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PNSWSH

Service Change Notice 26-48 Updated
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From: David Michaud, Director
 NWS Central Operations

Subject: Updated: Implementation of the Rapid Refresh Forecast System (RRFS) and RRFS Ensemble Forecast System (REFS): Effective November 3, 2026

Updated to reflect the new effective date of November 3, and added information on WMO headers for SBN/NOAAPort dissemination.

The RRFS and REFS will replace NAM, HREF, SREF, and HiresW. A full list of products being retired is available in [SCN26-47](#). The RRFS and REFS production implementation and the retirement of the legacy models will occur on the same day. In the event that the implementation date is declared a Critical Weather Day (CWD), an Enhanced Caution Event, or other significant weather is occurring or is anticipated to occur, implementation of this change will take place at 1200 UTC on the next weekday not declared a CWD and when no significant weather is occurring.

A real-time parallel feed of RRFS and REFS has been available since August 12, 2026, on NOMADS for both NCEP Web services and NOAAPORT output here:

Pre-implementation data location starting August 12, 2026:
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/rrfs/para/> /
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/refs/para/>
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/para/noaaport/rrfs/>
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/para/noaaport/refs/>

Post-implementation data location November 3, 2026:
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/rrfs/prod/>
<https://nomads.ncep.noaa.gov/pub/data/nccf/com/refs/prod/>

The development of the RRFS and REFS was a coordinated effort between the Office of Modeling and Development and NOAA's Office of Oceanic and Atmospheric Research (OAR), specifically the Global Systems Laboratory, and a wide-ranging network of partners. This collaboration included

other NWS entities, academic institutions, other federal agencies, and international partners.

1) RRFS modeling system

This transition to RRFS will provide an hourly updated modeling system covering the North America region at 3 km horizontal grid spacing, which, combined with the associated model retirements, will greatly unify and simplify the "convective scale" (approximately 3 km grid spacing) suite of regional models within the NWS operational modeling suite.

As a deterministic system running to 84 h for the 00/06/12/18 UTC cycles, and to 18 h for other hourly cycles, the RRFS will fully retire the North American Mesoscale (NAM), and retire the High-Resolution Window (HiresW) aside from the Guam domain which will remain. As an ensemble forecast system running to 60 h for the 00/06/12/18 UTC cycles, the RRFS Ensemble Forecast System (REFS) will fully retire the High-Resolution Ensemble Forecast (HREF) system.

a) Deterministic forecast details

The deterministic RRFS runs over a full North America (NA) domain at 3 km grid spacing, and provides subset grid output at 3 km grid spacing for the contiguous United States (CONUS) and Alaska (AK), and at 2.5 km grid spacing for Hawaii (HI) and Puerto Rico (PR). It also provides North America output at 13 km grid spacing. The RRFS also provides output from a separate relocatable 1.5 km RRFS fire weather run, with output provided over a 5 x 5-degree rotated latitude longitude region.

Deterministic RRFS output is organized as follows:

Under rrfs/v1.0

```
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.3km.fFFF.{conus|ak}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.2p5km.fFFF.{hi|pr}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.13km.fFFF.na.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.3km.fFFF.{conus|ak}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.2p5km.fFFF.{hi|pr}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.3km.subh.fFFF.{conus|ak}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.2p5km.subh.fFFF.{hi|pr}.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.13km.fFFF.na.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld_awipsubset.3km.fFFF.na.{grib2,grib2.idx}
firewx.YYYYMMDD/CC/rrfs.tCCz.prslev.1p5km.fFFF.firewx_lcc.{grib2,grib2.idx}
firewx.YYYYMMDD/CC/rrfs.tCCz.2dflld.1p5km.fFFF.firewx_lcc.{grib2,grib2.idx}
rrfs.YYYYMMDD/CC/bufrsnd.tCCz/bufr.*.YYYYMMDDCC
rrfs.YYYYMMDD/CC/rrfs.tCCz.class1.bufr
```

A full description of RRFS products including variables and encoding is available at:

<https://www.nco.ncep.noaa.gov/pmb/products/rrfs/>

b) Ensemble forecast details

The RRFS produces five ensemble forecast members running to 60 h for the 00/06/12/18 UTC cycles, over the same NA region as the deterministic RRFS. These members utilize different initial conditions, lateral boundary conditions, and model physics relative to the deterministic forecast to better cover the range of forecast possibilities.

Ensemble RRFS output is organized as follows:

Under rrfs/v1.0

```
rrfsens.YYYYMMDD/CC/m00#/rrfs.tCCz.m00#.prslevnomads.3km.fFFF.{conus|ak}.  
{grib2,grib2.idx}  
rrfsens.YYYYMMDD/CC/m00#/rrfs.tCCz.m00#.2dfldnomads.3km.fFFF.{conus|ak}.  
{grib2,grib2.idx}  
rrfsens.YYYYMMDD/CC/m00#/rrfs.tCCz.m00#.prslevnomads.2p5km.fFFF.{hi|pr}.  
{grib2,grib2.idx}  
rrfsens.YYYYMMDD/CC/m00#/rrfs.tCCz.m00#.2dfldnomads.2p5km.fFFF.{hi|pr}.  
{grib2,grib2.idx}
```

2) REFS modeling system

The REFS is an ensemble product generation system that combines the forecast output from the current and 6 h old cycles of RRFS deterministic (section 1a) and ensemble (section 1b) systems to generate ensemble products. For the Alaska and CONUS REFS domains, the HRRR provides two additional members (from current and 6 h old cycles).

The REFS is a replacement for the High-Resolution Ensemble Forecast (HREF) system, and shares similarities with the HREF in terms of product types. REFS does differ from HREF in terms of membership, and produces products to 60 h, while HREF generates products to 48 h. Also, REFS generates products for all domains (CONUS, AK, HI, PR) for the 00/06/12/18 UTC cycles, while HREF generates products twice daily for non-CONUS domains (AK and PR domains at 06Z/18Z, and HI at 00Z/12Z).

REFS ensemble product output is organized as follows under refs/v1.0:

```
refs.YYYYMMDD/CC/ensprod/refs.tCCz.${type}.fff.${dom}.{grib2,grib2.idx}
```

where dom is the domain (conus, ak, hi, pr)

and where type is the product type listed and described below

mean: simple ensemble mean
 sprd: ensemble spread
 pmmn: probability-matched mean
 lpmm: localized probability-matched mean
 avrg: a combination of the pmmn and mean fields
 prob: probabilistic output
 eas: ensemble agreement scale probabilistic output

refs.YYYYMMDD/CC/ensprod/refs.tCCz.ffri.fFF.conus.{grib2,grib2.idx}

ffri: flash flood and recurrence interval exceedance probabilities (conus only)

Detailed information about the file contents including variables and encoding is available at:

<https://www.nco.ncep.noaa.gov/pmb/products/refs/>

3) Changes to SBN/NOAAPORT Dissemination

While the RRFS and REFS run hourly and produce output for each cycle available on NOMADS, only a subset will be disseminated across the Satellite Broadcast Network (SBN) and NOAAPORT due to bandwidth limitations.

Below are the domains available for either the RRFS or REFS, the grid spacing, and WMO headers:

Geographic Region	Grid Spacing	WMO Headers
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AK (REFS)	3 km	A*[A-Q]*## KWDB
CONUS (REFS)	3 km	Y*[A-Q]*## KWDB
HI (REFS)	2.5 km	H*[A-Q]*## KWDB
PR (REFS)	2.5 km	P*[A-Q]*## KWDB
NA (RRFS)	3 km	Y*A*## KWDA
NA (RRFS)	13 km	Y*H*## KWDA

A detailed listing of RRFS and REFS WMO headers (by domain) to be added over the SBN/NOAAPORT can be found at:

<https://www.nco.ncep.noaa.gov/pmb/products/noaaport/>

NCEP urges all users to ensure their decoders can handle changes in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, and volume changes. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes before implementation.

Questions can be directed to:

The Office of Modeling and Development
 RRFS Feedback
rrfs.feedback@noaa.gov

For questions about dataflow aspects of these implementations,
please contact:

Margaret Curtis
NWS Central Operations HPC Dataflow Team Lead
ncep.pmb.dataflow@noaa.gov

National Service Change Notices are online at:

www.weather.gov/notification/

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