NOUS41 KWBC 061825 AAB
PNSWSH

Service Change Notice 26-48 Updated
National Weather Service Headquarters Silver Spring MD
1225 PM EDT Mon July 6 2026

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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 October 6, 2026

Updated to reflect a change to the parallel data feed; now available August 11, 2026, with production implementation October 6, 2026

Effective October 6, 2026, 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 parallel feed of RRFS and REFS will be available on or about August 11, 2026, on NOMADS for both NCEP Web services and NOAAPORT output here:

Pre-implementation data location starting August 11, 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 October 6, 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
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.2p5km.fFFF.{hi|pr}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.prslev.13km.fFFF.na.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dfld.3km.fFFF.{conus|ak}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dfld.2p5km.fFFF.{hi|pr}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dfld.3km.subh.fFFF.{conus|ak}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dfld.2p5km.subh.fFFF.{hi|pr}.grib2
rrfs.YYYYMMDD/CC/rrfs.tCCz.2dfld.13km.fFFF.na.grib2
firewx.YYYYMMDD/CC/rrfs.tCCz.prslev.1p5km.fFFF.firewx_lcc.grib2
firewx.YYYYMMDD/CC/rrfs.tCCz.2dfld.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.

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
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ncep.pmb.dataflow@noaa.gov

National Service Change Notices are online at:

www.weather.gov/notification/

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