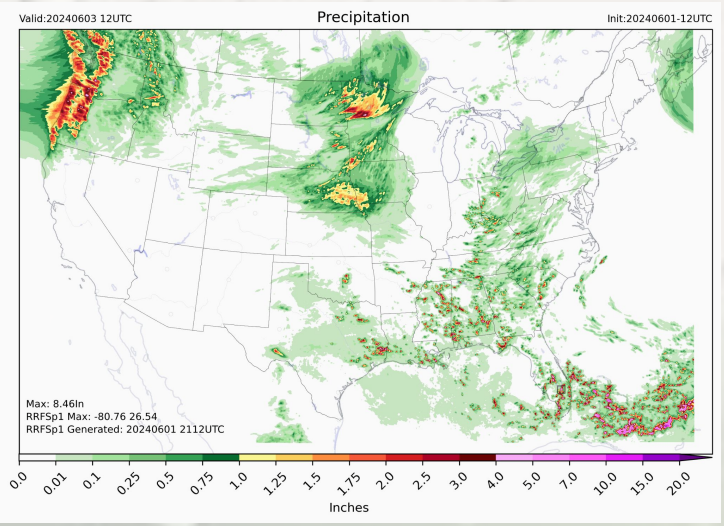
How to be FFaIR

FFaIR - the Flash Flood and Intense Rainfall experiment



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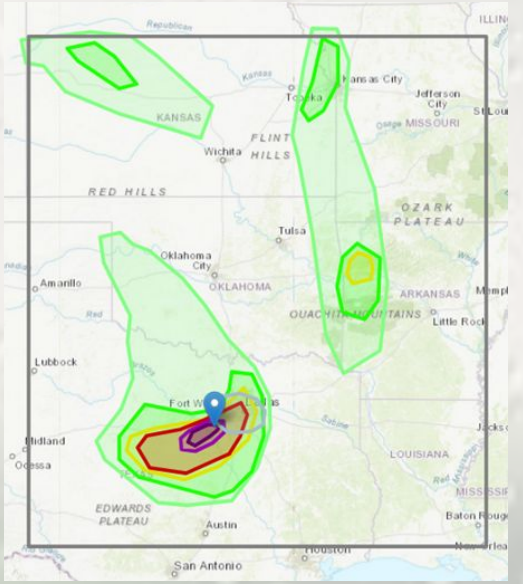


Sarah Trojniak - FFaIR Facilitator

James Correia - Testbed Coordinator

Massey Bartolini - WWE Facilitator

Tomer Burg - AR Facilitator

James Nelson - Testbed Manager

Kirstin Harnos - Testbed Liaison

The Hydrometeorology Testbed at the Weather Prediction Center (HMT-WPC)

Mission: accelerate the assessment and implementation of new technology, research, and other scientific advancements from the research and development communities to enhance WPC and NWS products and services, focusing on precipitation.

Our Testbeds:

- Flash Flood and Intense Rainfall (FFaIR) Experiment
  - Mid June to mid July
- Winter Weather Experiment (WWE)
  - Feb and March
- **NEW** Atmospheric River Experiment (AR)
  - Fall 2024

Roles:

- Test new forecasting products, tools and techniques
- Sit at the intersection between Research and Operations (R2O2O)
- Test new ways to identify regions of concern and communicate risk
- Evaluation of deterministic and ensemble models

Collaborators:

- Other NOAA Testbeds and forecasters
- Research and Academic Institutions
- Model Developers

Science Seminars

meet.google.com/fhb-spep-zui

Dates of seminars – all seminars are 2-230pm EDT	Presenter(s)	Title/Theme of Seminar	Affiliation
Tues - June 4	Sarah Trojniak and Jimmy Corriea	How to FFaIR	CIRES-CIESRDS @WPC-HMT
Thurs - June 6	Erica Bower	Objective Verification of the Weather Prediction Center's Mesoscale Precipitation Discussions	CIRES-CIESRDS@WPC
Tues - June 11	Trevor Alcott	MPAS Ensemble Forecasts of Heavy Rainfall: Does adding members add value?	GSL
Thurs - June 13	Aaron Hill	Medium-range Forecasts of Excessive Rainfall with the CSU-MLP	University of Oklahoma
Tues - June 25	Bill Gallus	A Machine Learning Postprocessor to Mitigate QPF Errors for Improved Hydrometeorological Forecasting	Iowa State University
Thurs - June 27	Keith Brewster	FV3-LAM CAM Ensemble Consensus and Machine Learning Products for Predicting Heavy Rain for the FFaIR Experiment	CAPS @ University of Oklahoma
Tues - July 9	Matt Pyle	Current Status of RRFS and REFS, with an emphasis on QPF	EMC
Thurs - July 11	Eric James	Evaluating HREF probabilistic forecasts of excessive rainfall	GSL
Tues - July 23	Austin Coleman	Advancing Situational Awareness with Ensemble Clustering and Sensitivity Analysis Tools	CIRES-CIESRDS@WPC
Thurs - July 25	Mike Seaman	Leveraging Machine Learning and Probabilistic Guidance to Improve Flash Flood Forecasting Across Southern Utah	WFO- SLC
Tues - July 30	Brenda Philips	Societal Responses to Flash Floods	University of Massachusetts
Thurs - Aug 1	Ben Moore and Leif Swenson	Advances and Challenges In Atmospheric River Forecasting	PSL and CIRES-CIESRDS@PSL

Rapid Refresh Forecast System (RRFS)

RRFS Development from 2020 to now in FFaIR

2020 evaluation of Nested vs Stand-alone CAM

- Testing to move RRFS from nested in GFS.

Wet bias

- Noted in results of FFaIR 2019 and continued through FFaIR 2022.
- Often wetter than the NAMnest
- In FFaIR 2022/23, participants said that overall the precipitation was looking more realistic than in past years, but that they don't trust the amounts
- FFaIR 2023 wet bias was less extreme than previous years

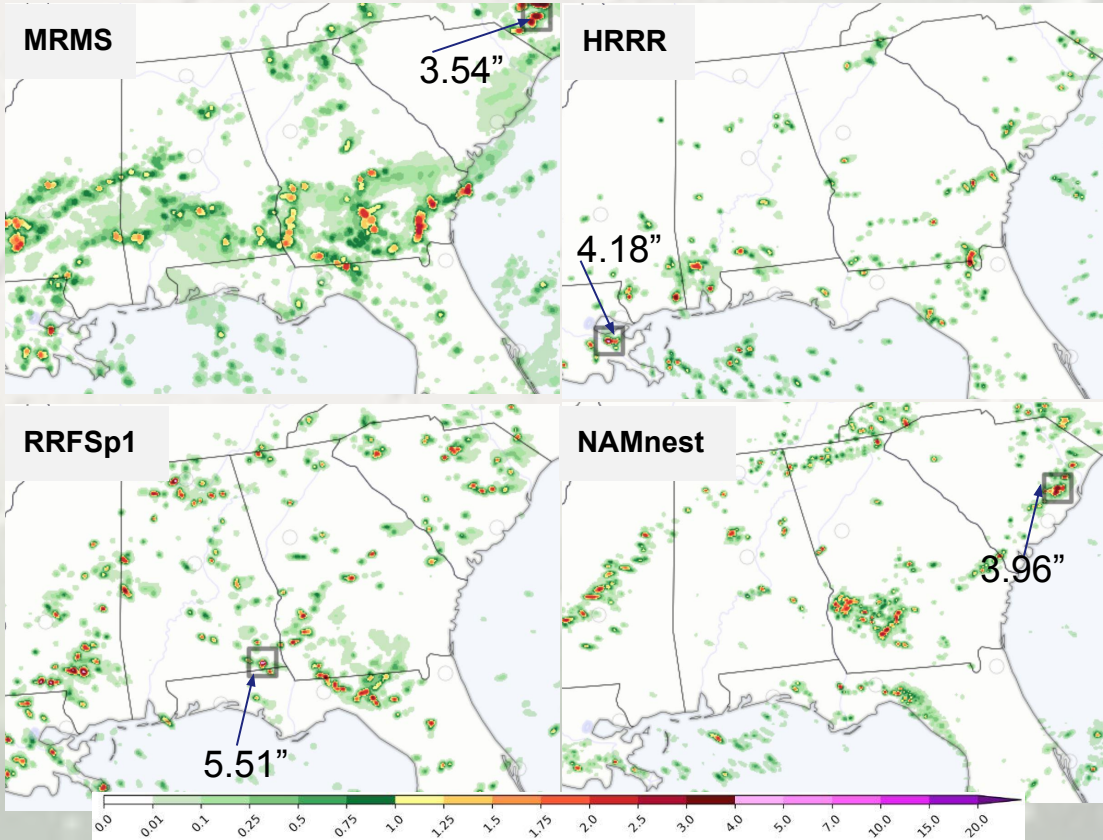
Grid-point (popcorn) convection

- First noted in FFaIR 2020 that popcorn/weakly forced convection had high hourly totals in nearly every cell forecasted
- Reminded participants and FFaIR team of grid-point storms
- FFaIR 2023 still present but size reduced

High precipitation rates

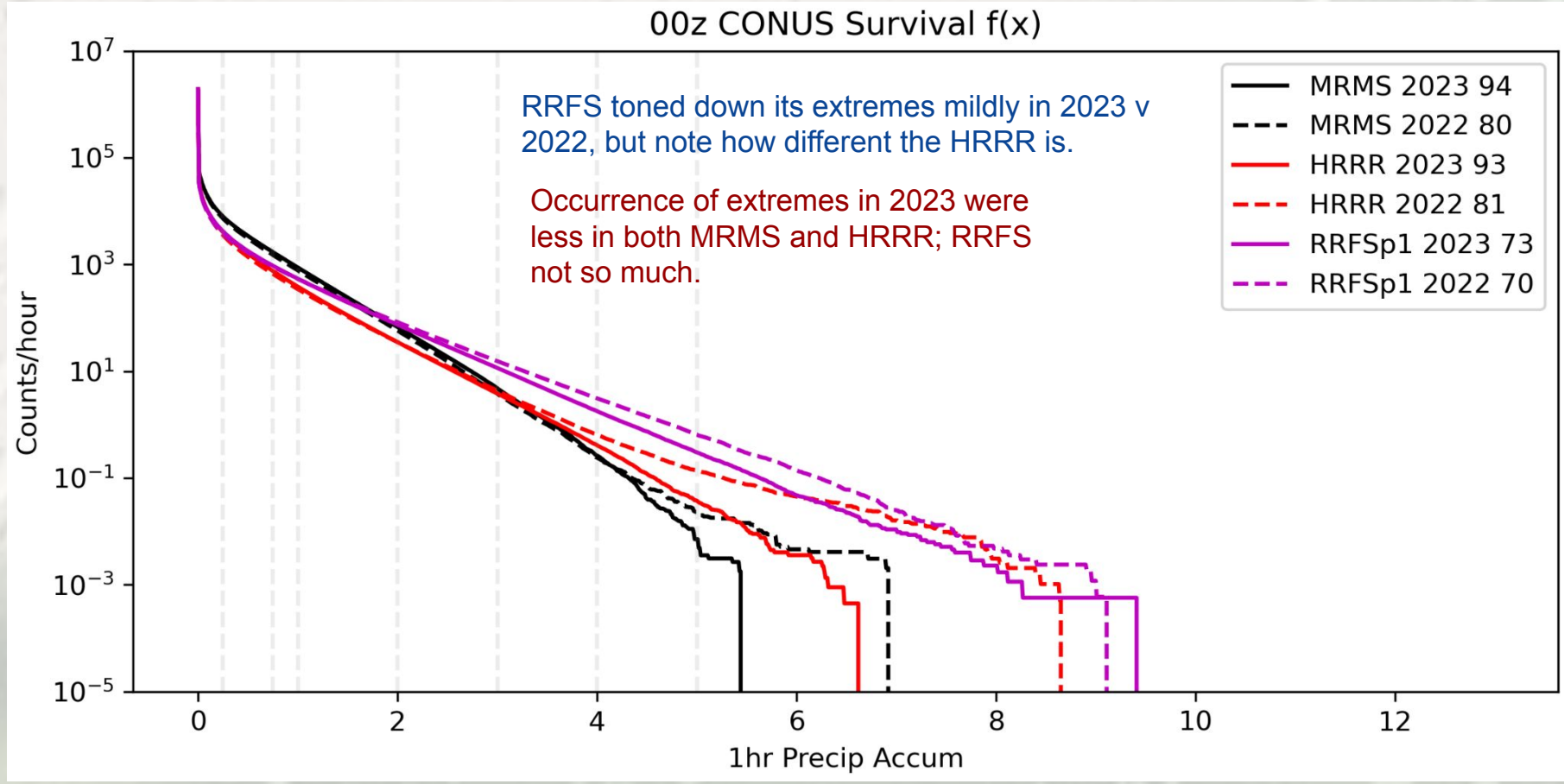
- Found to be resolved in the 2023 FFaIR Experiment

June 29 F21 1h Precip



*from FFaIR 2023 MEG Presentation

Precipitation: Statistical Perspective



FFaIR Setup: HREF vs REFS

HREF Group	REFS Group
GFS	GFS
HRRR	HRRR
NAMnest	RRFSp1
ARW-HREF	RRFSm2-6
ARW HREF2	REFS
FV3-HREF	CAPS Det.
HREF	CAPS Ensemble
NSSL-MPAS	REFS Clusters
ISU HREF MLP	

FFaIR How We are Comparing HREF and REFS

Forecasting Activities

Participants split into 2 groups

- Will remain in the group all day, for forecasting activities.

ERO

- Day 1 collaborative and individual conus forecast.
- Risk Categories: Marginal (5%-15%), Slight (15%-25%), Enhanced (25%-40%), Moderate (40%-70%), and High (>70%)
- Intensity Contour

MRTP (Maximum Rainfall and Timing Product)

- Identify the forecast precip extremes for Day 1 and 2, MPD style: timing, magnitude, extent, confidence.

Verification Activities

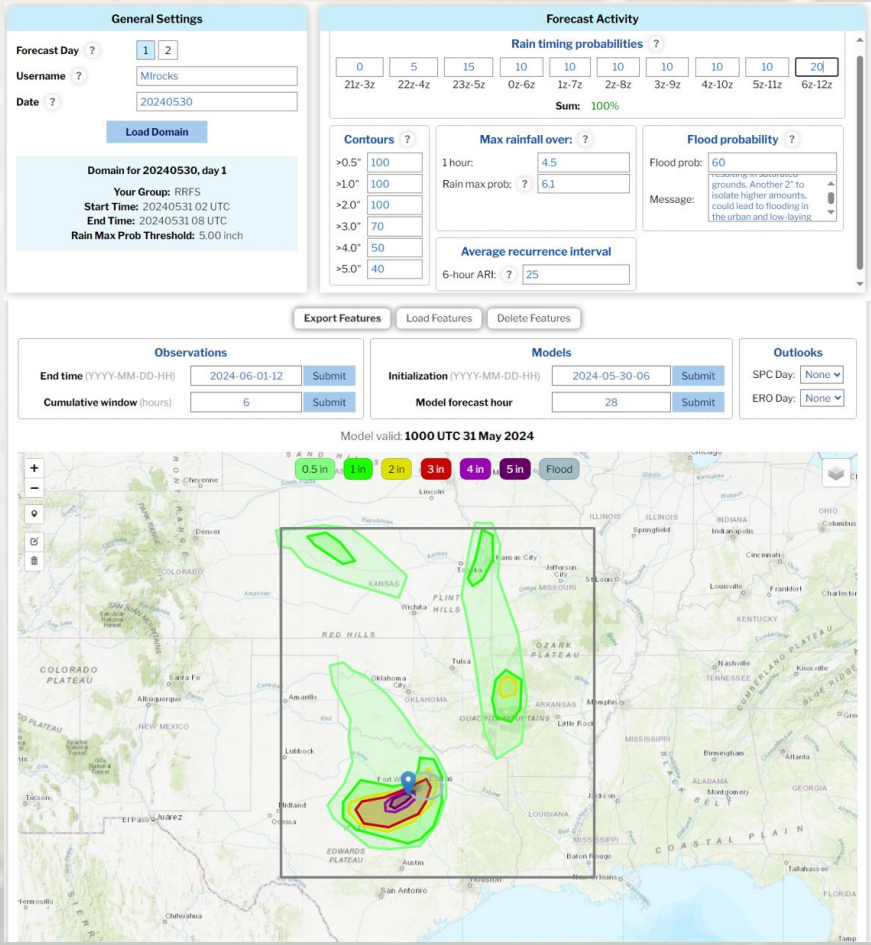
Deterministic Evaluation

- 6-h QPF verified against MRMS for the 4 valid cycles, valid across the 4, 6-h synoptic windows from 12-12 UTC or the core (HRRR, NAMnest, RRFSp1 and MPAS-NSSL) models.

Ensemble Evaluation

- Same 4 cycles/verification times. Evaluating the 1”/6h and 5”/6h neighborhood exceedance probabilities.

Evaluate individual and collaborative forecasts



Forecasting and Tools

ERO - valid Day 1

Morning activity, valid 16-12 UTC to mimic operational Day 1 ERO. This year the activity will include SCIENTIFIC Key Messages. It will also include a brief survey like the MRTP does to gather information about the forecasts within the Group they were assigned.

MRTP - 6h forecast

Can be valid within any 6-h window ending 03 UTC to 12 UCT. Attempt to identify the time and region the heaviest rainfall/greatest rainfall coverage will occur in the CONUS. New this year: forecasting the percent chance the 6-h acc. rain will exceed the 6 rainfall thresholds that can be drawn for.

Forecasting Websites

Use our realtime website to look at operational and experimental guidance and products and our interactive drawing tools to forecast.

Realtime Site -
https://www.wpc.ncep.noaa.gov/hmt/hmt_webpages/hmt_webpage.php

Sounding Viewer -
https://www.wpc.ncep.noaa.gov/hmt/hmt_webpages/soundingViewer/main.php?group=refs Change refs to href to view HREF Group membership

Dashboard (summary of amx hourly output of models) -
https://www.wpc.ncep.noaa.gov/hmt/hmt_webpages/drawingtools/dashboard_new.html

Drawing Websites

ERO Site -
https://www.wpc.ncep.noaa.gov/hmt/hmt_webpages/drawingtools/forecast.php?activity=ero&group=refs Change refs to href to view HREF Group membership

MRTP Site -
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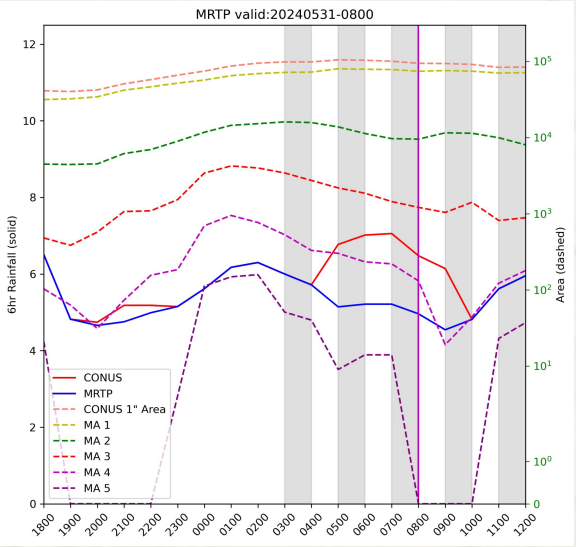
Questions/Comments?



CONTACT US!

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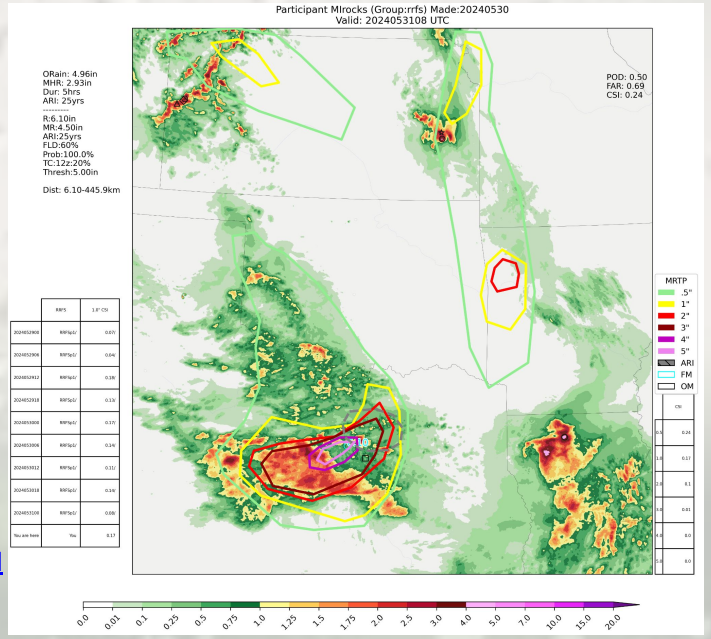

Find previous final reports at:
https://www.wpc.ncep.noaa.gov/hmt/experimentsummaries.shtml

MEG recording for 2023 FFaIR:
https://drive.google.com/file/d/1qBBtzYYk3sHWh2nsJWzhpxxHJEYPsQnL/view?usp=drive_link