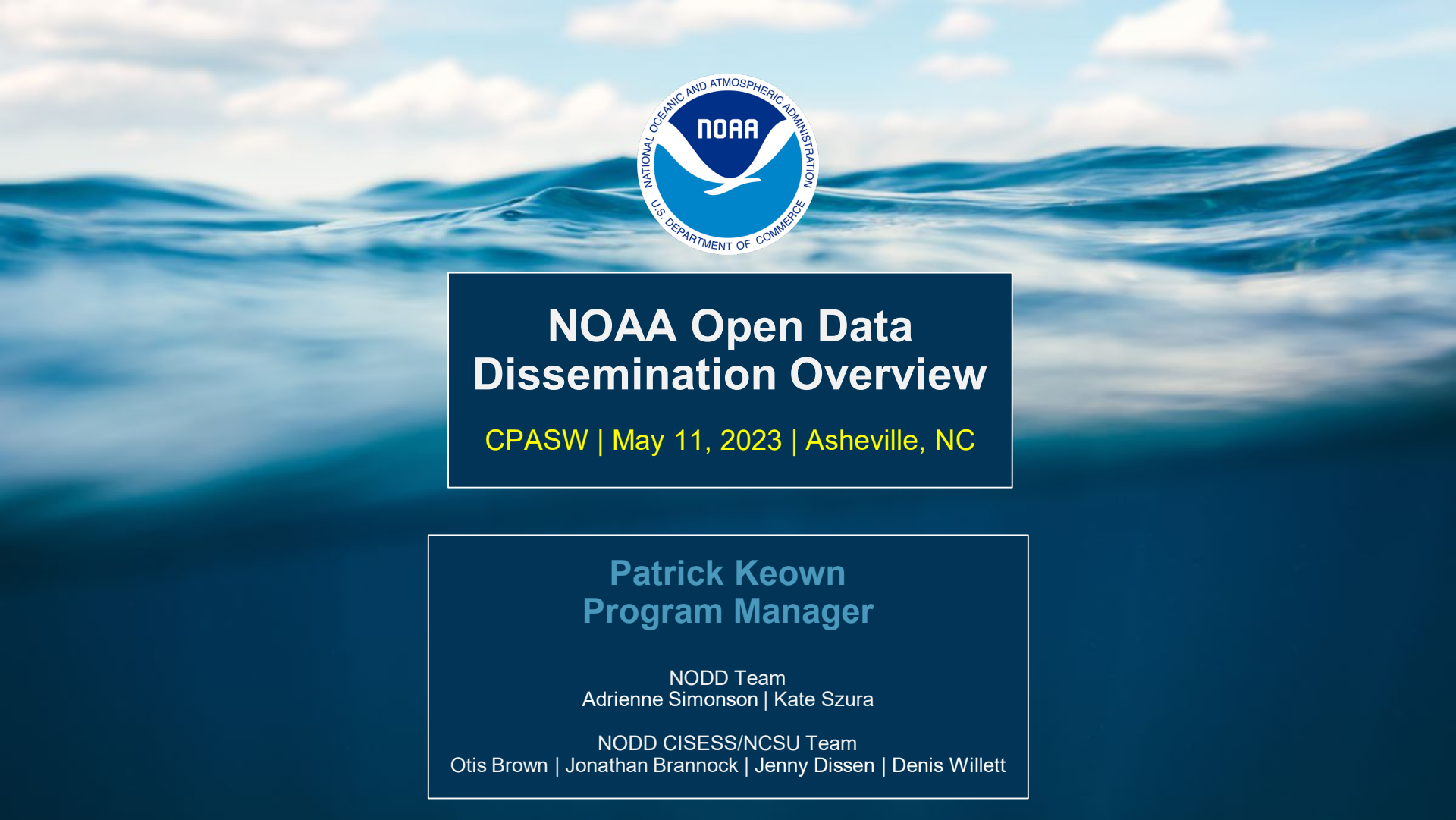

# NOAA Open Data Dissemination Overview

CPASW | May 11, 2023 | Asheville, NC


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NODD Team
Adrienne Simonson | Kate Szura

NODD CISESS/NCSU Team
Otis Brown | Jonathan Brannock | Jenny Dissen | Denis Willett

# BDP → NODD Evolution

**April 2015**
NOAA signs 3-year CRADA with AWS, Google, IBM, Microsoft and OCC

**Oct 2015**
NEXRAD as first NOAA dataset moved under the CRADA

**May 2018**
CRADA Extended

**October 2019**
BDP Initial Operational Capability

**FY 2022**
- FY22 Omnibus provides approval of NODD
- Included in FY22-FY26 NOAA Strategic Plan
- Big Data Analytics Chapter

**FY 2023**
- FY23 Omnibus supports NODD
- Metrics portal with email log in
- Customer Software Coordination
- NODD Service Delivery & Internal Engagement

**FY 2024**
LOs pushing data / NODD integrated :
- Metrics
- Cloud training
- User Engagement

# NODD Builds on Key CRADA Lessons

- ❑ Access on cloud platforms has resulted in increased usage of NOAA's data
- ❑ Integration of NOAA data into industry tools is most effective
- ❑ Key NOAA asset is expertise to understand and support the data
- ❑ The role of an intermediate "Data Broker" has emerged as a valuable function & possible Enterprise Service that could support NOAA in provision of data to the commercial cloud
- ❑ A defined commitment and level of service are needed by NOAA, the Collaborators, and Users

# NODD Disseminates NOAA Line Office Data

**Open & Free**

NOAA data is growing exponentially…

## TECHNOLOGY MODERNIZATION

Reduces stress on NOAA's on-premise dissemination systems

Improves services for Users

## FULL & OPEN PUBLIC ACCESS

Supports Federal Data Strategy & Evidence Act Open Data Requirements

No egress costs

## ENABLES & ENGAGES USERS

Catalyzes innovation in environmental services

Enables interoperability

- Open data with value to the public
- No use restrictions or user registration
- Appropriate metadata provided

# Via Public-Private Partnerships

- **NOAA Decision** – data goes into the NOAA Allocation on the CSP, minimum of 5 PBs per CSP
- **CSP or User Request -** data is not counted against the NOAA allocations
- **Based on an LO contract for storage or processing with one of the three CSPs -** data does not count against the NOAA allocation

- **Two year base contract** with four options of two years each. *Oct 1, 2022 start of year four of ten.*
- Very low cost contract with **no outyear costs**.
- Three Cloud Service Providers (CSPs) host NOAA data in the cloud - with **no cost for public egress or data download.**

*"Let's leverage the CSPs expertise, platforms and tools."*

**In order to avoid agency costs and risks associated with public access**

# Architecture

# NODD Accelerates Access to NOAA Open Data

Federal Security Boundary

Data transfer is one way

Data Broker

cisess
Cooperative Institute for Satellite Earth System Studies

NC STATE UNIVERSITY

Only trusted user inside security boundary

NODD Website

## Cloud Partners

Microsoft Azure

Google Cloud

aws

## Users

Research/ Academia

Business

Public

Value-Add Providers

# The NODD Data Broker Role and Activities

## Data Transfer

- Event driven data flows
- Cloud Ingest, Apache NiFi
- Key Products: GOES, JPSS, GFS, GEFS, HRRR, etc.
- Leverage Cloud Native Technologies

## Infrastructure Provisioning

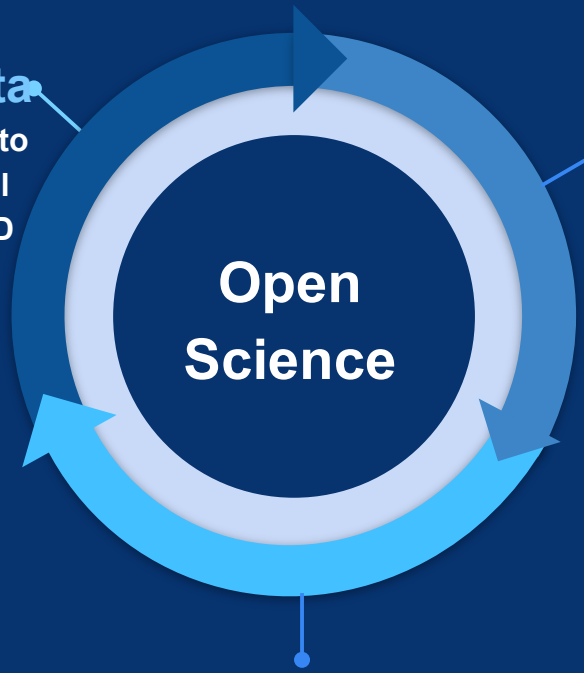
- Storage Buckets
- Transfer Clusters
- Credentials
- On-Prem and Multi-Cloud

## Monitoring

- Key Metrics
- Real Time Monitoring and Alerting of Data Flows
- Single-Pane of Glass
- Reporting

User Engagement

# NODD Accelerates Open Science & Interoperability




## Open Data

Open access to environmental data via NODD

## Open Reproducible Analysis

Open scientific process and reusable analytics pipelines

## Open Products

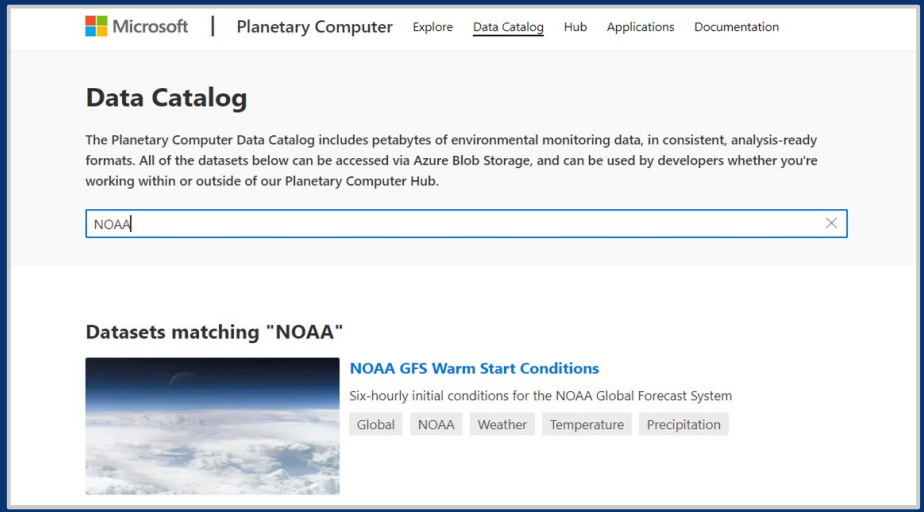
Open access to research products, results, and new data for reproducibility

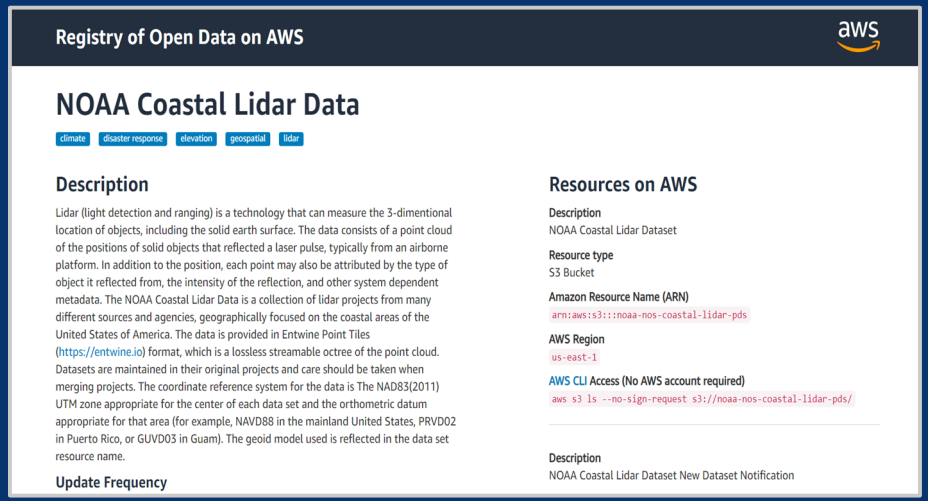
cisess
Cooperative Institute for Satellite Earth System Studies

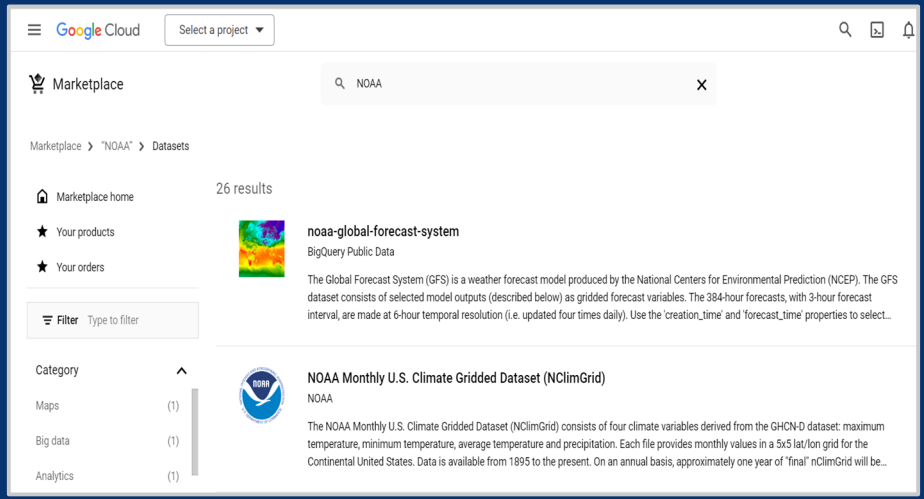
NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

# Public Datasets Programs

- The three cloud partners host NOAA data made available via NODD on each of their public datasets programs
  - Microsoft - Planetary Computer
  - AWS - Registry of Open Data
  - Google Cloud - Marketplace

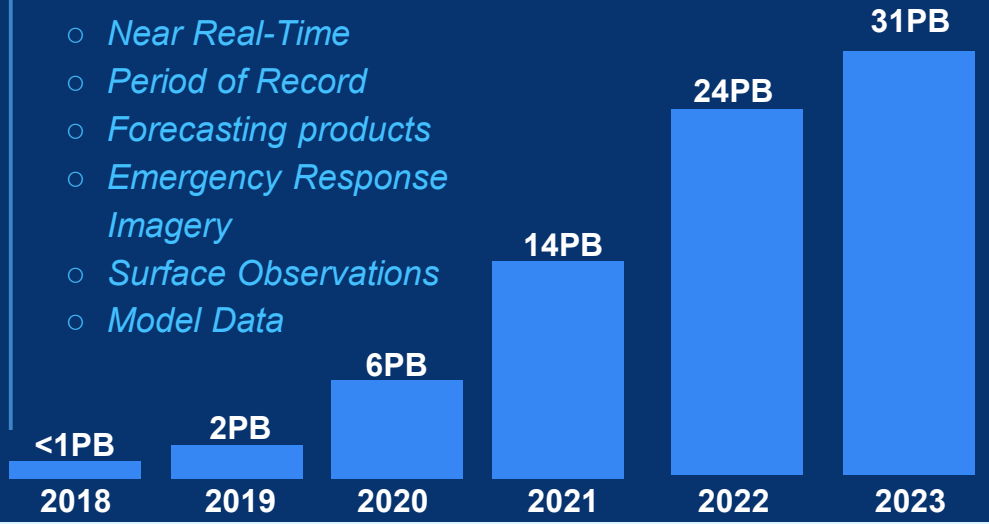


# NOAA Datasets Accessible via NODD

- *Atmospheric*
- *Oceanic*
- *Fisheries*
- *Weather*
- *Climate*
- *Near Real-Time*
- *Period of Record*
- *Forecasting products*
- *Emergency Response Imagery*
- *Surface Observations*
- *Model Data*




NOAA.GOV/NODD

# NWS Datasets on NODD

Microsoft Azure

Google Cloud

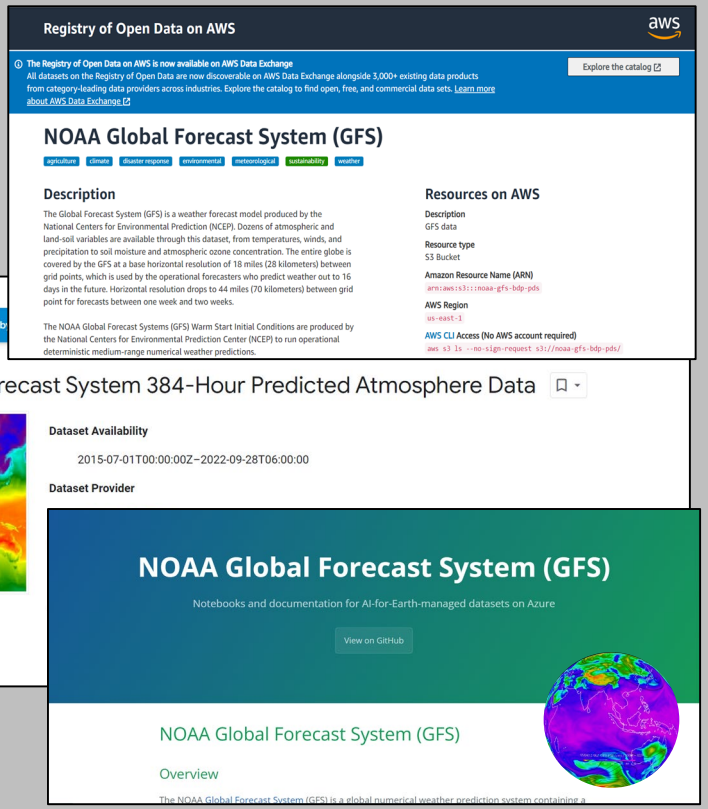
amazon web services

NOAA — National Oceanic and Atmospheric Administration, U.S. Department of Commerce

## NWS Data

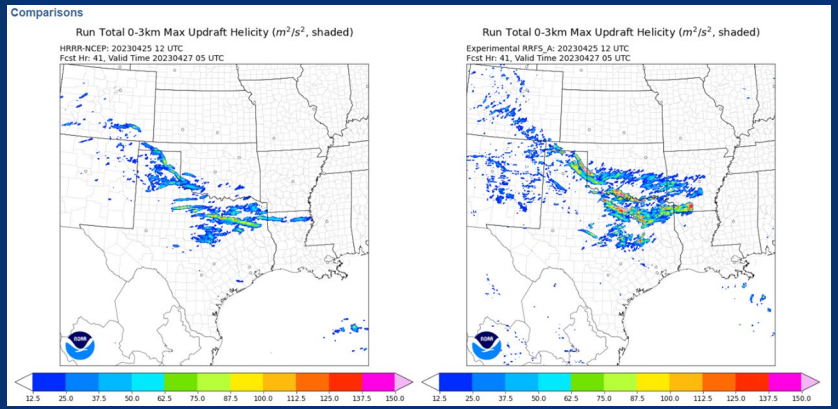
## NWS Datasets:

- Climate Forecast System (CFS)
- Global Forecast System (GFS)
- Global Ensemble Forecast System (GEFS)
- National Blend of Models (NBM)
- National Digital Forecast Database (NDFD) [Historical]
- National Digital Forecast Database (NDFD)
- National Water Model (NWM)
- Next Generation Weather Radar (NEXRAD)
- Space Weather Prediction Center (SWPC) Forecasts
- Yesterday's Storm Reports
- Multi-Radar/Multi-Sensor (MRMS)
- Global Real-Time Ocean Forecast System (Global RTOFS)
- Rapid Refresh Forecast System (RRFS) Ensemble (Prototype)



# *National Weather Service*

## *RRFS Research to Operations Delivery from WCOSS to the Public Cloud*




## AT A GLANCE

NOAA's National Weather Service (NWS) is currently developing a new data assimilation, and forecasting system to provide enhanced weather information to its customers.

## HOW NODD IS UTILIZED

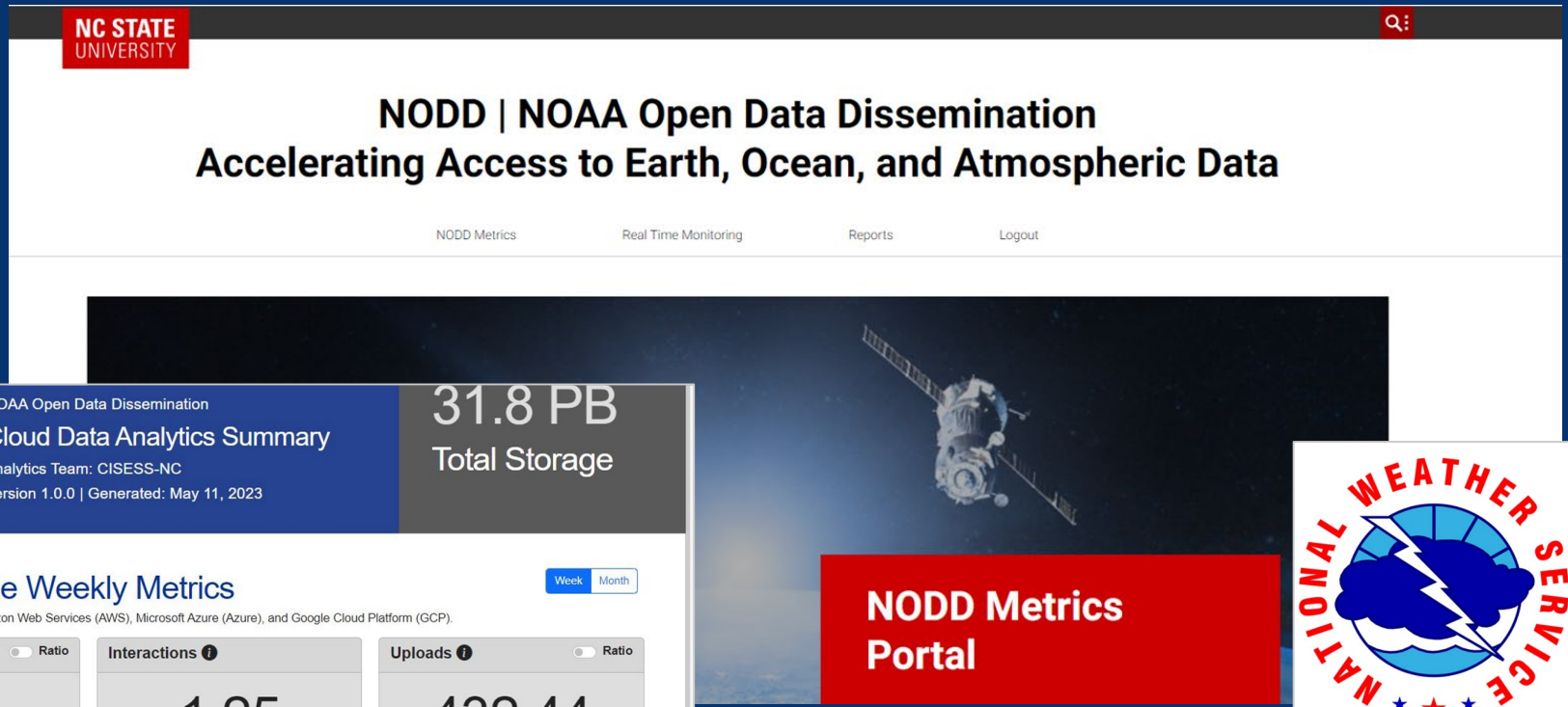
***Rapid Refresh Forecast System* data is provided to researchers, academia, and the public via NODD on AWS. Data is pushed from NOAA supercomputers directly out to the Cloud.**

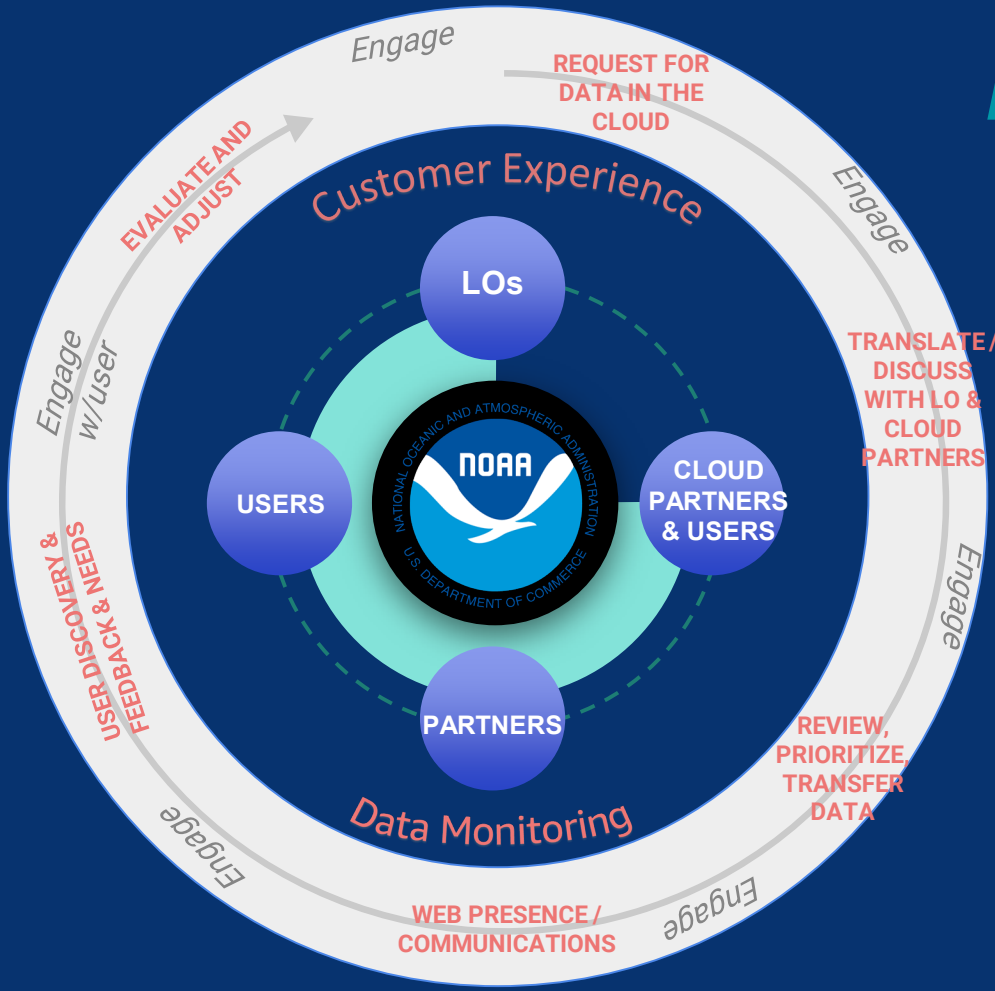
## IMPACT PROVIDED

It is critical to the development of this model to provide prototype data to researchers and academia. Cloud access to RRFS will allow for enhanced testing and development of the model.

# NODD Metrics Portal Now Available

[nodd.ncics.org](nodd.ncics.org)






# NOAA SERVICE DELIVERY & CX Functionality

- Users look to NOAA for a range of data, information, tools and services…via the CLOUD
- Need support to apply NOAA's data, information, and tools
- Others want answers, guidance, training, or a helping hand
- Access and discoverability continues to be a common theme
- Continuous user engagement via variety of modes provides insights on how data products and tools are, or are not, serving specific localities or sectors

*"Data have value when they are used in decision making. If not, then the economic value of such data is effectively zero."*

# NWS NODD AWS Office Hours on HRRR Update

- NODD co-hosted HRRR Office Hours with the NWS Office of Organizational Excellence and AWS on March 15th
- Roughly 40 attendees from public and private sectors, and academia
- Attendees answered a couple of initial engagement polls (provided right) to gauge attendee interests

- HRRR SME Geoff Manikin and the NODD team answered user questions
- Meeting summary can be referenced here

| 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 |
| | 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 |

# Cloud Data Analytics Faculty Fellows

- Expose faculty and students to NOAA data on NODD. Provide expertise, including connection to SMEs.
- Provide experiential cloud training to faculty and students via Microsoft access and tools.
- Allows faculty to incorporate cloud analytics as a strategy and NOAA data's broad commercial applicability as a resource in solving societal or economic problems in the classroom
- Serves as a pilot for other universities.
- 4 faculty selected with interdisciplinary backgrounds

# Let's Connect.

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*Jenny Dissen, Engagement & Partnerships, CISESS / NC State University*
*Denis Willett, Cloud Software Engineer, CISESS / NC State University*