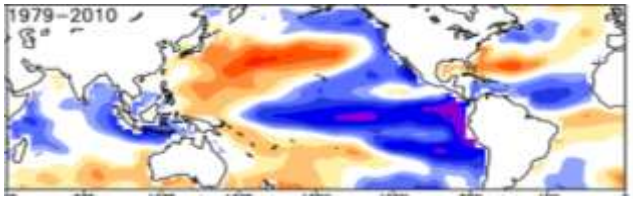
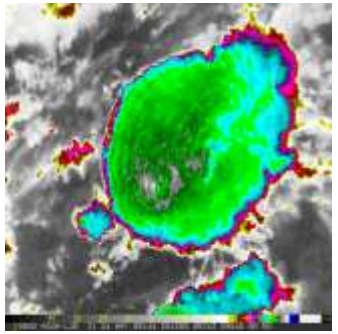



Toward the Development of Long Range Severe Weather Outlooks

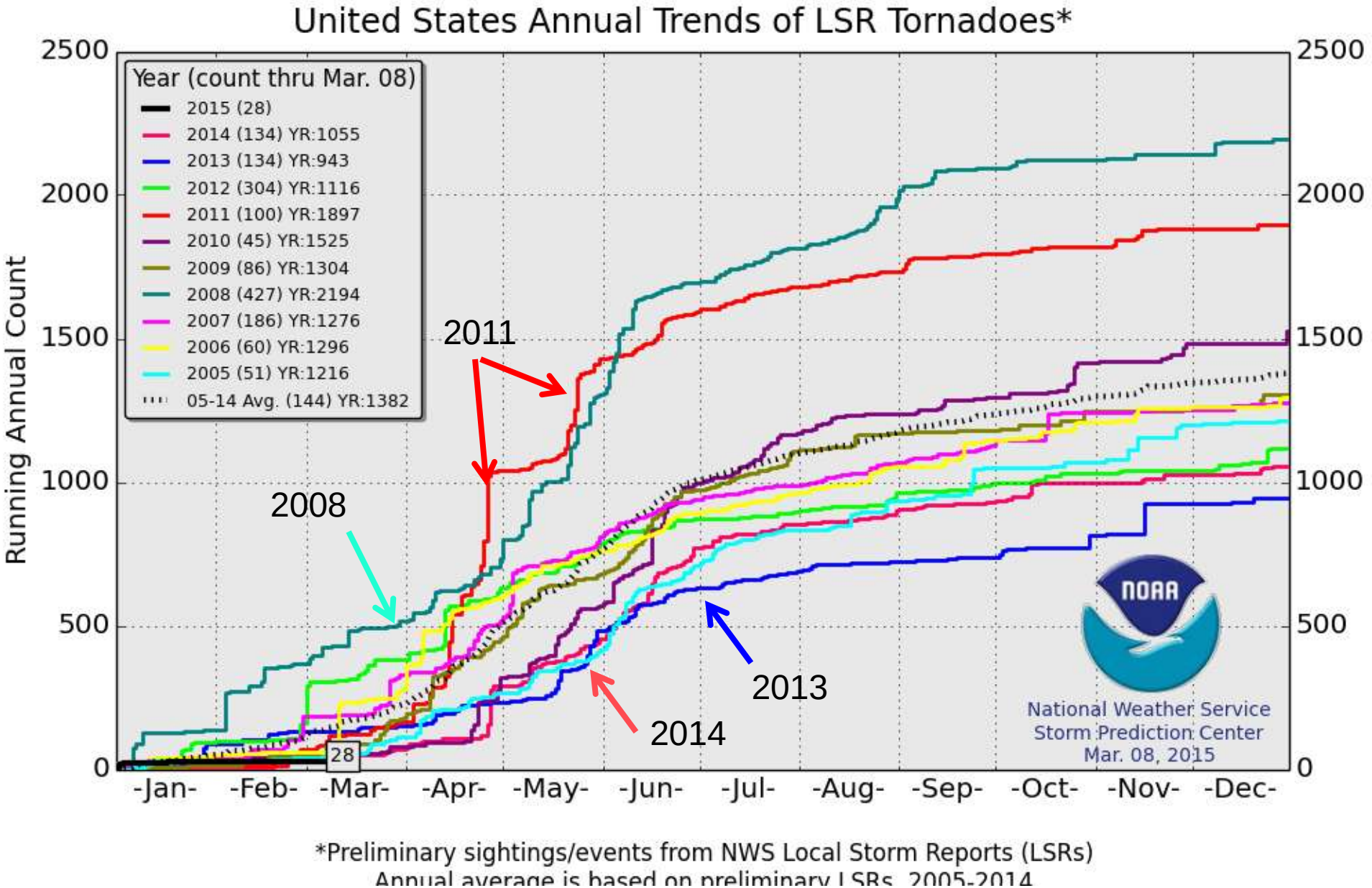
NMME Sub-Seasonal Forecast System Exploratory Workshop

March 30-31, 2015
NCWCP College Park, MD

Background

- April 2011 severe weather outbreaks had devastating impacts.
- Whitehouse asked NOAA if there is a seasonal tornado outlook. That's a tall order!
- Weather/Climate scientists began to talk about it via telecons.
- Workshops held in Norman Oklahoma, May 2012 and IRI/Columbia University in March 2013.
- September 2014 Obama Executive Order calls for weeks 3-4 extreme weather risk outlooks.
- NWS/NCEP incorporates a deliverable in AOP to assess the feasibility of developing extended and long range severe weather outlooks.
- CSWW at NCWCP March 11-12, 2015.

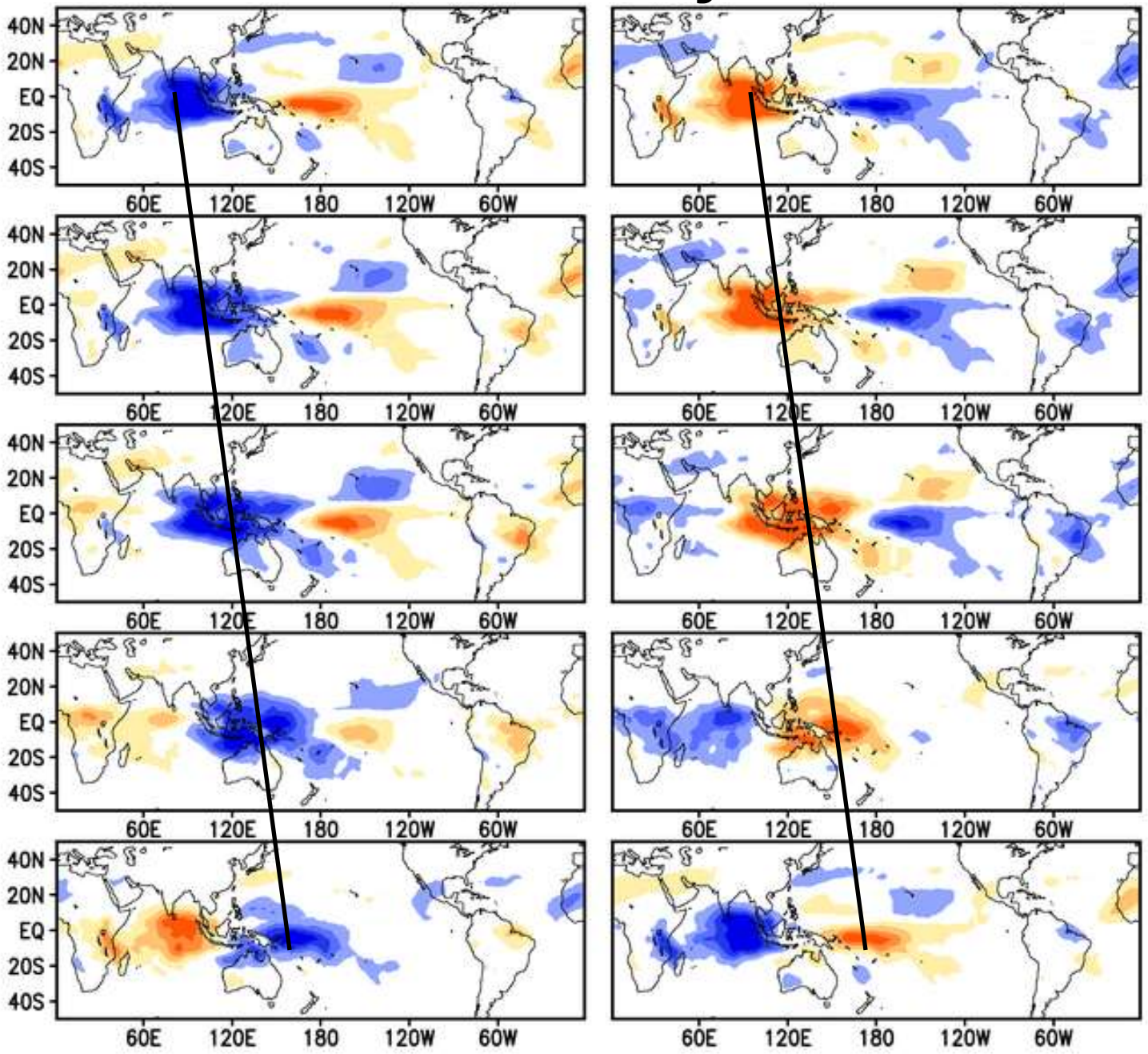
Tornadoes 2005-15



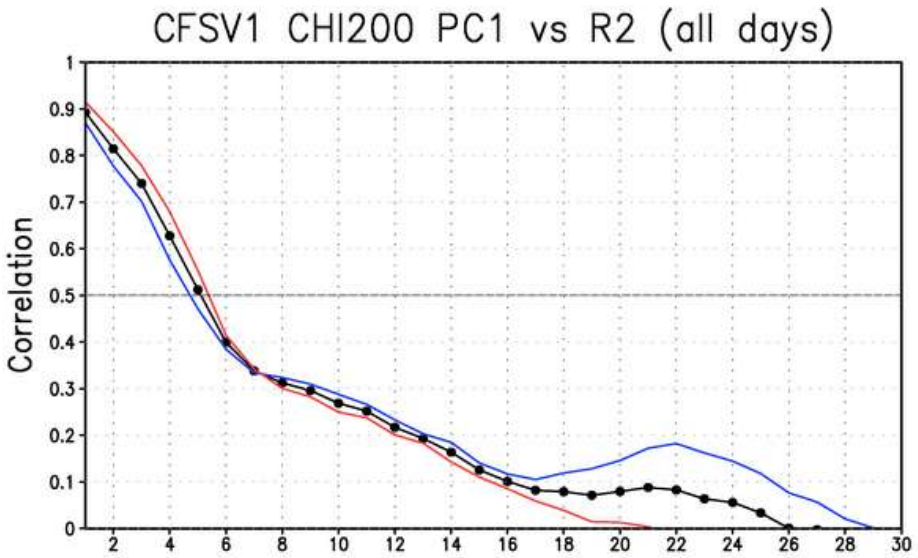
*Preliminary sightings/events from NWS Local Storm Reports (LSRs)
Annual average is based on preliminary LSRs, 2005-2014

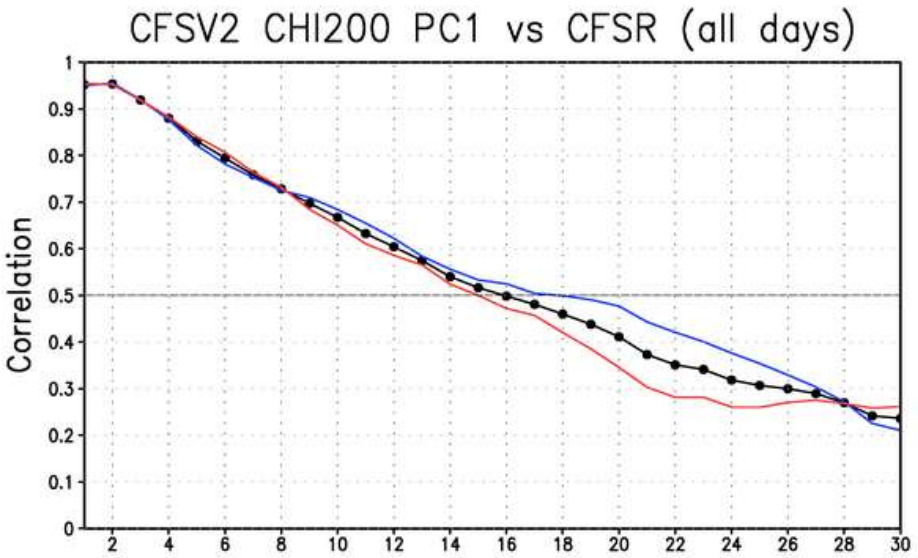
Why Do We Think Extended and Long Range Severe Weather Outlooks May be Possible

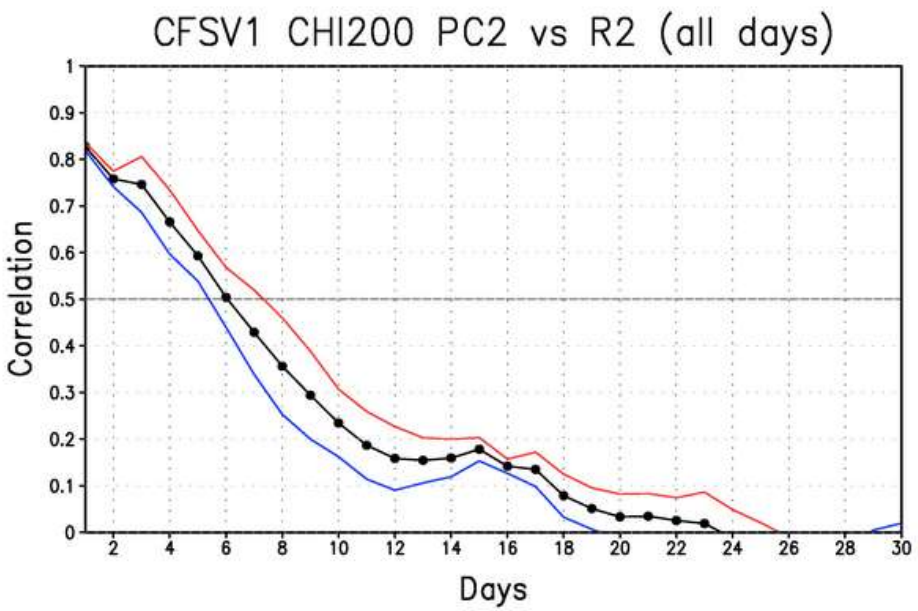
MJO Lifecycle

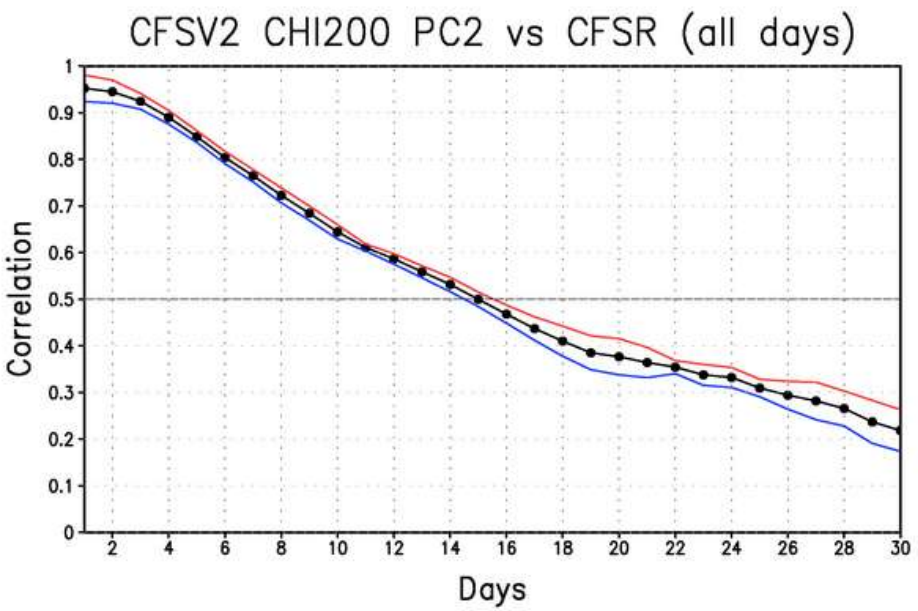


CFSv1 & CFSv2 MJO PC1 & PC2

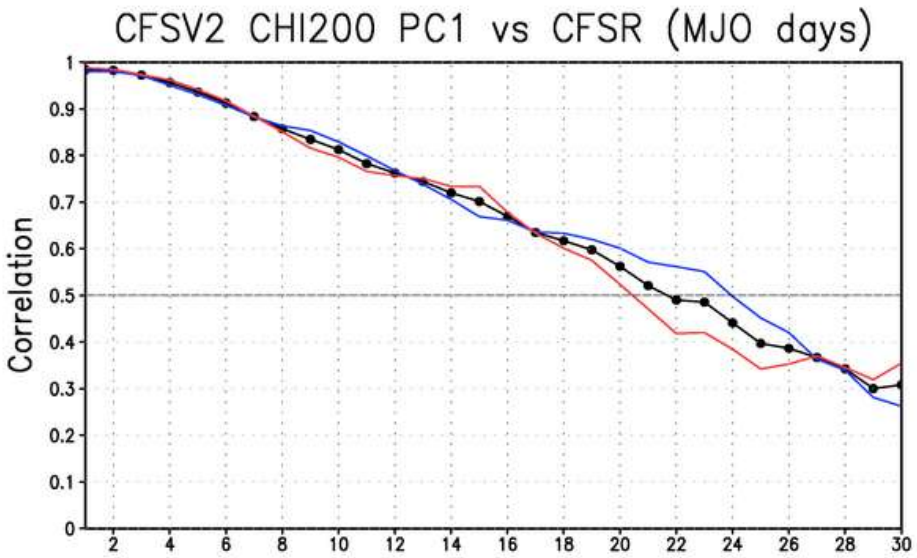


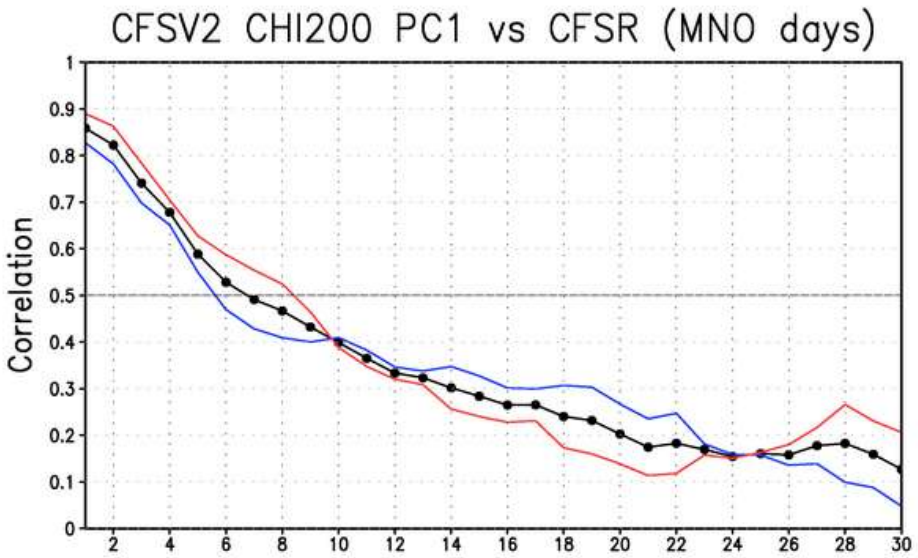


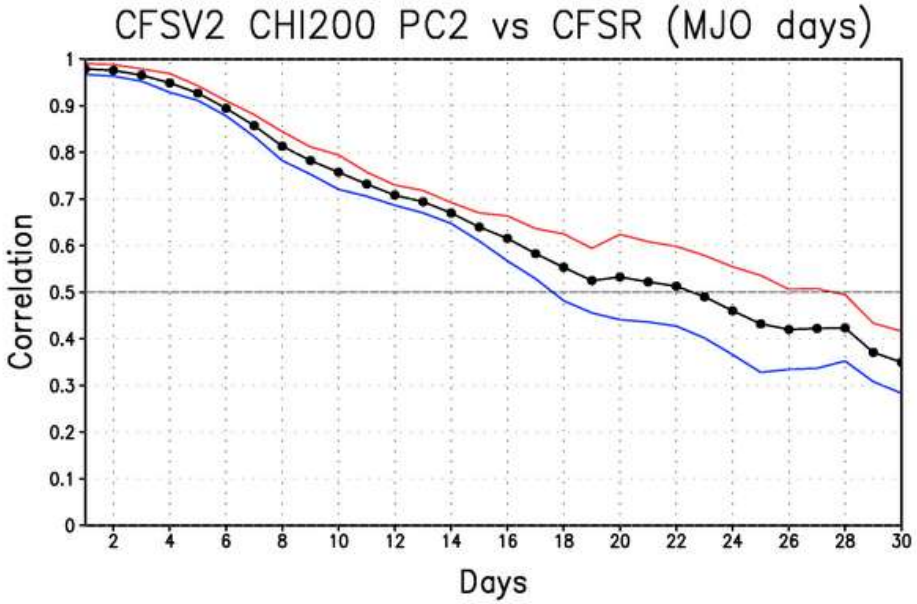


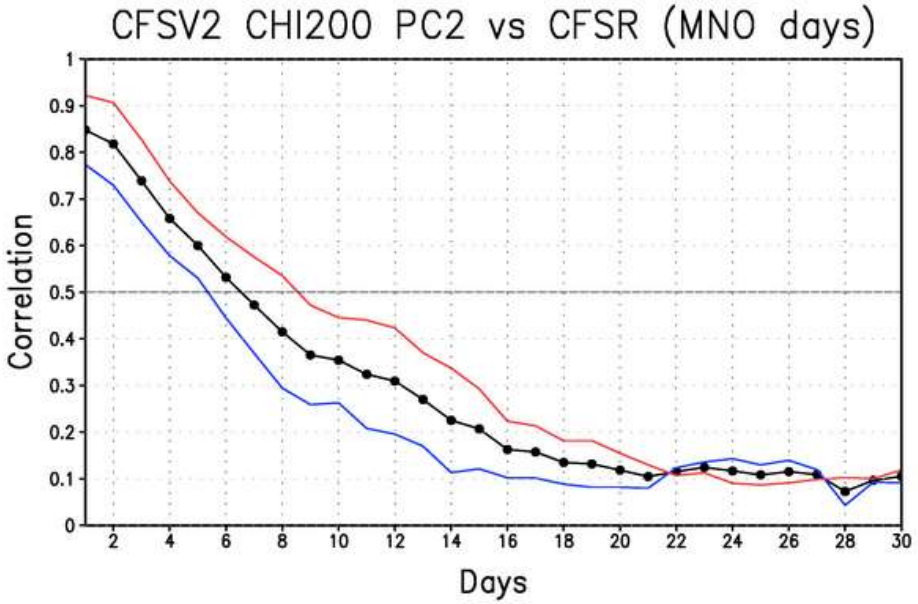


CFSv2 MJO & MJNO PC1 & PC2



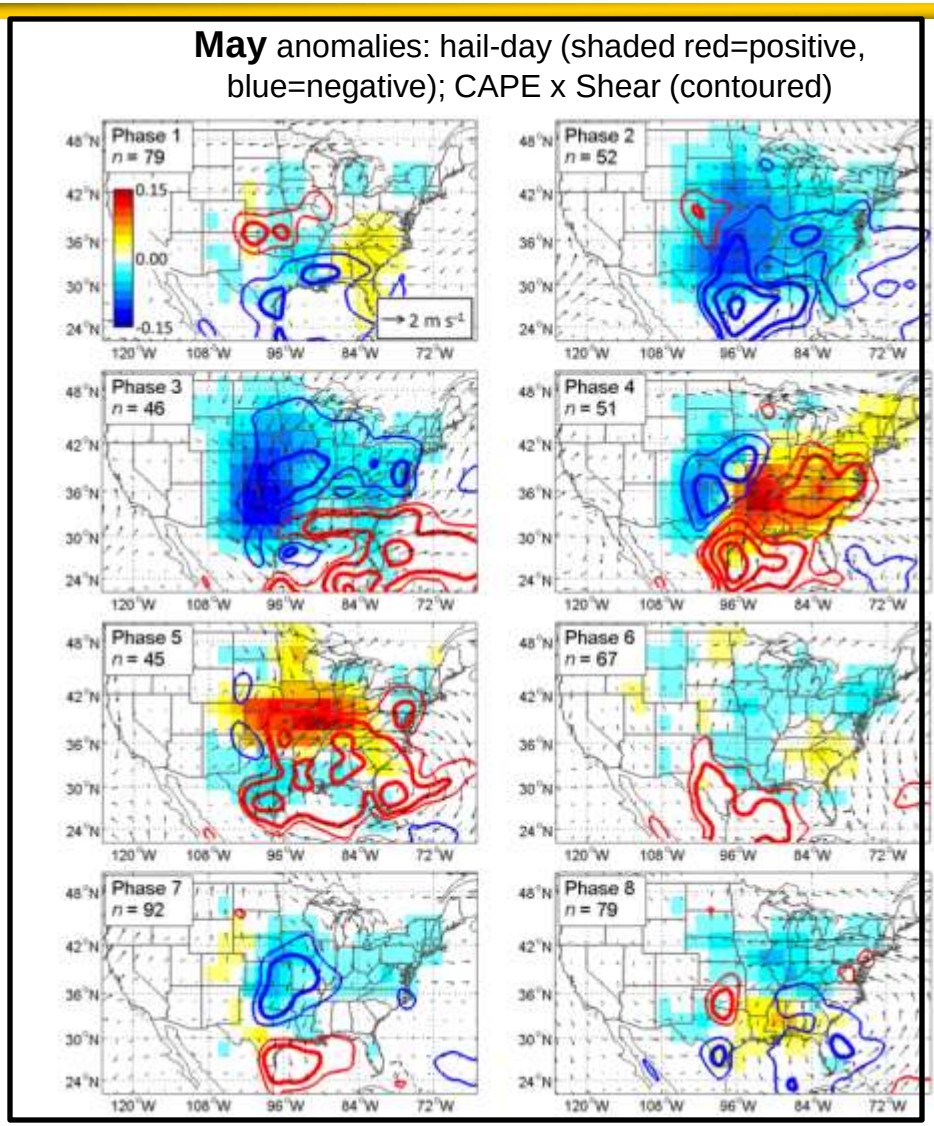






MJO and Severe Weather

- Notice differences in hail-day anomalies between Phases 3 and 4:
  - Below-normal hail anomalies in Phase 3
  - Above-normal anomalies in Phase 4
- Hail anomalies generally supported by buoyancy (CAPE) and circulation

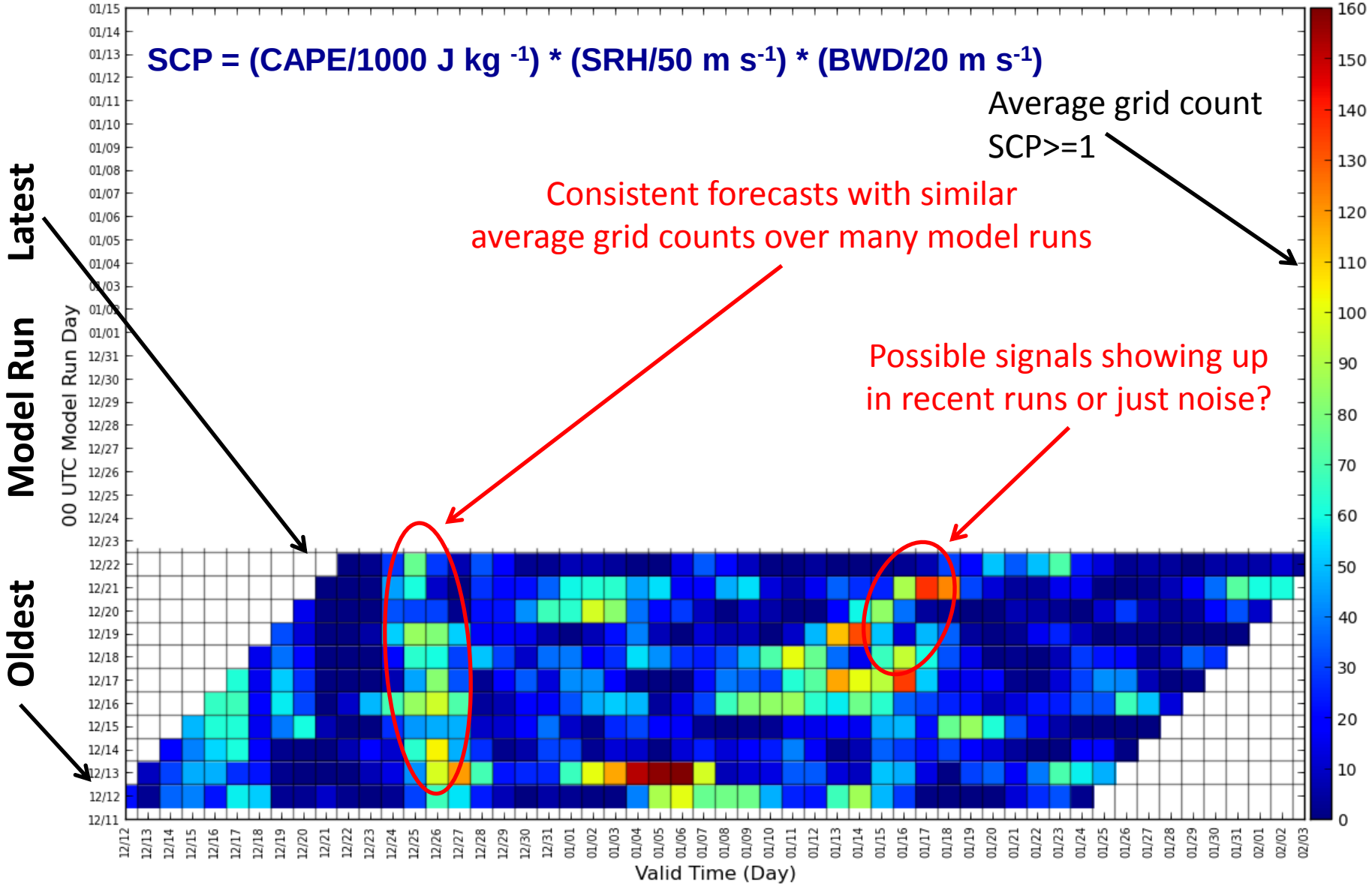


Brad Barrett
US Naval Academy

Figures from Barrett and Henley (2015 *Monthly Weather Review*)

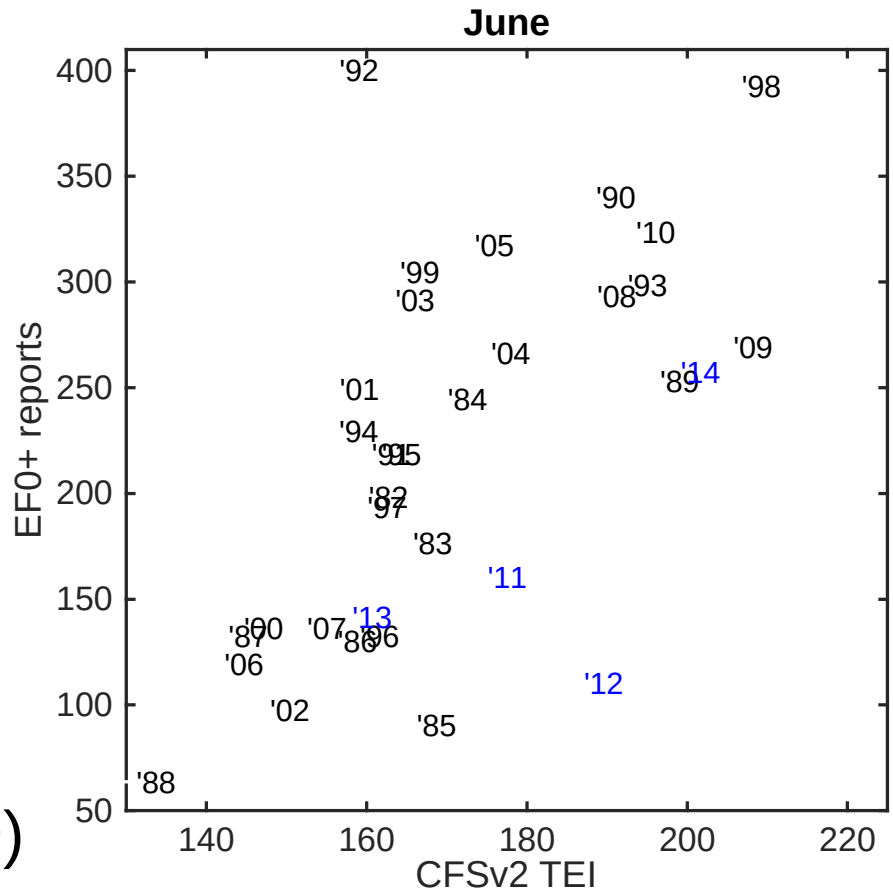
Severe Weather Indices in Climate Prediction Systems

Chiclet Chart: CFSv2 SCP Prediction



Greg Carbin et al. NOAA SPC

Monthly CFSv2 re-forecasts: CONUS totals



Tornado Environment Index (TEI): Expected # of tornadoes/month Based on cPrcp and SRH

Correlation between forecast index and observed number of **CONUS** tornadoes (1982-2009)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NARR	**0.75**	**0.64**	**0.54**	**0.50**	**0.60**	**0.67**	**0.75**	**0.40**	0.15	0.25	**0.48**	**0.74**
CFSv2	0.36	**0.38**	0.30	0.35	0.31	**0.72**	**0.59**	**0.41**	-0.25	0.18	**0.41**	**0.37**

Tippett et al. IRI & Columbia University

Monthly CFSv2 re-forecasts: NOAA climate regions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
South	0.16	0.36	0.29	0.05	0.28	**0.51**	0.09	0.34	0.05	0.30	0.29	0.33
Southeast	0.22	0.24	0.00	**0.41**	**0.66**	0.25	-0.01	0.00	**0.49**	0.26	**0.45**	**0.47**
Central	**0.47**	**0.50**	**0.64**	0.23	0.37	**0.45**	**0.42**	0.05	0.19	0.03	0.24	**0.42**
Midwest			-0.12	**0.58**	0.15	**0.67**	**0.39**	**0.42**	0.02	0.39	-0.04	
Plains			0.12	0.37	**0.40**	**0.50**	**0.53**	0.27	-0.03	0.03		
Northeast				0.15	0.05	0.15	**0.41**	0.18	0.70	0.15	-0.02	
Southwest				0.02	-0.10	0.32	0.04	-0.01	-0.44	0.30		
Northwest				-0.14	0.15	0.30		0.19				
West		0.21	0.34	0.13								

(1982-2009)

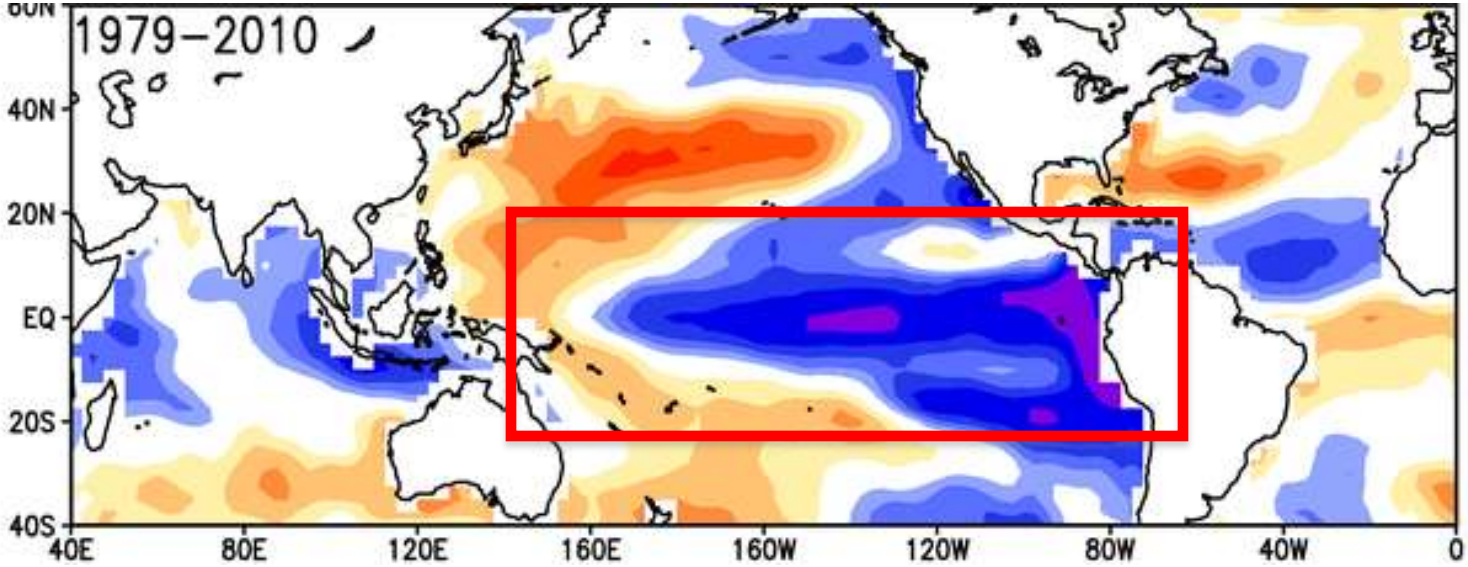
Relevance to NMME

- Potential improvements to MJO prediction skill.
- Need for other variables to analyze NMME impact on prediction of severe weather environments.
  - CAPE
  - 0-6 km shear
  - SRH
  - Convective Precipitation
  - CIN
- Downscalers requested sub-daily fields on a rotating archive
  - Real time access to 3d sub-daily data on a rotating archive. Even if once a month. p, t, q, u, v, z, u10m, v10m, q2, t2, psl
- “Data is cumbersome to access from NCAR.”

Thank You

CSWW Presentations @:
http://www.spc.noaa.gov/misc/CSWW-2015/

AMJ NGP Tornado Days



AMJ SE Tornado Counts F3-F5