

NWS NODD AWS Office Hours

March 15, 2023

TO: NWS NODD AWS Office Hours Participants

DATE: 28 March 2023

FROM: Cindy Elsenheimer (NOAA National Weather Service Office of Organizational Excellence)
Adrienne Simonson, Jenny Dissen & Kate Szura (NOAA Open Data Dissemination Engagement and Communication)

SUBJECT: Responses to Questions from Office Hours



Dear Colleagues,

Thank you again for your tremendous contribution during the pilot NWS NODD AWS Office Hours. Your comments, use cases and questions raised during the discussion were noted by NOAA, and where possible, we've provided responses where the information is known and available.

HRRR-to-RRFS product updates will be shared and made available via NWS subscription and via NODD as this data is made available via the cloud today, and will be in the future.

This document provides brief responses to questions that were identified during the registration and that were raised during the discussion. Names and attributions between the individuals, their affiliation and comments have been removed, unless it is a NOAA speaker.

We recognize the importance of continued engagement and collaboration, and invite ongoing comments via our emails. For your reference, this summary will be posted on the [NWS Weather Ready Nation Calendar website](#).

Thank you,
Cindy, Jenny, Kate

CC: Adrienne Simonson (NODD Director), Andrea Bleistein (NWS OOE Deputy Director), Stephanie Herring (Special Advisor, Office of the Assistant Secretary of Commerce for Environmental Observation and Prediction, NOAA NCEI)

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1. General Agenda of the Webinar

OUTLINE FOR THE DISCUSSION

- 12:03 - 12:08 Brief Introductions by NODD, NWS and AWS
- 12:08 - 12:15 Overview of HRRR Product Plans
- 12:15 - 12:30 Invited Comments by Users of HRRR via the Cloud
- 12:30 - 12:50 Open Discussion (Please use "Raise Hand" or the chat to raise questions)
- 12:50 - 12:55 Summary Comments/Closing Remarks/Next Steps
- 12:55 End

2. Questions and Responses

The questions below were identified as part of the registration process and during the Office Hours discussion. Responses are provided in brief where the NOAA team felt information was available.

QUESTIONS RAISED FROM REGISTRATION FORM

| QUESTION FROM REGISTRATION | RESPONSE |
|--|---|
| What is the plan/process on validation of the HRRR product using rain gauges. | <p>Formal real-time HRRR precipitation verification work is underway, but it will use the Climate-Calibrated Precipitation Analysis (which uses gauge data as one of the inputs) as the validation source.</p> <p>EMC is in the process of building an EMC verification system. Verification has been scattered across websites and with different graphics across websites. Currently working on a one stop shop for all on one website: https://www.emc.ncep.noaa.gov/users/verification/</p> <p>Held a community workshop years ago to get input on variables needed. That feedback will guide variables. At the workshop, CCPA was overwhelmingly highlighted as the preferred validation product.</p> <p>Will also include radar derived, it's a calibrated gauged and radar estimates which provide an overall national precipitation analysis.</p> |
| Will NOAA be generating HRRR in Zarr format? | <p>NOAA is always interested in understanding formats of interest to both the on-prem and cloud-based users.</p> <p>It's always a challenge when a specific format is requested because not everyone uses that format.</p> |

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| | <p>NODD as a program does not generate or convert NOAA data into cloud optimized formats.</p> <p>However we are working with NOAA and community partners, and in collaboration with AWS Open Data and ASDI to offer optimized data formats such as Zarr.</p> <p>We encourage engagement with our other partners like ESIP and Pangeo for further discussions on this.</p> |
| <p>We use HRRR for operational streamflow/river forecasting in HydroForecast (https://www.upstream.tech/hydroforecast). I'm curious to learn how operational these cloud access options are considered and would like to put our name into the list of folks who love ZARR formatted data.</p> | <p>HRRR data is pulled from the NWS FTPPRD and NOMADS systems by the NODD Data Broker.</p> <p>Any outage that impacts the availability of both of those systems will impact the latency and timeliness of new data availability.</p> <p>Existing data on AWS is supported by the AWS availability (99.99%) and durability (99.999999999%).</p> <p>The NC State University Data Broker utilizes 24x7 monitoring and alerting, and 8x5 technical support. We are working on plans for a direct push to AWS, which would have 24x7 support.</p> <p>NODD is hopeful that RRFs will utilize a direct push from the operational NOAA system and as such has an end to end 24x7 support.</p> |
| <p>What is the plan for putting more forecasting products (NAM) on AWS-S3 & Google GCS?</p> | <p>Yes! NAM is available <code>s3://noaa-nam-pds.arn:aws:sns:us-east-1:123901341784:NewNCEPNAMObject</code></p> <p>If you navigate to the AWS RODA page, type in North American and scroll down.</p> <p>NWS states that NAM is also slated for retirement soon.</p> <p>NODD is always interested in feedback about which datasets are in demand! Please email: NODD@noaa.gov</p> |
| <p>I'd be curious to know if any live interfaces have been built to help users assess how well the dataset's forecast performs.</p> | <p>Verification metrics have previously been used mostly to assess how a new version of the HRRR performs relative to the current version. NOAA's Environmental Modeling Center is working on construction of the <u>EMC Verification System (EVS)</u>, which will provide real-time statistics for all operational modeling systems, including</p> |

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| | the HRRR. |
| We are interested in operational-level support | The NC State University Data Broker utilizes 24x7 monitoring and alerting, and 8x5 technical support. We are working on plans for a direct push to AWS, which would have 24x7 support. |
| Interested in community of practice | Please refer to the references attached. |
| Interest in getting data with automatic processes. | SNS notifications are available for any NODD hosted data on AWS. See the Marketplace or Registry of Open Data for more information. arn:aws:sns:us-east-1:123901341784:NewHRRRObject |
| What are the upcoming plans for HRRR? | The HRRR is scheduled for retirement in (tentatively) late 2024. It (and other high-resolution models like the NAM Nest and Hi-Res Windows) will be subsumed by the Rapid Refresh Forecast System (RRFS). |

QUESTIONS / DISCUSSION FROM THE OFFICE HOURS

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| University of Utah HRRR Download page | https://home.chpc.utah.edu/~u0553130/Brian_Blaylock/cgi-bin/hrrr_download.cgi |
| Would variables remain the same in RRFS? | Yes, the goal is to have parameters match as much as possible. HRRR is an ARW model core - there may be some parameters that are specific to ARW but there is a goal to have a 1:1 product match. |
| How can users help in the transition of HRRR to RRFS? | There will be a formal evaluation period as there is with every model implementation. Every user is encouraged to participate. As well, NWS and NODD invites users to reach the teams via the reference emails provided below. Engagement leads in both organizations appreciate when users connect with NOAA. |
| Any plans to add other products like MRMS to AWS? | Multi-Radar Multi-Sensor (MRMS) is currently available via AWS . We are in the process of backfilling MRMS to Fall 2020 and the RODA page is live: https://registry.opendata.aws/noaa-mrms-pds/ which provides information on access via AWS. |

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| Historicals are very important to have for validation. Will there be any historicals released of “this is what we would have forecasted”? | <p>Retrospective testing will be a part of the evidence gathering to justify the decision.</p> <p>We'll certainly make statistics and case examples available. It's a challenge when talking about multiple months of retro data. To make even a fraction of that data available for public consumption, it's complex.</p> |
| What other NCEP products are supported on AWS? Are those products supported in an operational 24X7 fashion? Additional question on where NODD is headed in terms of 24x7 support and managing its data portfolio as operational and mission-critical. | <p>Addressing other products first, models like GFS and CFS, RAP and HRRR are available on AWS. As far as 24x7, this topic came up at AMS as well.</p> <p>NODD Data Broker monitors product information 24x7 basis via software and they have a technical team that is available 8x5. Have been having conversations with NWS to have it supported 24x7.</p> |
| A user expressed that it would be helpful to maintain access to the historical data and asked if there is any ability to segment to sub-domains for access via NODD. | <p>The full RRFS grid will be much larger than either of the current HRRR grids, so users are understandably concerned about having to download and process much larger datasets. Fortunately, in addition to providing the full RRFS grids, the current smaller HRRR output grids (covering CONUS and Alaska) will continue to be provided.</p> |
| Zarr discussion & University of Utah | <p>We (U/Utah) could use help/input on use cases and strategies to archive RRFS in zarr format on AWS. We likely won't try to replicate all variables over the entire domain, etc. john.horel@utah.edu</p> |
| Who is the contact point for providing feedback to advocate for the implementation of 24x7 operational support for the AWS endpoint? | <p>For questions related to cloud access, emails can go to NODD@noaa.gov</p> <p>For questions regarding future HRRR updates, emails can be directed to: cindy.elsenheimer@noaa.gov</p> |
| Was the RRFS tested with the National Water Model for flood inundation forecast and mapping? | <p>RRFS is still very much in development so there is not much validation yet. The NWM is important for validation. So while it hasn't been done yet, the NWM will be tested with RRFS data and that output will be used to justify when the RRFS is ready to go.</p> |
| Is there any plan to version HRRR again? It sounds like probably not | <p>It's not desirable to go there effectively for years without a HRRR upgrade. There is no way to do the development on RRFS and develop HRRR at the same</p> |

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| | time. |
| Are there plans to convert HRRR to Zarr? | <p>Currently, there are no plans to convert HRRR To Zarr.</p> <p>We are interested in investigating this with the user community to understand if the best formats are needed or beneficial if there are efforts for data conversions.</p> <p>Data conversion and formats also involve engagement with data owners and PIs to discuss validation concerns/issues as the format changes.</p> <p>As NOAA HRRR goes from 21 to 8, we can investigate options for data conversions since there are fewer datasets to manage.</p> <p>NOAA research partners are interested in supporting users interested in Zarr and/or Kerchunk. Please email NODD@NOAA.GOV if you'd like to be involved in connecting on this further.</p> |
| Users expressed using kerchunk with great success for HRRR data | <p>CAMUS Energy referenced how they are converting to cloud formats, referencing work by Rich Cignell from USGS.</p> <p>Worked with 2d layers, 6hr FMRC style that are useful Camus referenced that they haven't been open source data but are open data code.</p> <p>CAMUS Energy offered to share additional information.</p> |
| AWS Posed Question on Formatting | <p>Comments from cloud partner perspective:</p> <p>If Zarr or kerchunk is a preference, or if users just want cloud optimized formats, it is helpful for users to share these preferences to NODD and with cloud partners.</p> <p>If a cloud provider were to provide cloud optimized format, and if it was blessed by NOAA – would the user consider that a NOAA product or be hesitant to use it?</p> <p>Please email to NODD@noaa.gov and also cindy.elsenheimer@noaa.gov with any feedback.</p> |

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3. Office Hours Organizing Team

| Name | Title |
|-------------------|--|
| Chris Stoner | AWS Open Environmental Data Lead |
| Cindy Eisenheimer | NWS Partner Engagement Lead |
| Geoffrey Manikin | NWS Verification and Validation Project and Model Evaluation Group Lead |
| Jessica Grisler | NWS M2 Contract Support |
| Adrienne Simonson | NODD Director |
| Jenny Dissen | NODD Engagement Lead / NC State University |
| Katelyn Szura | NODD Communications Lead |
| Patrick Keown | NODD Program Manager |
| Otis Brown | Director, North Carolina Institute for Climate Studies (NCICS) / NC State University |
| Jonathan Brannock | NODD Lead Cloud Software Engineer /NC State University |

4. Poll Results

| Poll 1 | | |
|------------------------------------|------------------------------|-------|
| Question | Answer | Count |
| How do you access HRRR data today? | On-prem via NOAA | 2 |
| | Cloud | 11 |
| | Both/Either | 7 |
| | 3rd party / web-based viewer | 4 |
| | Other | 3 |

| Poll 2 | | |
|---|--|-------|
| Question | Answer | Count |
| My primary goal for attending today is: | Understand technical use and access of HRRR data | 5 |

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| | To learn about the HRRR-to-RRFS transition | 9 |
| | To learn about cloud access to data (e.g. NODD Program) | 7 |
| | Meet and engage with NOAA staff scientists | 3 |
| | Learn about AWS access and tools | 1 |

5. Resources / References

- [NWS Office of Organizational Excellence | Cindy.Elsenheimer@NOAA.GOV](#)
- [NOAA Open Data Dissemination | NODD Email](#)
- <https://rapidrefresh.noaa.gov/hrrr/>
- <https://www.emc.ncep.noaa.gov/users/verification/>
- <https://noaa-mrms-pds.s3.amazonaws.com/index.html>
- [National Service Change Notices and Public Statements](#)