Data Access for Jason-2 and Jason-3

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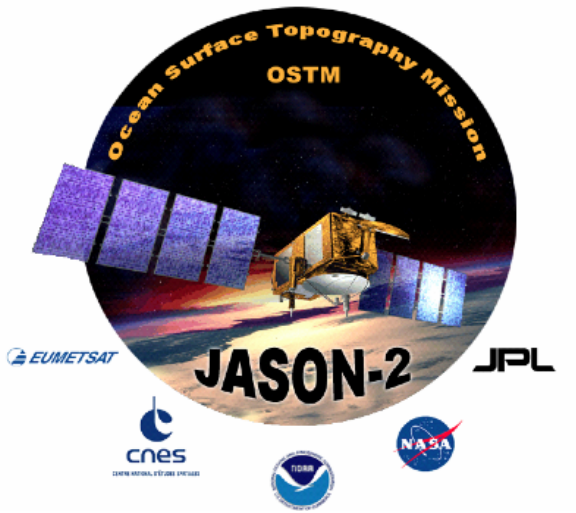


What is NODC?

- **NODC was founded in 1961 as part of the Naval Oceanographic Office**
- **One of three national environmental data centers operated by NOAA.**
- **NODC holds the world's largest collection of publicly available oceanographic data with approximately 100,000 individually archived data sets.**
- **A relative latecomer to satellite data.**
- **Mission to provide scientific stewardship of marine data and information – extremely broad - broader than the initial scope of the NASA DAACs**: *"As data and information management needs of science researchers have become more sophisticated, we have been able to take advantage of maturing information technologies to develop and implement tools and services that help science researchers extract the information they seek from the data they work with."*
- **Scope is all oceanographic data and information of scientific interest - not just NOAA data.** (This of course is how we ended up with 100k datasets).
- **Policy is to preserve data for 75 years or as long as scientifically significant – also somewhat different than the original scope of the NASA DAACs and has given rise to the arrangement seen in GHRSST, where the PO.DAAC serves as the GDAC and NODC serves as the LTSRF.**
- **However, there is no doubt that the mission of NODC and the mission of the PO.DAAC, in particular, overlap in the area of Ocean Surface Topography – not to mention AVISO. Careful and close coordination is required.**

Altimetry User Communities Defined

High volume, Low assistance

- **Jason-2/3 Science Working Teams (SWT):** Level of expertise: Highest. SWT members monitor instrument performance, apply calibrations, specify reprocessing requirements and schedule and so on.
- **Ocean Surface Topography Science Team (OSTST):** Level of expertise: high. OSTST members are data users but also data producers. They help define the data formats, products and protocols that should be routinely supported.

Medium volume, medium assistance

- **Scientists without subject expertise in altimetry:** most agency clients (e.g. NOAA's NCCOS, NMS and HPC), and academics such as ecologists, chemical and biological oceanographers. Level of expertise: low to intermediate. These users often have a high-level understanding of what altimetry can provide but lack the technical skill or familiarity to manipulate the data. They tend to be primary drivers for routine, value-added products such as gridded fields and derived products such as currents and heat content.

Low volume, high level of assistance,

- **Non-specialists** conducting scientific research or planning: undergraduates, geospatial information system (GIS) users. Level of expertise: low. These users are aware of the existence of satellite altimetry and have some idea of the information it might provide, but often need individual help accessing the data or reformulating it into a product such as a time series or georeferenced image.
- **The general public:** Level of expertise: low to non-existent. These users are often seeking general ocean information and have no prior awareness of satellite altimetry. Sample users: individuals wanting wave height statistics.

Altimetry User Communities in Practice

Jason-2 annual data download volume (est. from 2011/Q1)
over 6,500 users (based on IP address)
3 million files
over 7 Tb or > 700% of the annual volume of new data

- **Science Working Teams (SWTs) and Ocean Surface Topography Science Team (OSTST):** 3 user queries in past 12 months, primarily when a service outage or product delivery delay occurred.
- **Scientists without subject expertise in altimetry:** Current examples include the Gulf of Mexico Digital Atlas, a combined federal-state partnership to provide information to support the *Gulf Coast Restoration Support Plan*, NCCOS, NMS, and NHC, with whom we are working to define needs.
- **Non-specialists:** E.g., 50% of user requests to the NODC satellite team in past 12 months have been for information/data in GIS-ready format.
- **The general public:** Sample users: individuals wanting wave height statistics. 5 users in the past 12 months requested “radar information” or wave data.

Data Services @ NODC

Existing

Data Discovery services (all files)

- Federal Geospatial Digital Content (FGDC)-compliant metadata published via a Web Accessible Folder (WAF) supporting the NOAA Global Earth Observation - Integrated Data Environment (GEO-IDE) and Geospatial One-Stop (GOS).
- ISO 19115-2 metadata published through a WAF
- Catalog Service for the Web (CSW) through the ArcGIS geoportal

Data Access services - Level 2 data (science data)

- ftp
- http
- OPeNDAP server
- Web Coverage Service (WCS)
- THREDDS Data Server (TDS)

Data Archive services (all files)

- Archival storage in the Comprehensive Large Array-data Stewardship System (CLASS) (provision of versioning, offline backup and redundancy)
- Additional data quality monitoring/notification for delayed-mode Level-2 products

Data Services @ NODC

To be deployed in 2012

Data Discovery services (all files)

- Search and Retrieval via URL (SRU)

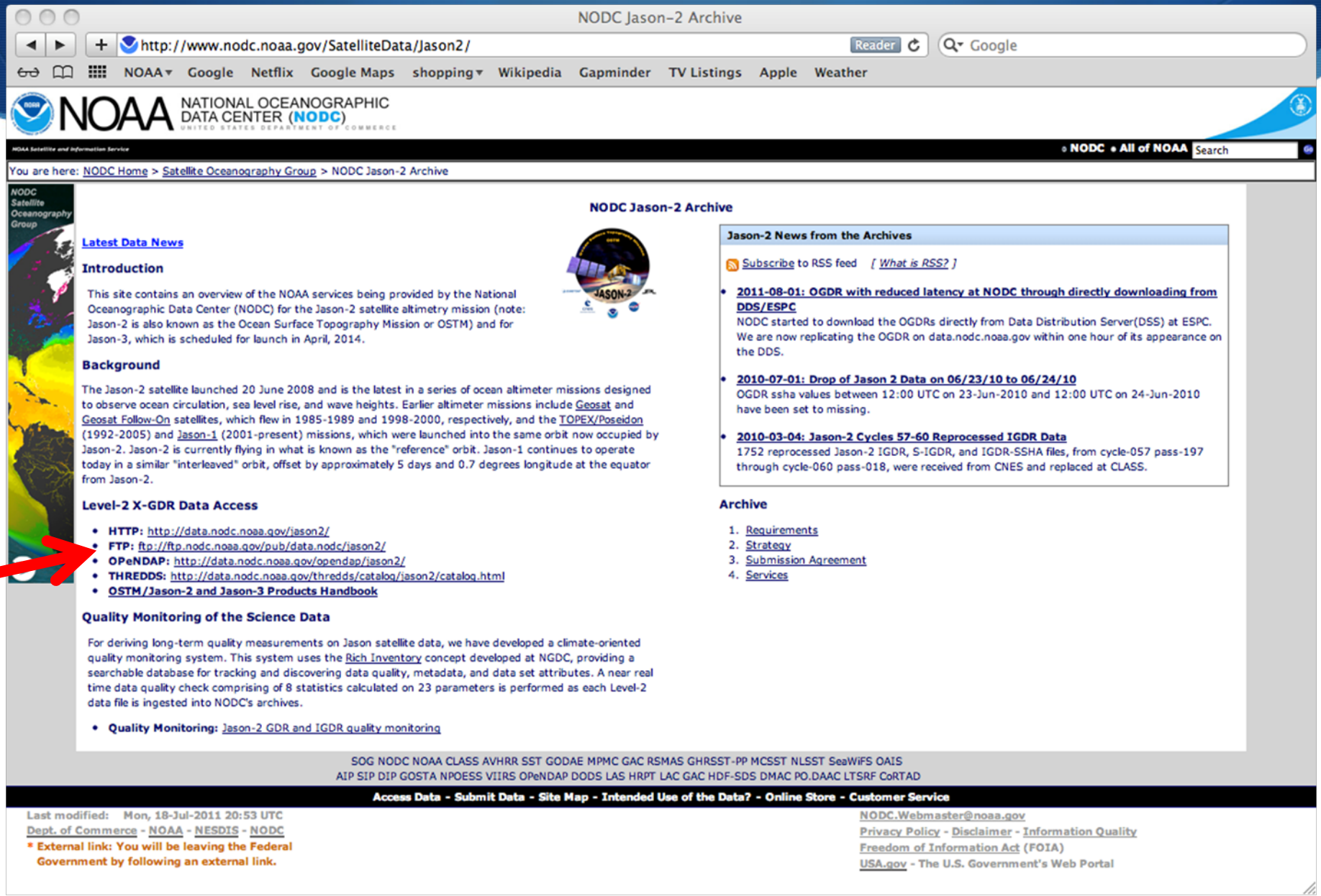
Data Access services

- Web Mapping Service (WMS)
- Live Access Server (LAS) Development
  - ✓ custom front-end
- **ESRI ArcGIS for Server**

Data Archive services (all files)

- “Dashboard” monitoring of O/I/GDR quality statistics
- Really Simple Syndication (RSS) notification of missed file delivery into archive

NODC Jason-2 home page



Data access and visualization

NODC TDS

THREDDS Data

Server

Catalog
http://data.nodc.noaa.gov/thredds/catalog/jason2/gdr/gdr_ssha/cycle114/catalog.html

Dataset: cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200

- *ID:* jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200

Access:

1. **OPENDAP:** /thredds/dodsC/jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200
2. **HTTPServer:** /thredds/fileServer/jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200
3. **WCS:** /thredds/wcs/jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200
4. **WMS:** /thredds/wms/jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200
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7. **ISO:** /thredds/iso/jason2/gdr/gdr_ssha/cycle114/JA2_GPR_2PTP114_254_20110816_093547_20110816_103200

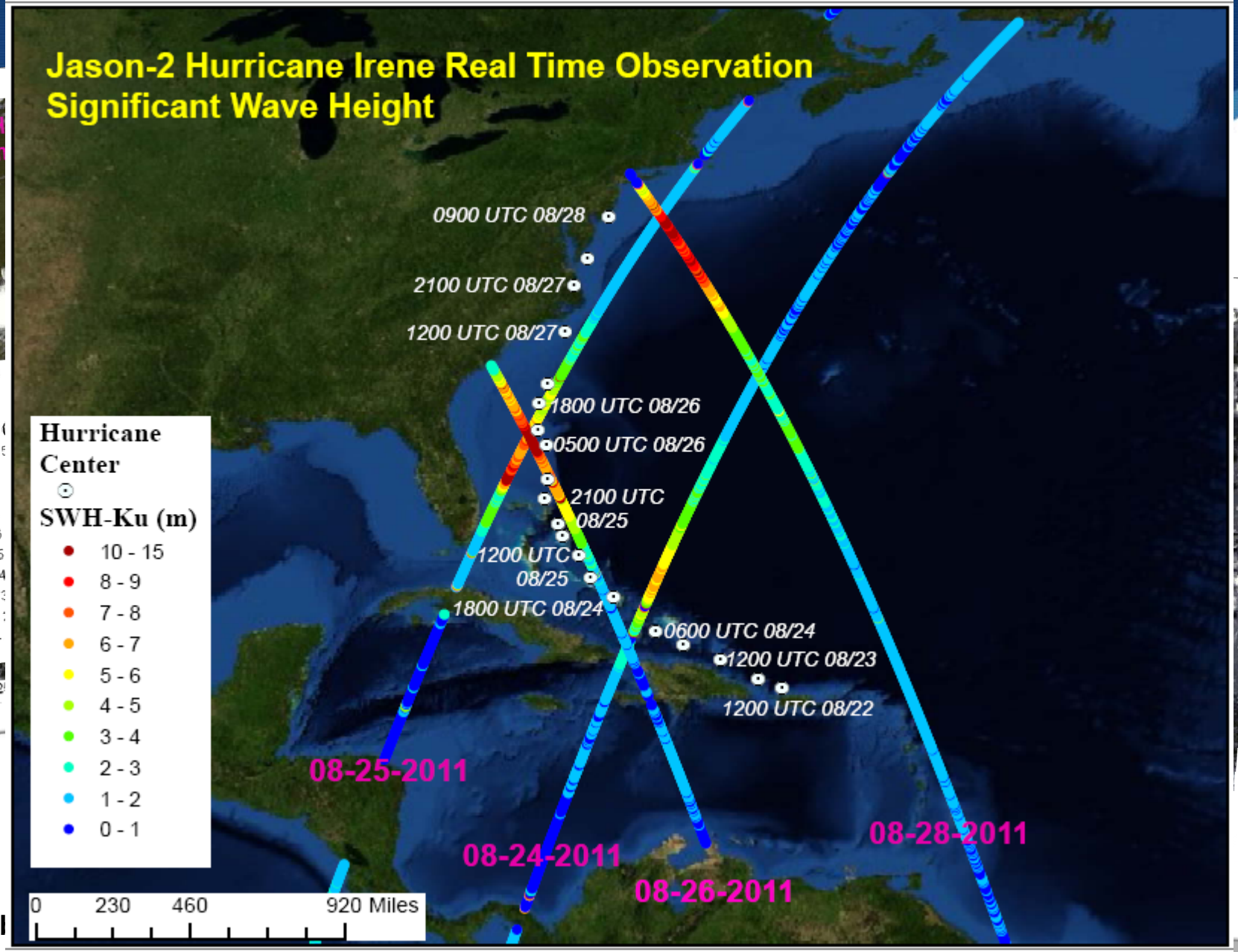
Dates:

- 2011-10-11 01:22:31Z **(modified)**

Viewers:

- NetCDF-Java ToolsUI (webstart)
- Godiva2 (browser-based)

NODC Jason-2 data visualization services



Octol

Data access and visualization

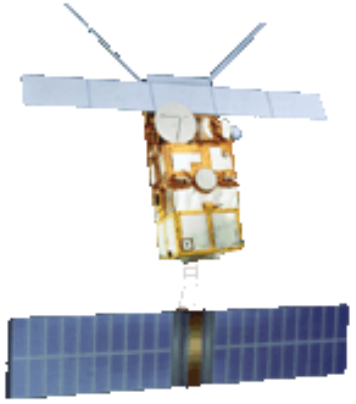
Radar Altimeter Data Acquisition from RADS

Data selection

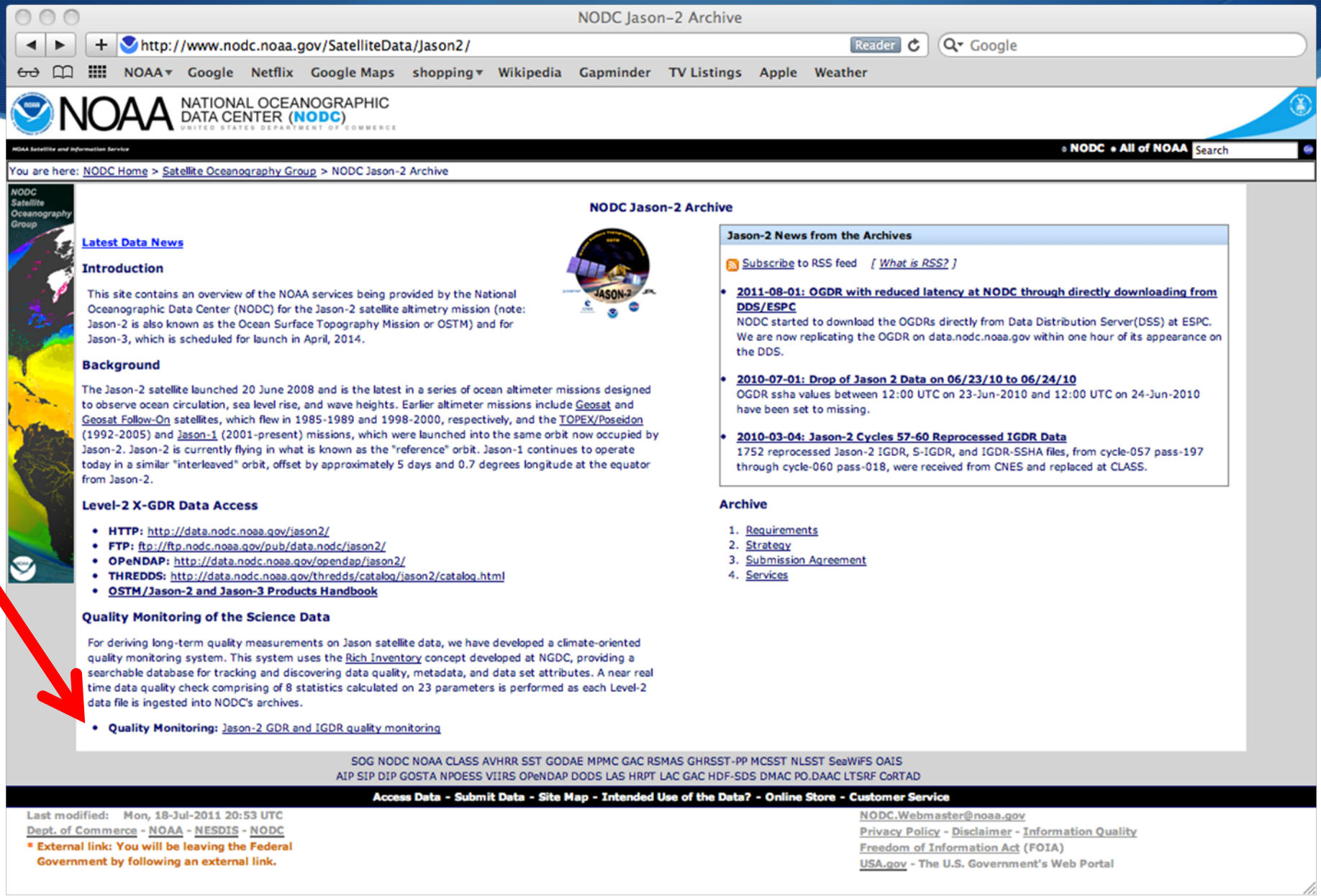
Output data:

- [x] Time
- [x] Latitude
- [x] Longitude

- [x] sea level anomaly
- [ ] significant wave height
- [ ] backscatter coefficient
- [ ] wind speed



NODC Jason-2 home page



Quality monitoring of O/I/GDRs

- Sea surface height anomaly
- Ku-band significant wave height
- Altimeter wind speed
- Difference between altimeter and radiometer wind speeds
- Radiometer wet tropospheric correction
- Difference between the radiometer and model wet tropospheric corrections

COMPUTED, PUBLISHED and MONITORED through:

1. LAS server visualization of the QA statistics at NODC and public access to the NetCDF-format statistical values - robust and simple. NODC Jason-3 Real-time QA assurance homepage.
2. NODC Jason-3 RSS Feed of operational status and automated notification service if any predefined conditions met (e.g., to Project Scientist and/or Systems or Archive and Access Engineers)

Quality monitoring of O/I/GDRs

Jason-2 GDR/IGDR Da

http://www.nodc.noaa.gov/SatelliteData/Jason2/qa.html

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NOAA Satellite and Information Service

You are here: NODC Home > Satellite Oceanography Team > NODC Jason-2 Archive > GDR/IGDR Data Quality Monitoring

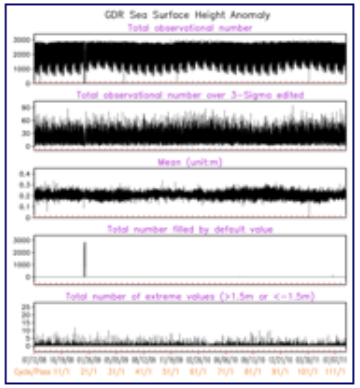
Jason-2 Geophysical Data Record (GDR) and Interim GDR Data Quality Monitoring

The data quality monitoring (DQM) system developed by the satellite oceanography team at NODC is based on the concept of a Rich Inventory developed by the Enterprise Data Systems Group at the National Geophysical Data Center (NGDC). The principle concept of a Rich Inventory is to calculate statistics for selected parameters as files are received and ingested into the archive, store them in a database, and make them available to users and managers of the archive. A "granule" is the smallest data unit over which statistics are calculated - in this case, one pass (half-orbit) of the Jason-2 satellite. Thus, the DQM produces 254 statistical estimates per cycle, one for each pass.

Below are some representative statistics calculated from the selected parameters in a granule as it is ingested into NODC's archive. Parameters we monitor include sea surface height anomaly, Ku-band significant wave height, altimeter wind speed, the difference between altimeter and radiometer wind speeds, the radiometer water vapor content, and the difference between the the radiometer and model wet tropospheric corrections.

- Take me to the Data Quality Monitoring Interface

GDR Granule Statistics



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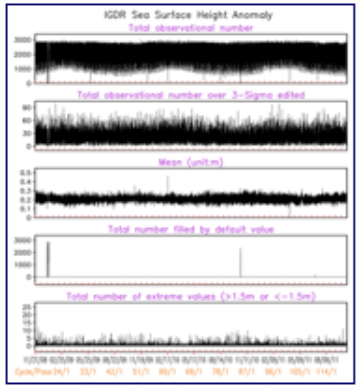
IGDR Granule Statistics



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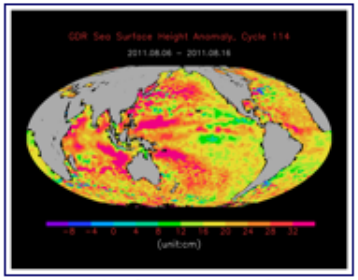
. . .

Statistics for other parameters:

- Significant wave height (Ku Band): GDR; IGDR
- Altimeter wind speed: GDR; IGDR
- Difference between radiometer wet tropospheric and model correction: GDR; IGDR
- Difference between altimeter and radiometer wind speed: GDR; IGDR
- Radiometer water vapor content: GDR; IGDR

Latest GDR Sea Surface Height Anomaly (gridded to 3.0x1.0 longitude/latitude)



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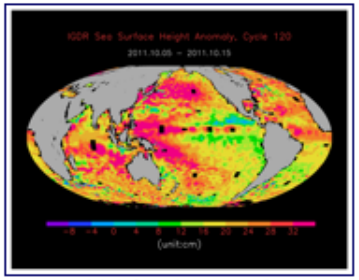
Latest IGDR Sea Surface Height Anomaly (3.0x1.0 longitude/latitude)



(click for a larger view)

Observations for other parameters:

- Significant wave height (Ku Band): GDR; IGDR
- Altimeter wind speed: GDR; IGDR
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- Difference between altimeter and radiometer wind speed: GDR; IGDR
- Radiometer water vapor content: GDR; IGDR

Observations gridded to 0.25x0.25 longitude/latitude:

- Sea surface height anomaly: GDR; IGDR
- Significant wave height (Ku Band): GDR; IGDR
- Altimeter wind speed: GDR; IGDR
- Difference between radiometer wet tropospheric and model correction: GDR; IGDR
- Difference between altimeter and radiometer wind speed: GDR; IGDR
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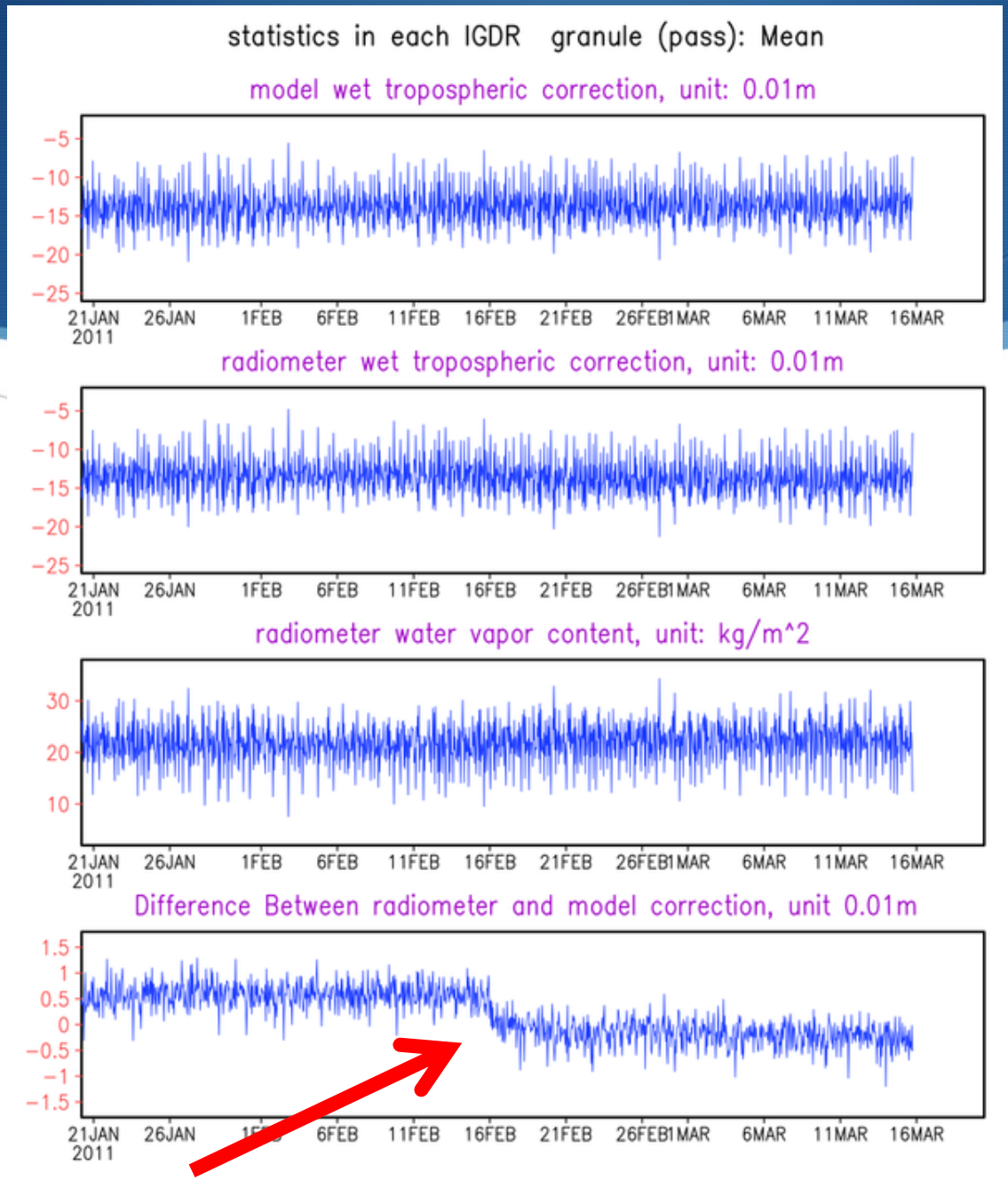
statistics in each IGDR granule (pass): Mean
model wet tropospheric correction, unit: 0.01m
−5
−10
−15
−20
−25
21JAN 2011
26JAN
1FEB
6FEB
11FEB
16FEB
21FEB
26FEB
1MAR
6MAR
11MAR
16MAR
radiometer wet tropospheric correction, unit: 0.01m
radiometer water vapor content, unit: kg/m^2
30
20
10
Difference Between radiometer and model correction, unit 0.01m
1.5
1
0.5
0
−0.5
−1
−1.5

Quality monitoring of O/I/GDRs

Jason-2 GDR/IGDR Da

http://www.nodc.noaa.gov/SatelliteData/Jason2/qa.html

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- Take me to the Data Quality Monitoring Interface

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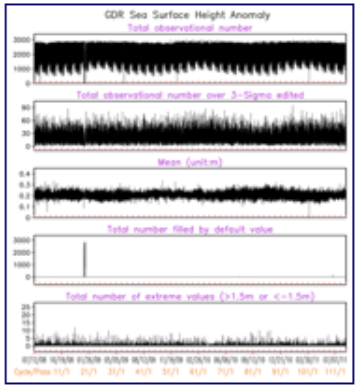

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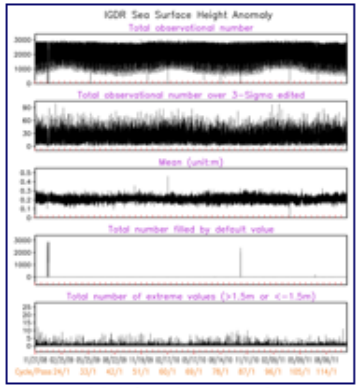

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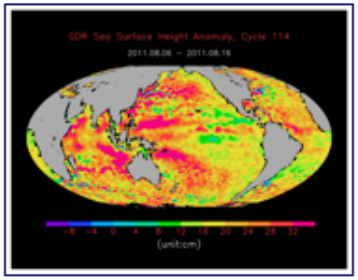
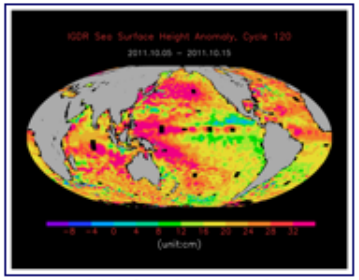
Latest GDR Sea Surface Height Anomaly (gridded to 3.0x1.0 longitude/latitude)



(click for a larger view)

Latest IGDR Sea Surface Height Anomaly (3.0x1.0 longitude/latitude)



(click for a larger view)

Observations for other parameters:

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- Difference between radiometer wet tropospheric and model correction: GDR; IGDR
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Observations gridded to 0.25x0.25 longitude/latitude:

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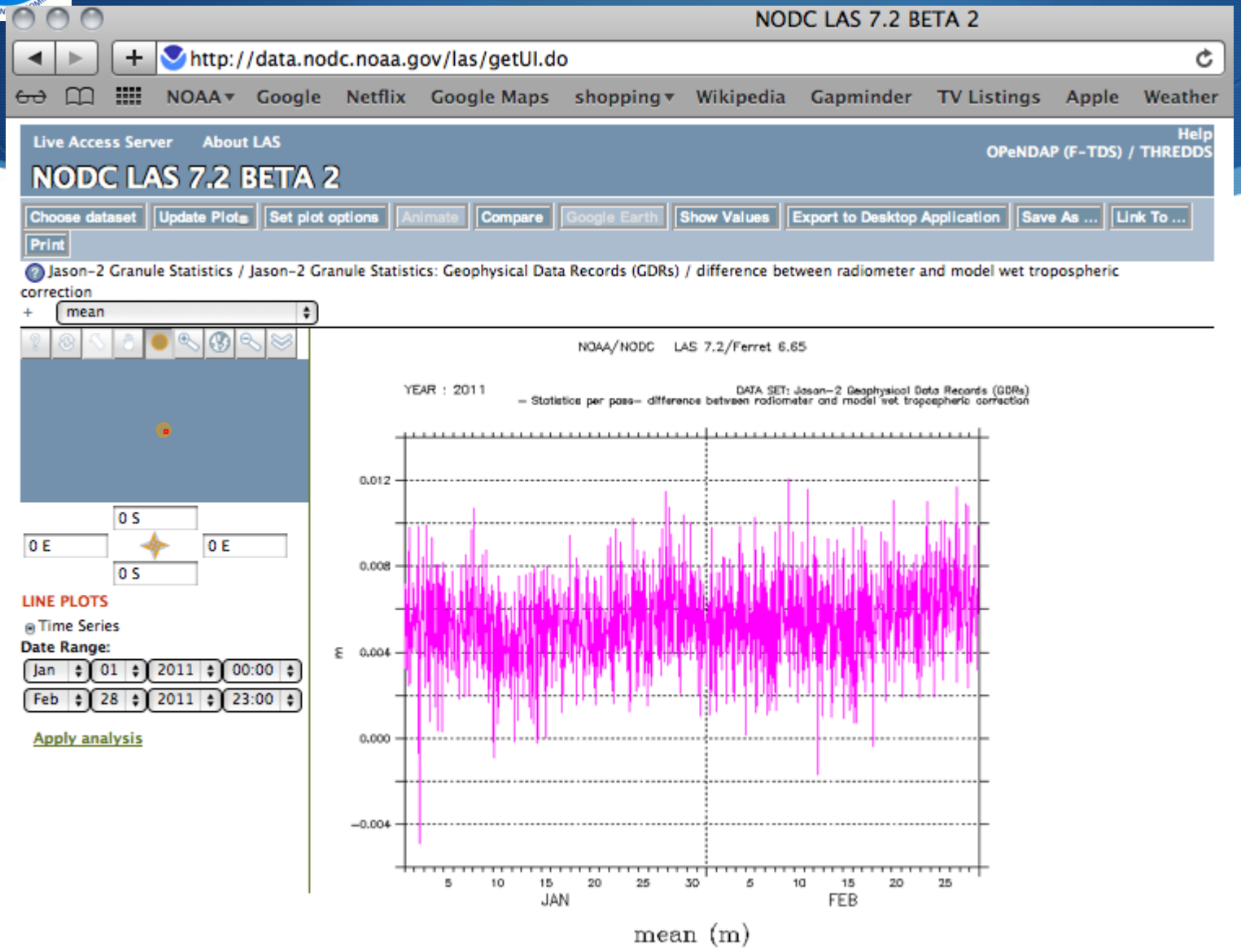
- Difference between altimeter and radiometer wind speed: GDR; IGDR
- Radiometer water vapor content: GDR; IGDR

Jason-2 Quality Monitoring - LAS



Dashboard monitoring (planned)

Take me to the GDR ➔

Jason-3 IGDR - SLA

	Cycle	278	277	276	275	274
Pass	1					
	2					
	…					
	254					

QA Key:

- Excellent
- Good
- Fair
- Poor

Dashboard monitoring (planned)

Take me to the GDR ➔

Jason-3 IGDR – SLA Cycle 278

Pass	**SLA**	SWH-Ku	U_{alt}	U_{alt}-U_{rad}	RWT	RWT-MWT
1						
2						
…						
254						

QA Key:

- Excellent
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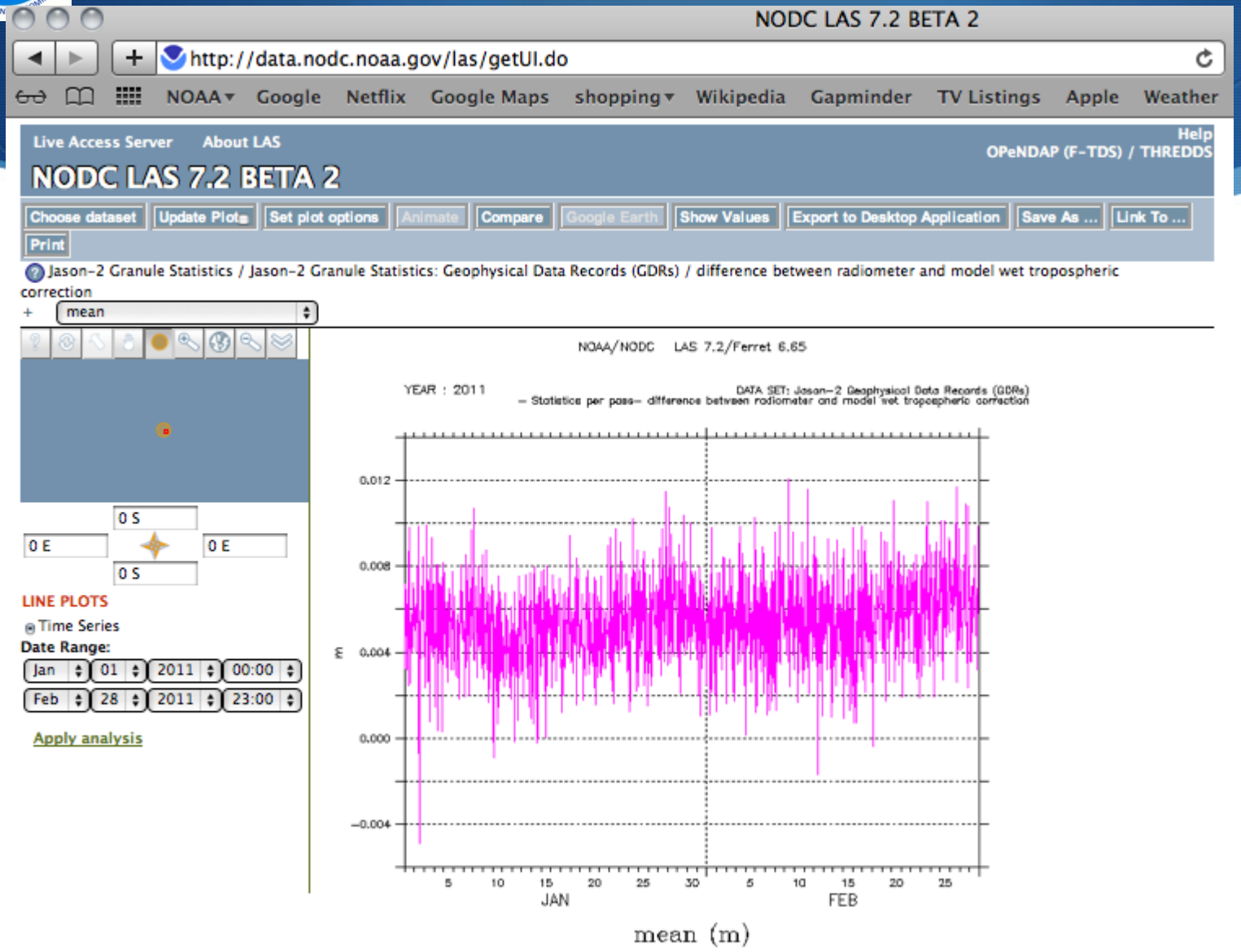
Jason-2 Quality Monitoring - LAS



Dashboard monitoring (planned)

Take me to the GDR ➔

Jason-3 IGDR – SLA Cycle 278

Pass	**SLA**	SWH-Ku	U_{alt}	U_{alt}-U_{rad}	RWT	RWT-MWT
1						
2						
…						
254						

Dashboard monitoring (planned)

Back to grid →

Jason-3 IGDR – Cycle 278 Pass 2

Key:

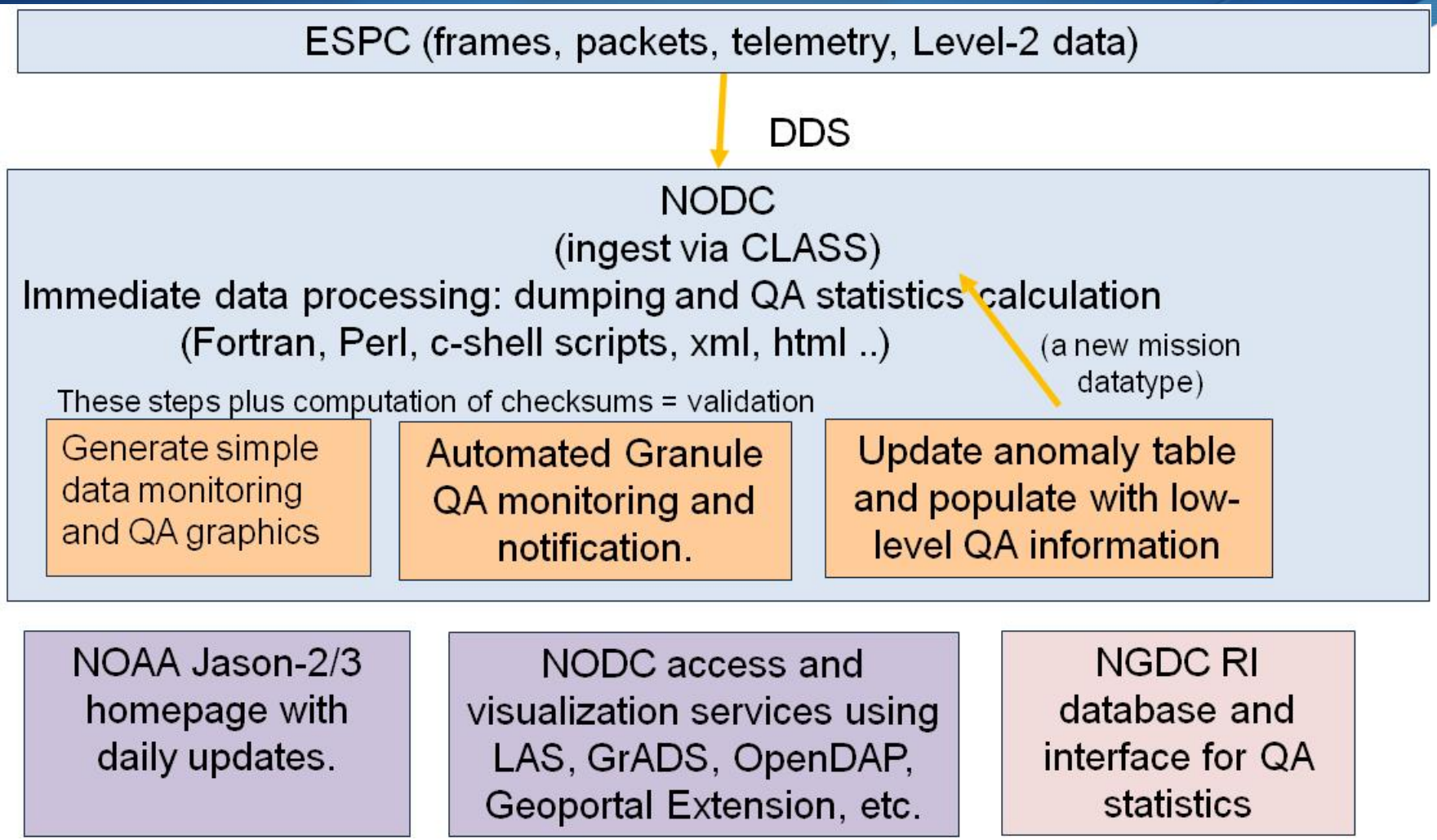
- Excellent
- Good
- Fair
- Poor

Data Access for Jason-2 and Jason-3

Thank you for your time and attention!

Spare slides follow

NODC Service Provision Model



NJGS Data Quality Monitoring System: NODC QMS and Rich Inventory

Jason-2/3 Rich Inventory (JRI) is a granule metadata management and quality monitoring tool, developed as a NODC/NGDC collaboration. JRI provides:

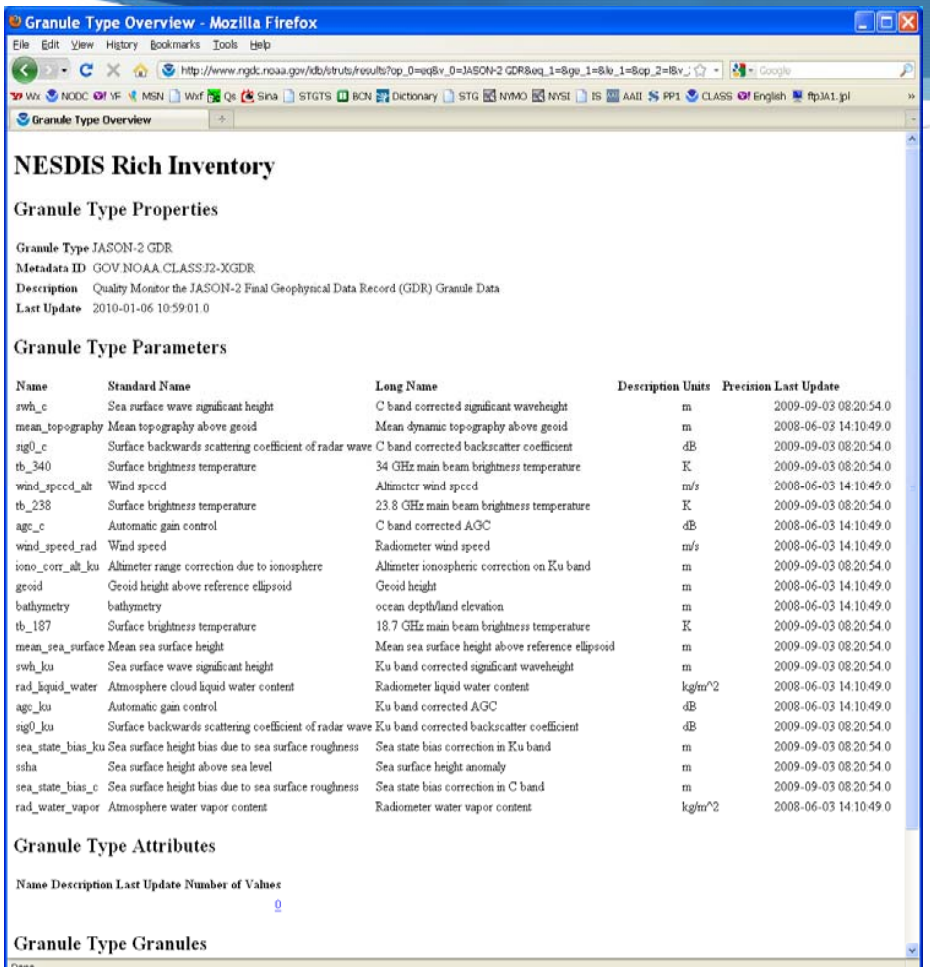
A database management mechanism for tracking data quality, metadata, and data set attributes. Smallest segment of data monitored = “granule”.

Tracks eight QA statistics and attributes for over 20 Jason-2 parameters for both IGDR and GDR data, and makes the results available to data manager and public users via a web interface in both graphical and numerical representations.

Performs an immediate quality check when granules are ingested into NODC's archives.

Rich Inventory System: Interface at NGDC RI Database

Entrance webpage



Plotting and downloading