

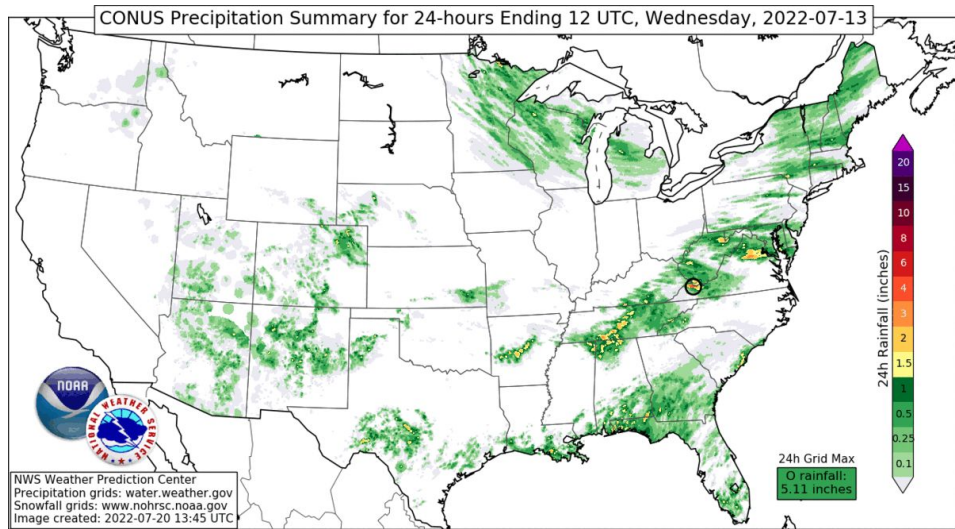
Extreme Precipitation Forecasts from the Weather Prediction Center

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NOAA Extreme Precipitation Info Webinar for the Insurance Sector
September 29, 2022



Summer of Extreme Rainfall Incidents



- This summer across the CONUS we have seen frequent but localized extreme events (**62 prelim flood fatalities since June**)
- Slight Risk on the ERO somewhere in the CONUS on 94% of the days from 12 July to 13 September (*animation to left; 60 out of 64*)
- Lack of many large, organized systems (e.g. *tropical cyclones, cutoff low, large MCS*). Rainfall has been more localized and random.

June 2022

SUN	MON	TUE	WED	THU	FRI	SAT
			SLGT	MRGL 1	MDT 1	MDT
MDT 8	SLGT 7	SLGT 8	SLGT 9	SLGT 10	SLGT 11	MRGL 12
12	SLGT 13	SLGT 14	SLGT 15	SLGT 16	SLGT 17	MRGL 18
19	SLGT 20	SLGT 21	SLGT 22	SLGT 23	SLGT 24	MRGL 25
26	SLGT 27	MRGL 28	MRGL 29	SLGT 30		

July 2022

SUN	MON	TUE	WED	THU	FRI	SAT
					SLGT 2	SLGT 3
4	SLGT 5	SLGT 6	MDT 7	MDT 8	MD 9	MDT 10
11	SLGT 12	SLGT 13	SLGT 14	SLGT 15	SLGT 16	MRGL 17
18	SLGT 19	SLGT 20	SLGT 21	MRGL 22	MRGL 23	MDT 24
25	SLGT 26	MDT 27	MDT 28	MDT 29	MDT 30	SLGT 31
MDT 1						

August 2022

SUN	MON	TUE	WED	THU	FRI	SAT
			SLGT 3	SLGT 4	SLGT 5	SLGT 6
7	SLGT 8	MDT 9	SLGT 10	SLGT 11	SLGT 12	SLGT 13
14	SLGT 15	SLGT 16	SLGT 17	SLGT 18	SLGT 19	SLGT 20
21	SLGT 22	SLGT 23	SLGT 24	SLGT 25	MDT 26	MDT 27
28	MDT 29	MDT 30	MDT 31	SLGT	SLGT	SLGT
MDT 1	MDT 2	MDT 3	MDT 4	SLGT 5	SLGT 6	SLGT 7

September 2022

SUN	MON	TUE	WED	THU	FRI	SAT
					MDT 2	SLGT 3
4	MDT 5	SLGT 6	SLGT 7	SLGT 8	MDT 9	SLGT 10
11	SLGT 12	SLGT 13	MDT 14	SLGT 15	SLGT 16	SLGT 17
18	SLGT 19	MDT 20				
21	SLGT 22	MDT 23				
24	SLGT 25	SLGT 26	MDT 27			
28	MRGL 29	SLGT 30	MDT 31			

n = number of flood fatalities (preliminary)

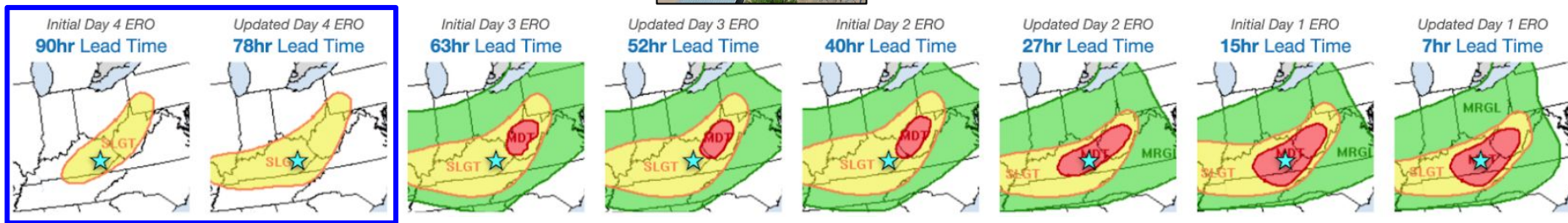


Immediate Benefits from ERO Extension

NEW THIS YEAR: ERO extended to Day 4 and 5, extra lead time for big events



Example below shows the progression for the devastating Kentucky floods in late July

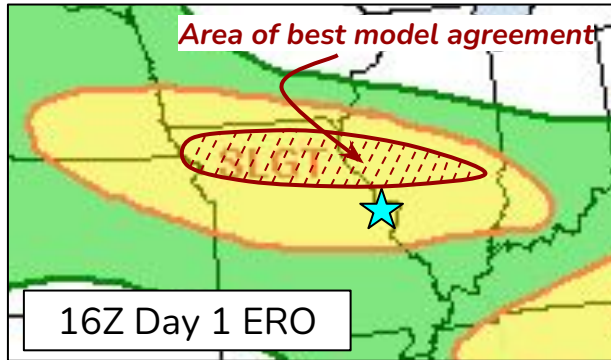
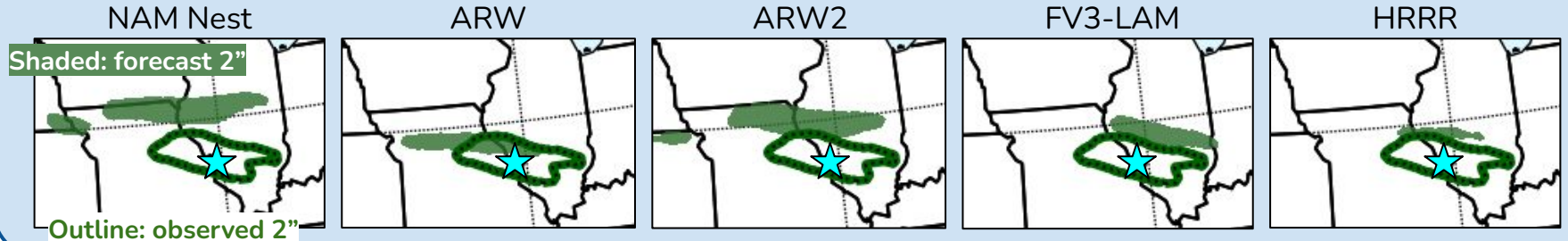


- Need to evaluate verification data to assess some key questions before next steps:
 - Should we include Marginal Risks (being practiced internally) beyond Day 3?
 - Should we test an extension further out to Day 7? What is the skill at those lead times?
- Example: Marginal Risk was outlined in advance of June Yellowstone flooding on Day 5
 - Low probabilities can be meaningful, especially at longer lead times in sensitive areas



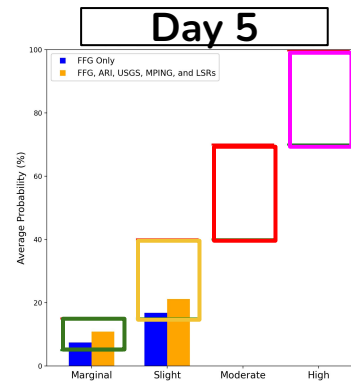
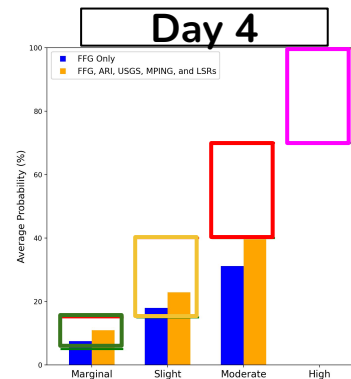
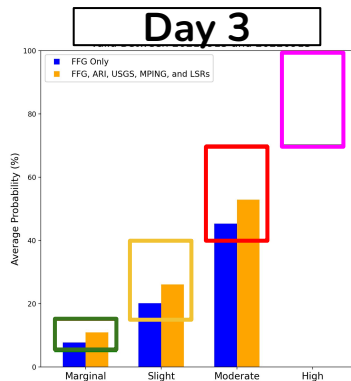
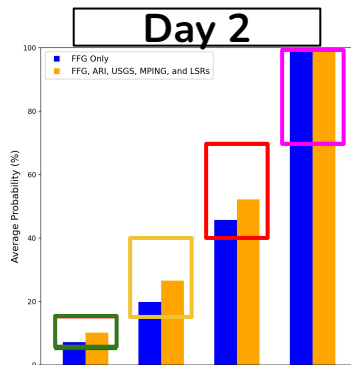
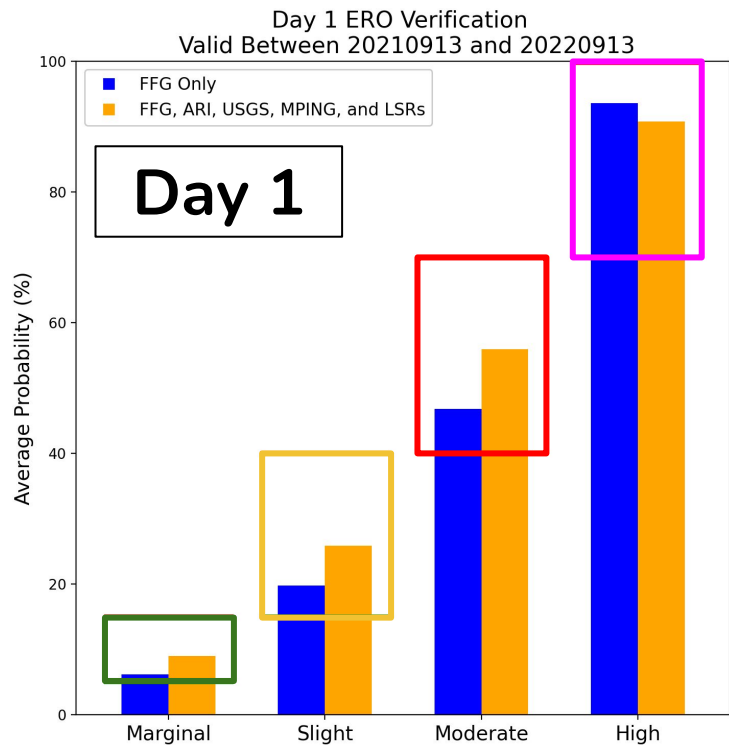
ERO Case Study: St. Louis Event

What do you do when the models agree on an extreme event, but not the location?



- Forecaster used experience and their understanding of atmospheric and statistical uncertainty to draw a broader risk area that crucially DID include St. Louis.
- Many hi-res models had some degree of error to the north
- Overfitting the risk to the hi-res signal likely would have “overwarned” areas too far north, potentially “underwarned” STL

ERO: How Are We Doing?



We are generally hitting the revised probability ranges

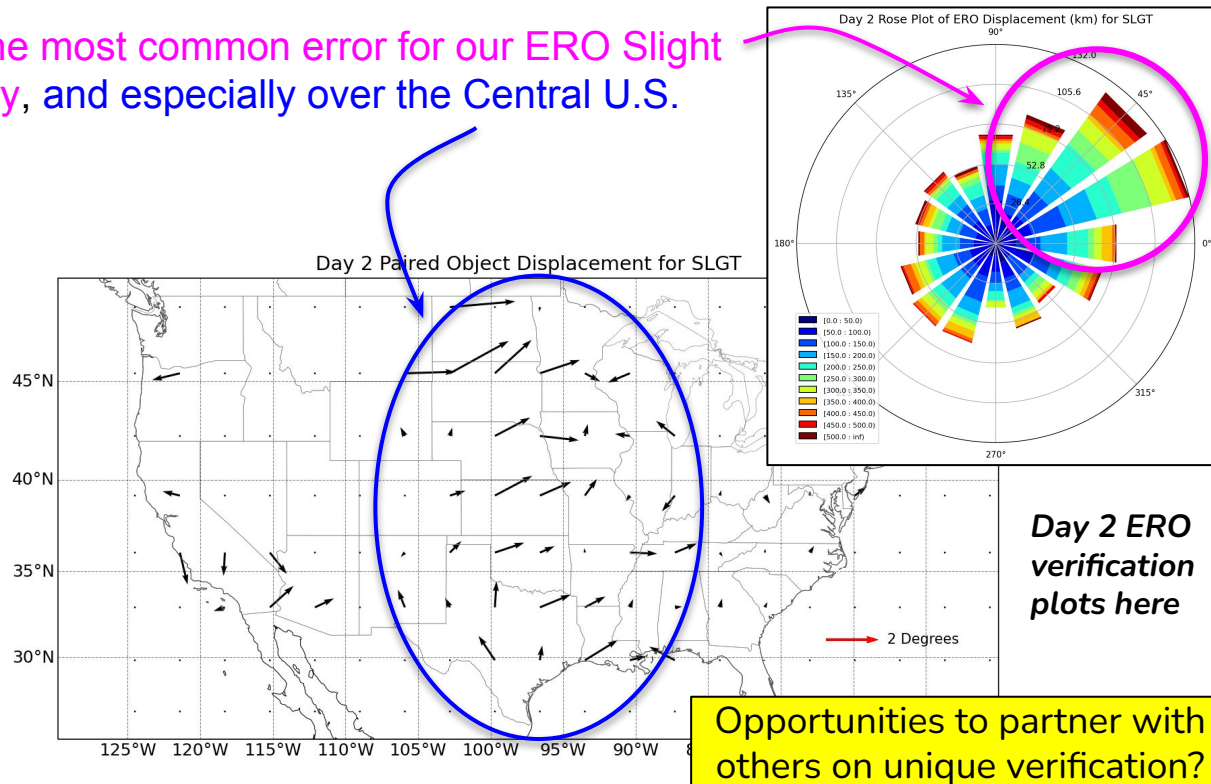
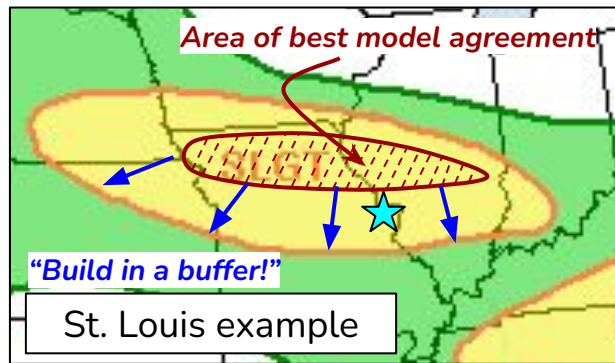
This is true even out on Day 4 and 5, suggesting that we are fairly well calibrated and reliable, BUT...

...a lower frequency bias at Day 4 and 5 suggests we are more selective about when we draw risk areas at longer lead times.

Verification → Knowledge → Application

Northeastward placement bias is the most common error for our ERO Slight Risk areas across the entire country, and especially over the Central U.S.

Knowledge of this common statistical error and conceptual models can factor into forecaster decisions. Sometimes we have to draw the risk areas bigger than we'd like.

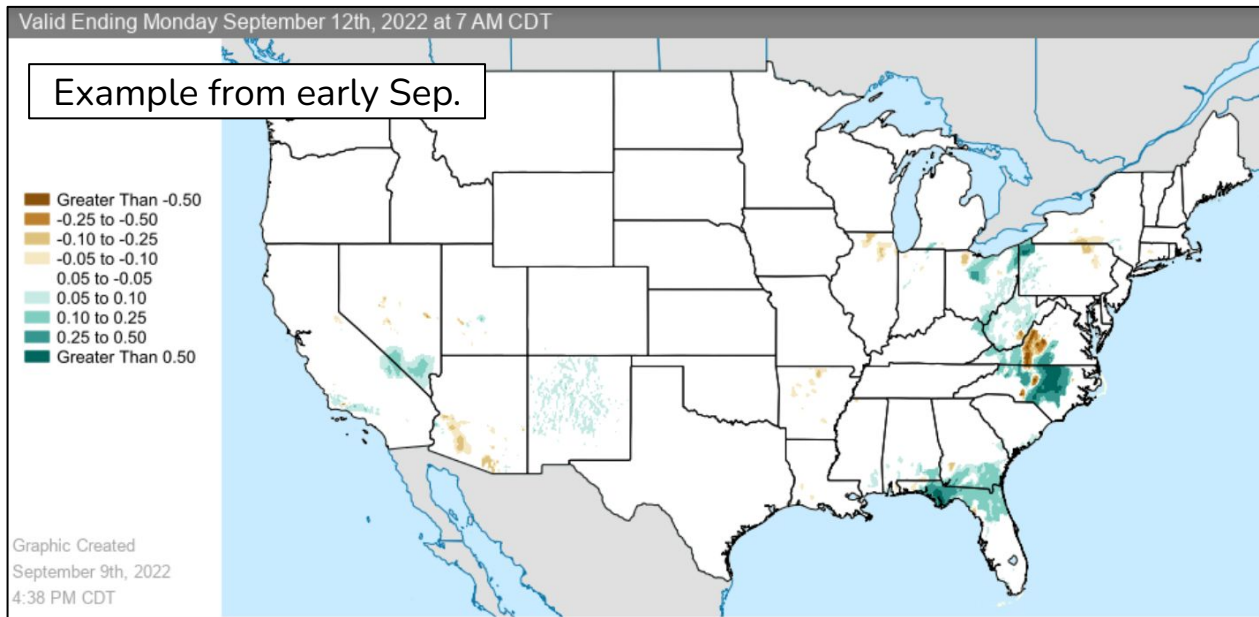


Collaborative Forecast Process (CFP)

- QPF CFP demonstration started in August
- The goal is “one NWS QPF”
- Still noticing some edits after defined collaboration window; some occasional big edits as well
- How does this fit in the hydro workflow? Let’s talk.
- Yet to see how this will work in winter when small changes in QPF can make big differences in snow/ice

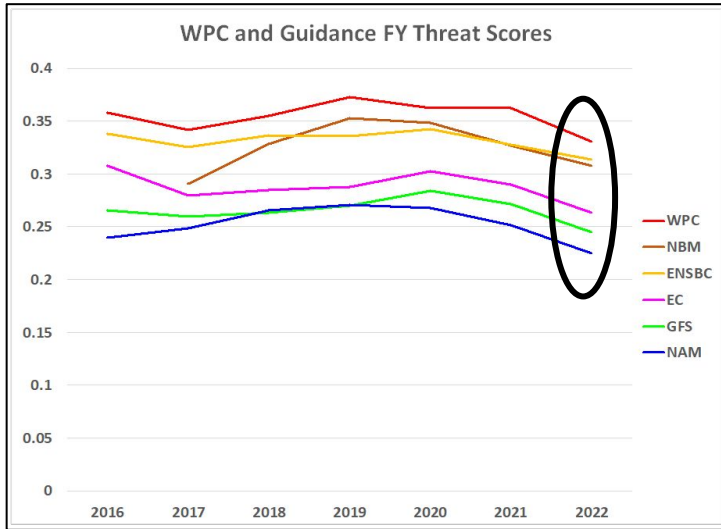
Culture change takes time. Still seeing some post-collaboration editing.

Below map shows NDFD-WPC Day 2-3 QPF. **Green = NDFD Higher.** **Brown = WPC Higher.**

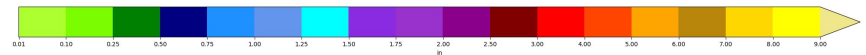
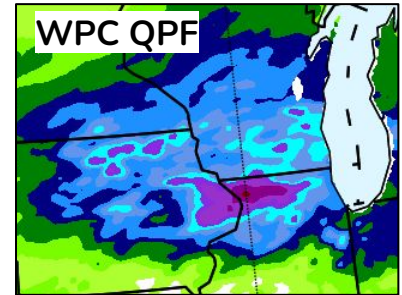
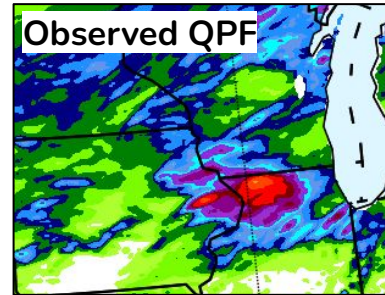
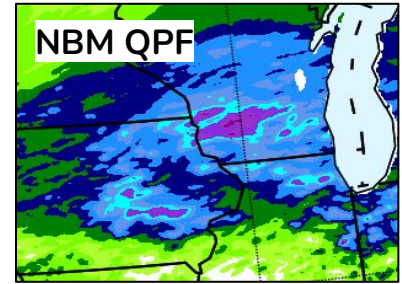
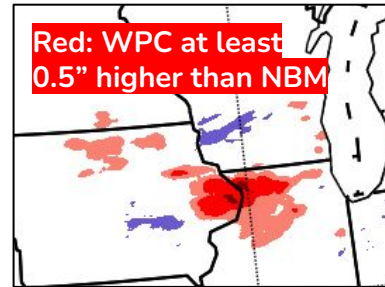


Lack of Large Systems = QPF Challenges

Still have seen some successful CFP edits to NBM
 Example: 12Z August 7 to 12Z August 8 below

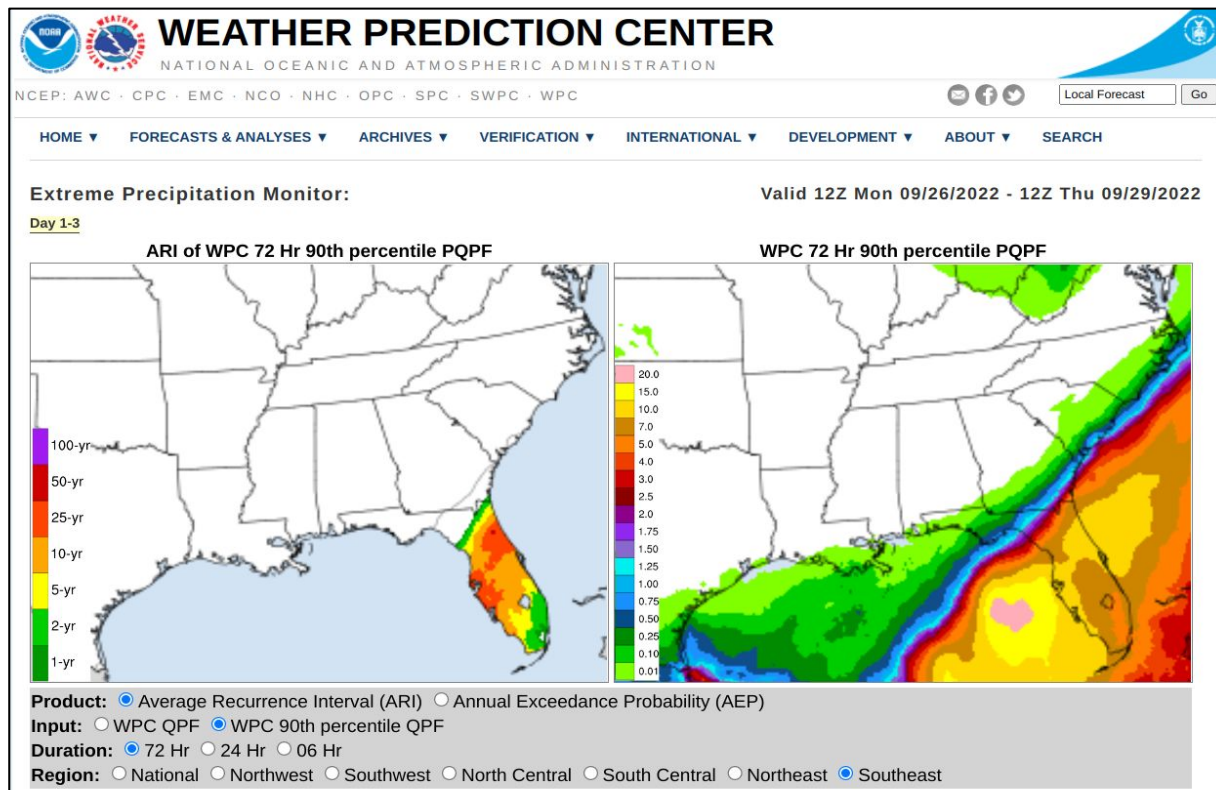


- Threat scores are down this year across the board, not just human forecasts
- Very likely due to a systematic atmospheric cause – lack of widespread rain events



Extreme Precipitation Monitor

- Utilizes Probabilistic QPF (PQPF) at upper percentiles
- “Reasonable worst case?”
- AEI and ARI output
- Useful for tropical regimes where rainfall efficiency may exceed deterministic forecasts
- Caveat! Percentiles are grid based, not area coverage



Thank you and I'm happy to answer any questions you may have.

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HEAVY RAIN AND FLOODING
MARKET STREET, YORK COUNTY
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STORM TEAM



WEATHER PREDICTION CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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