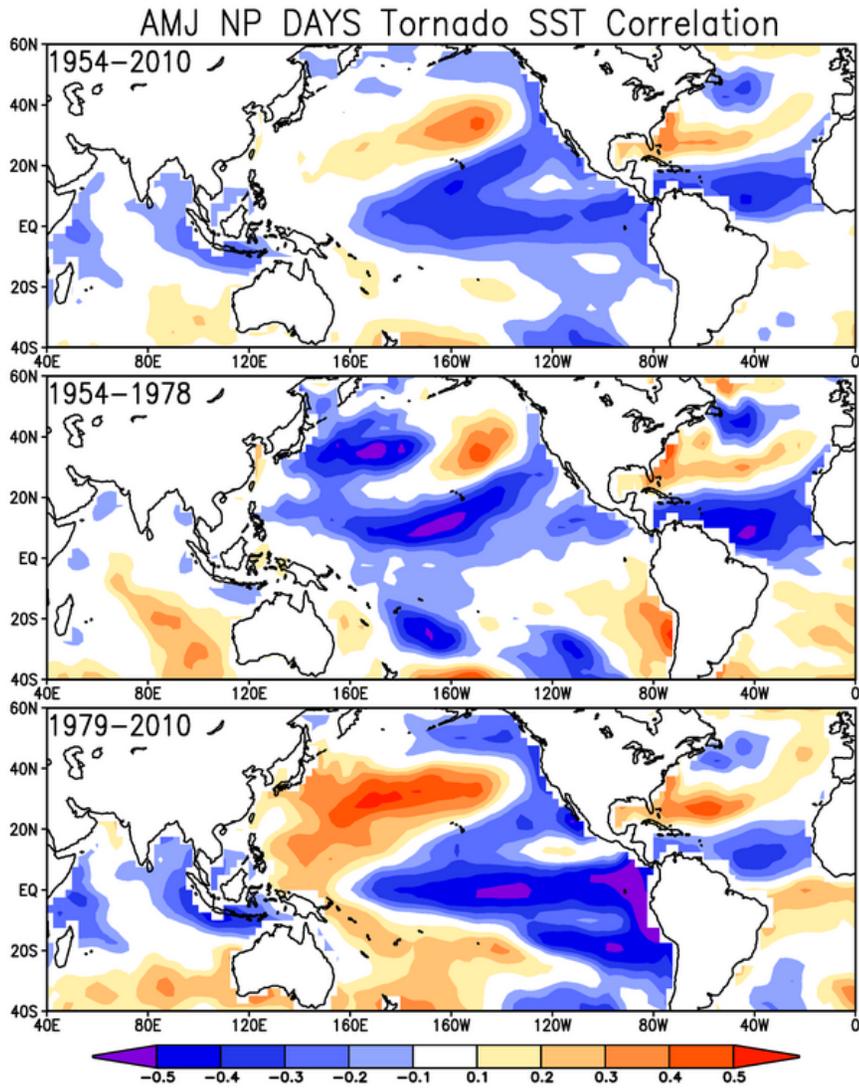
Regional Tornado Index Anomalies (1950–2010)

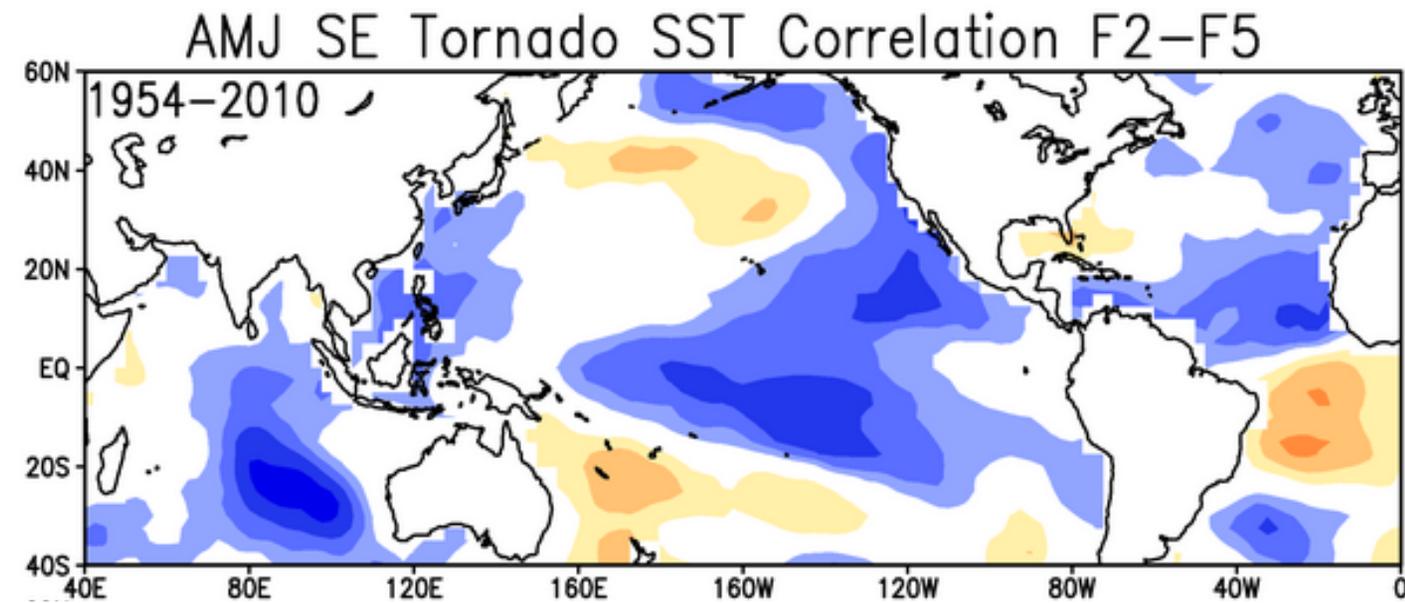
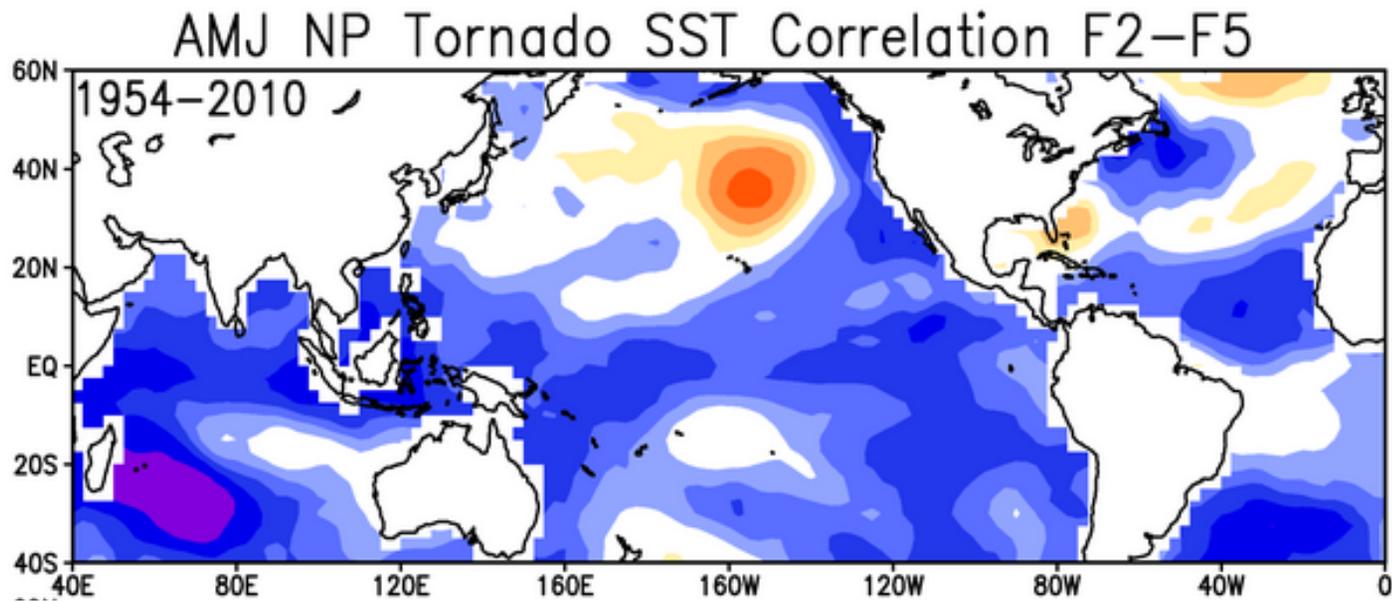


	SE	NP	SP
50-10	0.78	0.30	0.45
50-78	0.95	0.75	0.79
79-10	0.82	0.43	0.62

April 2011 Mean V850 & Precipitation



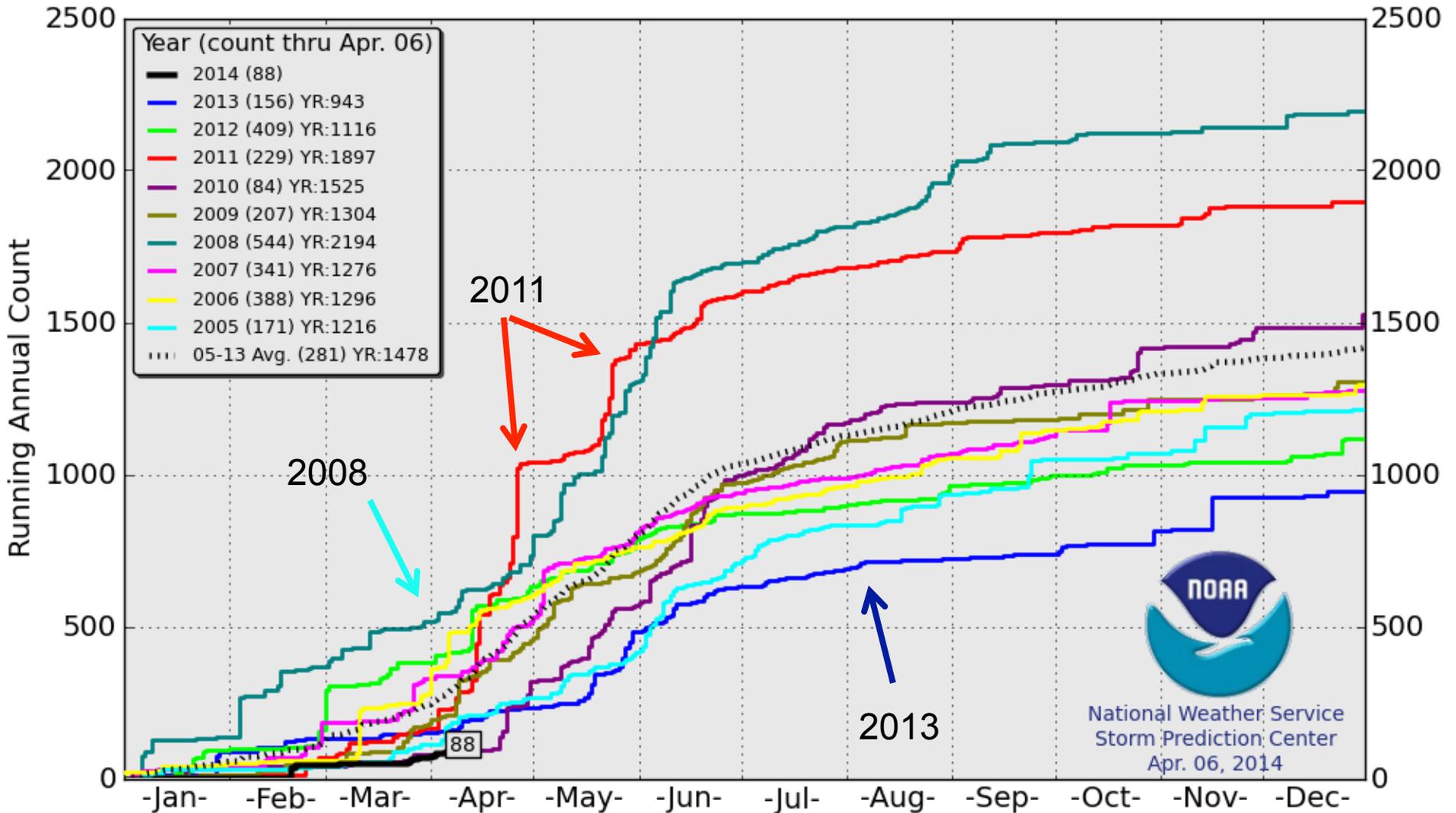




NGP anti-correlated to SST trend indicating potential reductions in the strength of NP tornado activity. SE SST correlations are weaker and appear more decadal-like. ²¹

Tornadoes 2005-14

United States Annual Trends of LSR Tornadoes*



*Preliminary sightings/events from NWS Local Storm Reports (LSRs)
Annual average is based on preliminary LSRs, 2005-2013