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PNSWSH

Service Change Notice 26-48  
National Weather Service Headquarters Silver Spring MD  
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To:           Subscribers:  
              -NOAA Weather Wire Service  
              -Emergency Managers Weather Information Network  
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              Other NWS Partners, Users and Employees

From:        David Michaud, Director  
              NCEP Central Operations

Subject: Implementation of the Rapid Refresh Forecast System (RRFS) and  
RRFS Ensemble Forecast System (REFS): Effective August 31, 2026

Effective on August 31, 2026, beginning with the 1200 Coordinated  
Universal Time (UTC) run, the National Centers for Environmental  
Prediction (NCEP) will implement two new modeling systems, the Rapid  
Refresh Forecast System (RRFS) and RRFS Ensemble Forecast System (REFS).

The RRFS and REFS will replace NAM, HREF, SREF, and HiresW. A full list  
of products being retired is available in [SCN 26-47](#). 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 feed of RRFS and REFS will be available on or about June 9,  
2026, on NOMADS for both NCEP Web services and NOAAPORT output here:

Pre-implementation data location starting on or about June 9, 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 August 31, 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  
Environmental Modeling Center 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). 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 rrfsv1.0

```
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.3km.fFFF.{conus|ak}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.2p5km.fFFF.{hi|pr}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.3km.fFFF.{conus|ak}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.2p5km.fFFF.{hi|pr}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.3km.subh.fFFF.{conus|ak}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dflld.2p5km.subh.fFFF.{hi|pr}.grib2
firewx.YYYYMMDD/CC/rrfs.tCCz.prslev.1p5km.fFFF.firewx_lcc.grib2
firewx.YYYYMMDD/CC/rrfs.tCCz.2dflld.1p5km.fFFF.firewx_lcc.grib2
```

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.

## 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
```

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
```

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>

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.

For questions regarding the implementation of RRFS and REFS, a public webinar will be hosted on June 25th. To sign up please use the following form:

<https://forms.gle/UgfQevsN716reNX67>

Additional questions not answered in the webinar can be directed to:

The Environmental Modeling Center  
RRFS Feedback

[rrfs.feedback@noaa.gov](mailto:rrfs.feedback@noaa.gov)

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

Margaret Curtis

NCEP Central Operations HPC Dataflow Team Lead

[ncep.pmb.dataflow@noaa.gov](mailto:ncep.pmb.dataflow@noaa.gov)

National Service Change Notices are online at:

[www.weather.gov/notification/](http://www.weather.gov/notification/)

NNNN