



**NATIONAL
WEATHER
SERVICE**

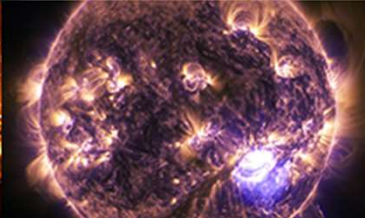
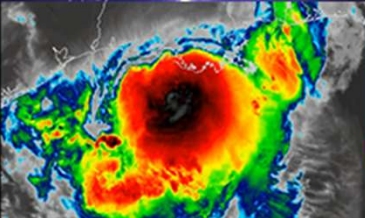
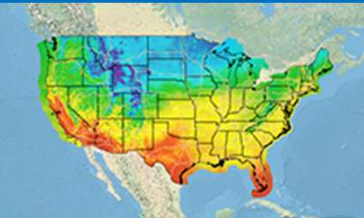
NOAA Regional Models Consolidation and Retirement Plan: Rapid Refresh Forecast System (RRFS)

July 18, 2023

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Acknowledgments: RRFS development team from NWS/EMC, OAR/GSL, and Community partners | NWS Communications





Outline



- Unification of NCEP Production Suite



- Transition to Operations Timeline



- RRFS Rollout Plan

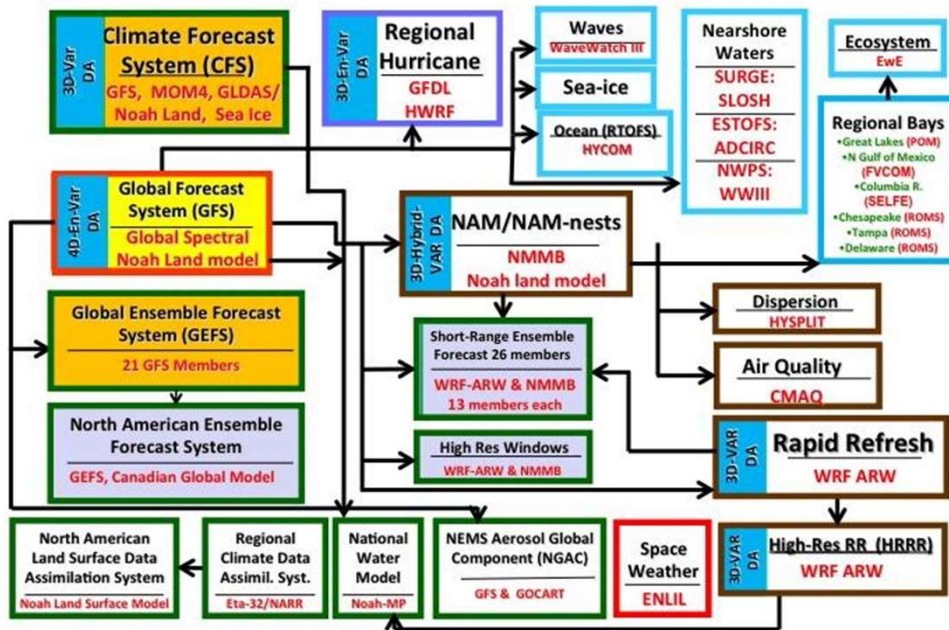


- Takeaways



Simplifying NCEP Production Suites

Production Suite ca. August 2016



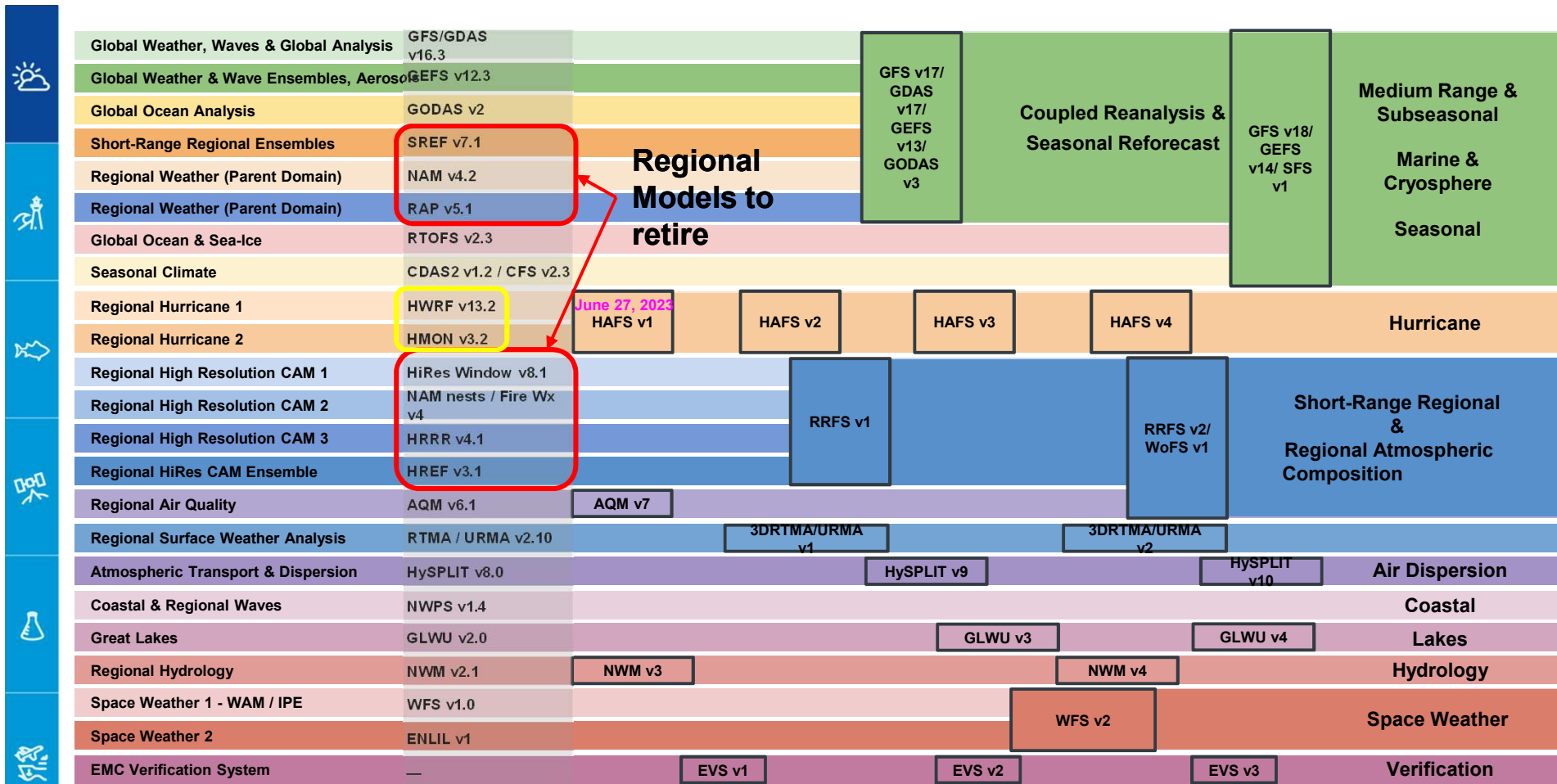
Courtesy Bill Lapenta

NCEP Modeling reviews by the UCAR Community Advisory Committee for NCEP (UCACN), 2015 - 2017: “Reduce the complexity of the NCEP Production Suite.”, “a unified, collaborative strategy for model development” and “better leverage the capabilities of the external community”

UCACN Reports (2015, 2016, 2017): <https://ufsccommunity.org/documents/repository/>

→ Unified Forecast System (UFS): community-based, fully-coupled, comprehensive Earth Modeling System



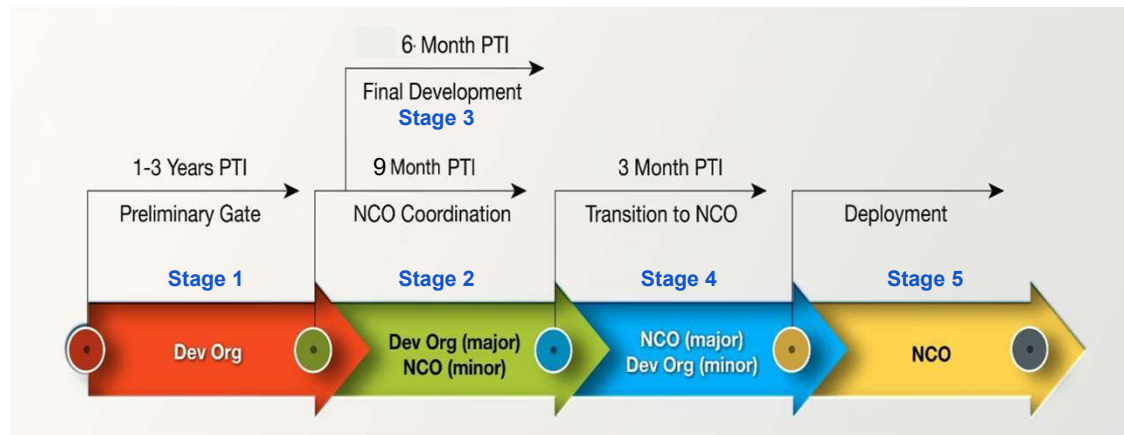


EMC Migration Plan to UFS-based Modeling Suites





T2O Timeline



* PTI: Prior To Implementation

* *Considerations: Computational cost, production timelines, data flows and archive*

< Adopted from EMC Implementation Plan FY23-27 >

- Stage 1: Identify candidates for new improvements
- Stage 2: Start coordinating implementation with NCO
- Stage 3: Finalize science change, formal evaluation by stakeholders
- Stage 4: Code hand-off to NCO, 30-day IT test by NCO

More details, watch a presentation given by Dr. Arun Chawla at the 2022 UIFCW Summer Workshop, Day 2 : <https://epic.noaa.gov/uifcw-summer-workshop-2022/>





Rollout Timeline

Rollout Team
in 5/2020

Date	Action	POC	Status
9/2022	RRFS Rollout Plan	Rollout Team	In progress
11/2022	Stakeholder List and Engagement Methods	Rollout Team	In progress
5/2023	Communication Rollout Plan	Rollout Team	In progress
5/2023	RRFS Product List	EMC	Completed
7/2023	Code Retirement Public Site	OSTI	8/2023
TBD	Public Information Statement (PNS)	EMC	90 days before 30 day IT test
TBD	Service Change Notice (SCN)	EMC	30 - 75 days prior to implementation
TBD	News release (https://www.weather.gov/news/)	NWS Comms	Not started yet
TBD	RRFS Implementation	EMC	TBD



Sample Stakeholder List and Engagement

Stakeholder	Influence	Interest	HRRR	HREF	NAM	NAMNests	NARRE	SREF	RAP	Communication Vehicle	Frequency
SPC			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Workshops	Monthly
AWC			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Workshops	Quarterly
AFS (for WFOs)			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
AWIPS/SBN			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Meetings	Quarterly
DTC			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Combination	Quarterly
FAA			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Combination	Quarterly
FEMA			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Email	Annually
University Partners			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Combination	Quarterly
Private Companies			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vlab/PNS	Quarterly
UFS Comms WG			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Meetings	Biweekly
Central Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
Eastern Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
Southern Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
Western Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
Alaska Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
Pacific Region			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Workshops	Annually
NSSL			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Combination	Quarterly
OSTI			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Combination	Monthly

Considerations for communication methods and frequency:

- Impact of the transition on their operations or research
- Lead time needed



Products

RRFS will provide functionally equivalent products currently on NOMADS and the SBN (NOAAport/AWIPS)

- e.g., covering the following systems HRRR, NAM nests, HREF and HiResW members

- **SBN (AWIPS):**

- Deterministic

- CONUS: 227 deterministic variables on 2 unique grids.
 - Alaska: 231 deterministic variables on 3 unique grids.
 - Hawaii, Puerto Rico, Guam: 110 deterministic variables.

- Probabilistic HREF output

- CONUS: 193 probabilistic variables.
 - Alaska, Hawaii, Puerto Rico: 190 probabilistic variables.

- **NOMADS:**

- Deterministic

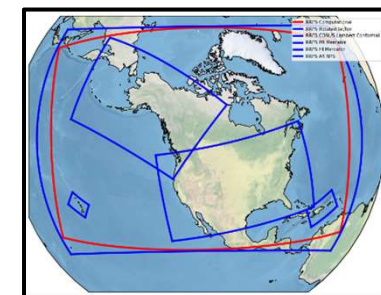
- CONUS: 4000+ deterministic variables on 4 unique grids.
 - Alaska: 2800+ deterministic variables on 3 unique grids.
 - Hawaii: 1300+ deterministic variables on 2 unique grids.
 - Puerto Rico: 1300 deterministic variables on 4 unique grids.
 - Guam: 390 deterministic variables on 2 unique grids.

- Probabilistic HREF output

- CONUS: 305 probabilistic variables.
 - Alaska, Hawaii, Puerto Rico: 294 probabilistic variables

Table depicting planned output grids for distribution from RRFS.

Region	Projection	Approx. Grid-spacing	Corresponding existing grid (if applicable)	Notes
North America [coarse-res]	Rotated Lat-Lon	13 km	-	
North America [hi-res]	Rotated Lat-Lon	3 km	-	
CONUS	Lambert Conformal	3 km	HRRR CONUS	
CONUS [legacy]	Lambert Conformal	13 km	Office Note 388 Table B Grid 130	Legacy grid with select aviation products for FAA Weather Aviation and Radar system (WAR targeted to be retired in 2027) - not for NOMADS distribution (and not pictured below).
Alaska	Polar Stereographic	3 km	NAM AK nest	
Hawaii	Mercator	2.5 km	NAM HI nest	
Puerto Rico	Mercator	2.5 km	NAM PR nest	



[Courtesy of Andrew Benjamin (EMC)]





Public Information Statements (PNS) /Service Change Notices (SCN)

- NOAA/NWS will provide interested persons and entities adequate notice and opportunity for input into decisions regarding significant changes to products and services: <https://www.weather.gov/notification/>
 - Proposals for new, enhanced, changed, or terminated products and services
 - Comments from affected parties and the public

Example: [Feedback form](#) or [contact info](#)

If you have comments regarding these changes please contact:

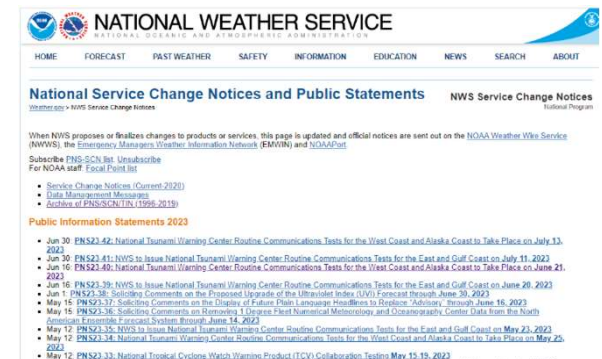
<Point of Contact Name>

Email: <email address>

Or

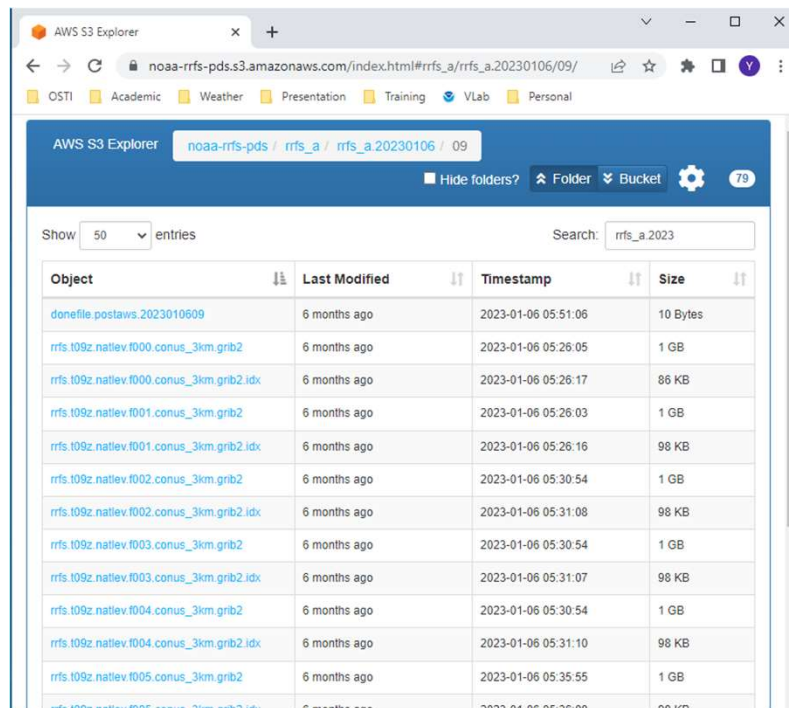
Please submit comments and feedback via the following survey:

<[Survey link](#)>



Pre-operational Real-time and Retrospective Simulations

- Prototype RRFS output is available on NODD:
<https://registry.opendata.aws/noaa-rrfs/>
- RRFSv1 retrospective and real-time parallel data will be made available to both internal and external users
- Official evaluation will be presented at EMC MEG meeting:
<https://www.emc.ncep.noaa.gov/users/meg/home/>



The screenshot shows the AWS S3 Explorer interface for the bucket 'noaa-rrfs-pds / rrf_a / rrf_a.20230106 / 09'. The table displays the following data:

Object	Last Modified	Timestamp	Size
donefile postaws.2023010609	6 months ago	2023-01-06 05:51:06	10 Bytes
rrfs.t09z.natlev.f000.conus_3km.grib2	6 months ago	2023-01-06 05:26:05	1 GB
rrfs.t09z.natlev.f000.conus_3km.grib2.idx	6 months ago	2023-01-06 05:26:17	86 KB
rrfs.t09z.natlev.f001.conus_3km.grib2	6 months ago	2023-01-06 05:26:03	1 GB
rrfs.t09z.natlev.f001.conus_3km.grib2.idx	6 months ago	2023-01-06 05:26:16	98 KB
rrfs.t09z.natlev.f002.conus_3km.grib2	6 months ago	2023-01-06 05:30:54	1 GB
rrfs.t09z.natlev.f002.conus_3km.grib2.idx	6 months ago	2023-01-06 05:31:08	98 KB
rrfs.t09z.natlev.f003.conus_3km.grib2	6 months ago	2023-01-06 05:30:54	1 GB
rrfs.t09z.natlev.f003.conus_3km.grib2.idx	6 months ago	2023-01-06 05:31:07	98 KB
rrfs.t09z.natlev.f004.conus_3km.grib2	6 months ago	2023-01-06 05:30:54	1 GB
rrfs.t09z.natlev.f004.conus_3km.grib2.idx	6 months ago	2023-01-06 05:31:10	98 KB
rrfs.t09z.natlev.f005.conus_3km.grib2	6 months ago	2023-01-06 05:35:55	1 GB
rrfs.t09z.natlev.f005.conus_3km.grib2.idx	6 months ago	2023-01-06 05:36:08	98 KB





Takeaways

- Various communication channels will be set up with stakeholders
- Stay tuned for PNS/SCN
- If you have any questions, you may reach out to youngsun.jung@noaa.gov

