

Integrated Ocean Observing System Glider Data Assembly Center (IOOS-GDAC)

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National Glider Network Design Team

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- **Review Panel:**

- Matt Howard, *Texas A&M University & GCOOS*
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- Scott Glenn, *Rutgers University & MARACOOS*
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National Glider Network Plan

- Leverage existing regional association resources & glider operations
- Sustained spatial and temporal subsurface ocean observations
- Consistency in operational and data processing standards/quality control
- Efficient and timely data dissemination and archiving procedures
- Cooperation with international groups (ANFOG, EGO, GROOM)

Glider Technology Applications

- Emergency Response: Deepwater Horizon
- Climate Variability: El Nino/La Nina
- Hurricane Intensity Forecasting: East Coast, Gulf of Mexico, American Territories
- Harmful Algal Blooms: all coasts
- Hypoxia: all coasts

GDAC Responsibilities

- Specify and create a CF-compliant netCDF file format standard for the exchange of real time, per dive data
- Receive data from glider operators (providers will convert data to glider netCDF format)
- Verify CF-compliance of the netCDF files and report errors back to the individual providers where appropriate. The DAC will provide guidance to the providers on compliance
- Creation of higher level products for data exchange and consumption
- Interface with the National Ocean Data Center (NODC) and other data consumers (public, private, etc.) to provide access to the operational data sets (archiving, dissemination to GTS)
- Publish the datasets using compliant web services (eg. THREDDS, ncISO, ncSOS)
- Support harvesting by IOOS Service Registry and Data Catalogs which includes liaising with NGDC (Registry) and ASA (Catalog) development teams
- Develop publicly available user guides

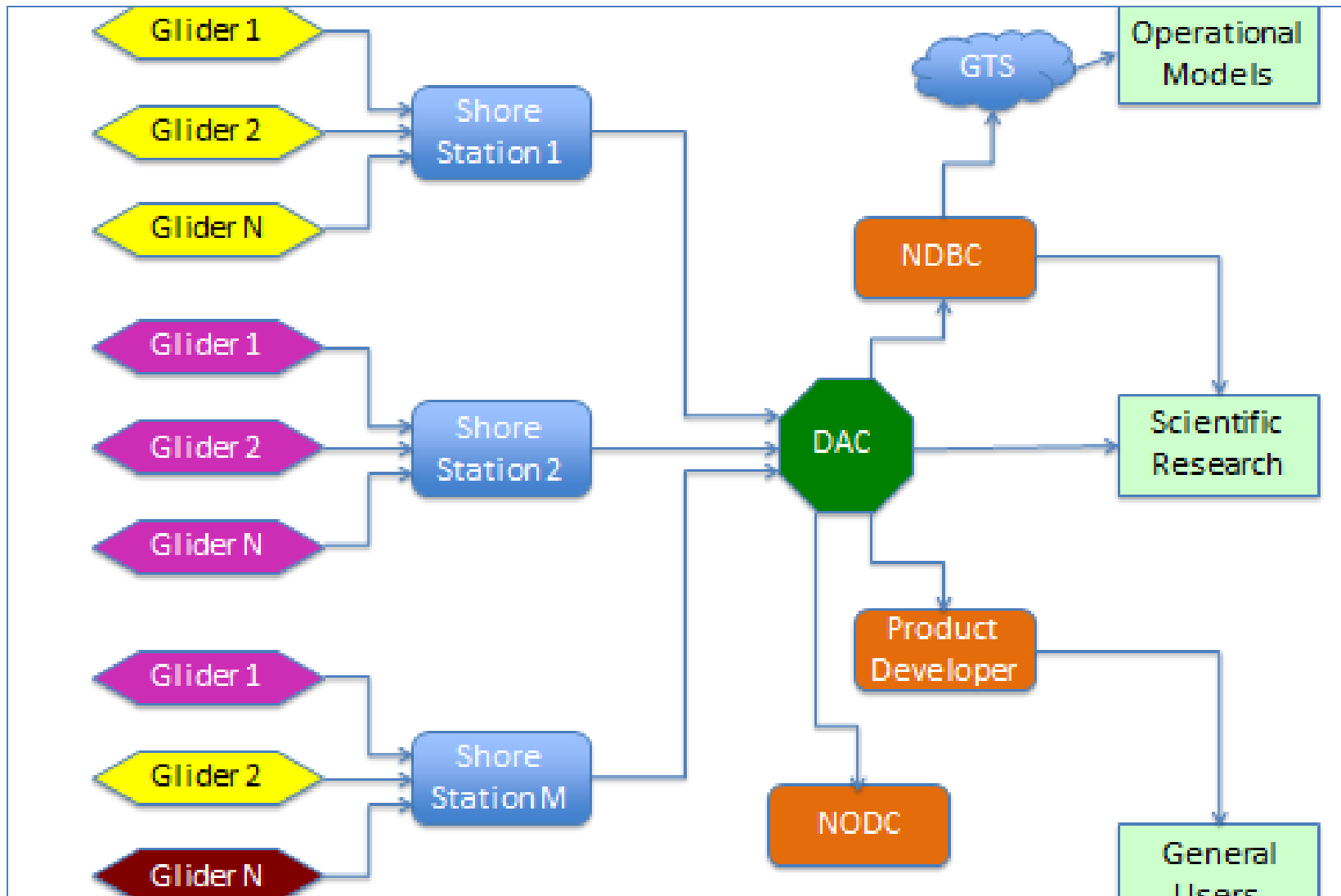
Contributing Organizations

- IOOS Regional Associations
- IMOS/ANFOG (Australia)
- GROOM/EGO (Europe)
- NODC
- NDBC
- Applied Science Associates

Glider Types: Profile Data

- Currently only profiling gliders: trajectories
- Slocum Gliders (Teledyne Webb Research)
- Spray (SIO/Bluefin)
- Seaglider (University of Washington/APL)
- Future: Wavegliders, ?

Data Flow: Glider -> Data Consumers



Community Participation

- Simplify the data standardization & submission process to encourage wide participation
- NetCDF: NODC templates, IMOS, GROOM
- Github
- Community contributed toolboxes
 - Matlab
 - Python

NetCDF Trajectory Feature Type

https://github.com/IOOSProfilingGliders/Real-Time-File-Format/tree/master/examples/proposed_templates

- CF Conventions
- Time-series data preserves original resolution
- Required Variables
 - Time
 - Latitude/Longitude
 - Depth/Pressure
 - **Temperature**
 - Conductivity
 - **Salinity**
 - Density
 - QC Flags: ARGO standards
 - U/V: one or more records specifying a time & depth-averaged current
 - Trajectory id
 - Dive id
 - **Profile id**
- Allows additional (CF conventions) variables (Chl a, O₂, etc.) depending on glider payload

Data Provider/Glider Registration

- Data Provider Registration: Web-based
 - Contact Name
 - Institution
 - Phone
 - Email

} sftp/ftp user account
- Glider Registration: Web-based
 - Name
 - Data Provider
 - Launch Date
 - Launch Location

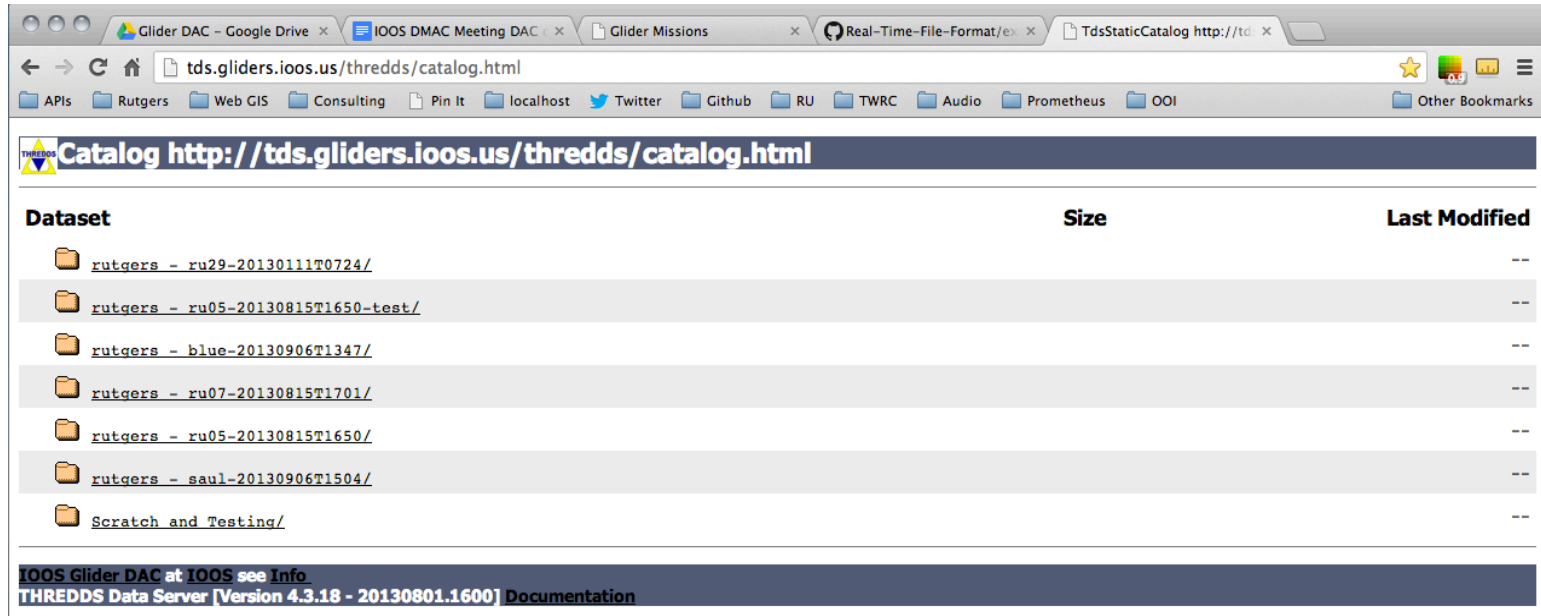
} WMO id (NDBC)

GDAC Dataset Submission

The screenshot shows a web browser window with the address bar displaying `http://ftp.glanders.ioos.us`. The page title is "Glider Missions for rutgers". At the top right, there is a "logout" link. Below the title, there is a form with two input fields: "Mission Name" and "WMO ID (optional)", followed by a "+ New Mission" button. The main content area lists five missions, each with its name, WMO ID, number of files, and the last update date and time.

Mission Name	WMO ID	Files	Last Updated
saul-20130906T1504	4801503	7	Sat, Sep 07 2013 at 02:10PM
ru29-20130111T0724	1801500	437	Sun, Sep 08 2013 at 03:10AM
blue-20130906T1347	4801504	19	Sun, Sep 08 2013 at 08:40PM
ru05-20130815T1650	None	556	Sun, Sep 08 2013 at 11:25AM
ru07-20130815T1701	None	401	Sun, Sep 08 2013 at 12:10PM

Deployment Data Access (THREDDDS)



The screenshot shows a web browser window with the address bar displaying `tds.gliders.ioos.us/thredds/catalog.html`. The browser's address bar and tabs are visible at the top. The main content area shows a table of datasets with the following columns: Dataset, Size, and Last Modified. The table lists several datasets, all with a size of -- and a last modified date of --. The datasets are: `rutgers - ru29-20130111T0724/`, `rutgers - ru05-20130815T1650-test/`, `rutgers - blue-20130906T1347/`, `rutgers - ru07-20130815T1701/`, `rutgers - ru05-20130815T1650/`, `rutgers - saul-20130906T1504/`, and `Scratch and Testing/`. At the bottom of the page, there is a footer with the text: `IOOS Glider DAC at IOOS see Info` and `THREDDDS Data Server [Version 4.3.18 - 20130801.1600] Documentation`.

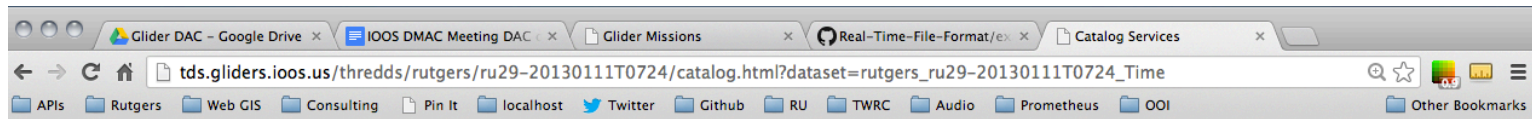
Dataset	Size	Last Modified
rutgers - ru29-20130111T0724/	--	--
rutgers - ru05-20130815T1650-test/	--	--
rutgers - blue-20130906T1347/	--	--
rutgers - ru07-20130815T1701/	--	--
rutgers - ru05-20130815T1650/	--	--
rutgers - saul-20130906T1504/	--	--
Scratch and Testing/	--	--

IOOS Glider DAC at IOOS see Info
THREDDDS Data Server [Version 4.3.18 - 20130801.1600] Documentation

Data Access

- TDS Catalogs
 - Time Aggregation
 - **Time-UV Aggregation**
 - Individual Files/Segments
- Services:
 - OPeNDAP
 - http NetCDF download
 - UDDC: compliance & digital libraries
 - ncSOS
 - nclSO: cataloging

Time & Time-UV Aggregations



IOOS Glider DAC

THREDDS Data Server

Catalog <http://tds.gliders.ioos.us/thredds/rutgers/ru29-20130111T0724/catalog.html>

Dataset: IOOS Glider DAC - rutgers - ru29-20130111T0724 Catalog/rutgers - ru29-20130111T0724 - Time Aggregation

- *ID:* rutgers_ru29-20130111T0724_Time

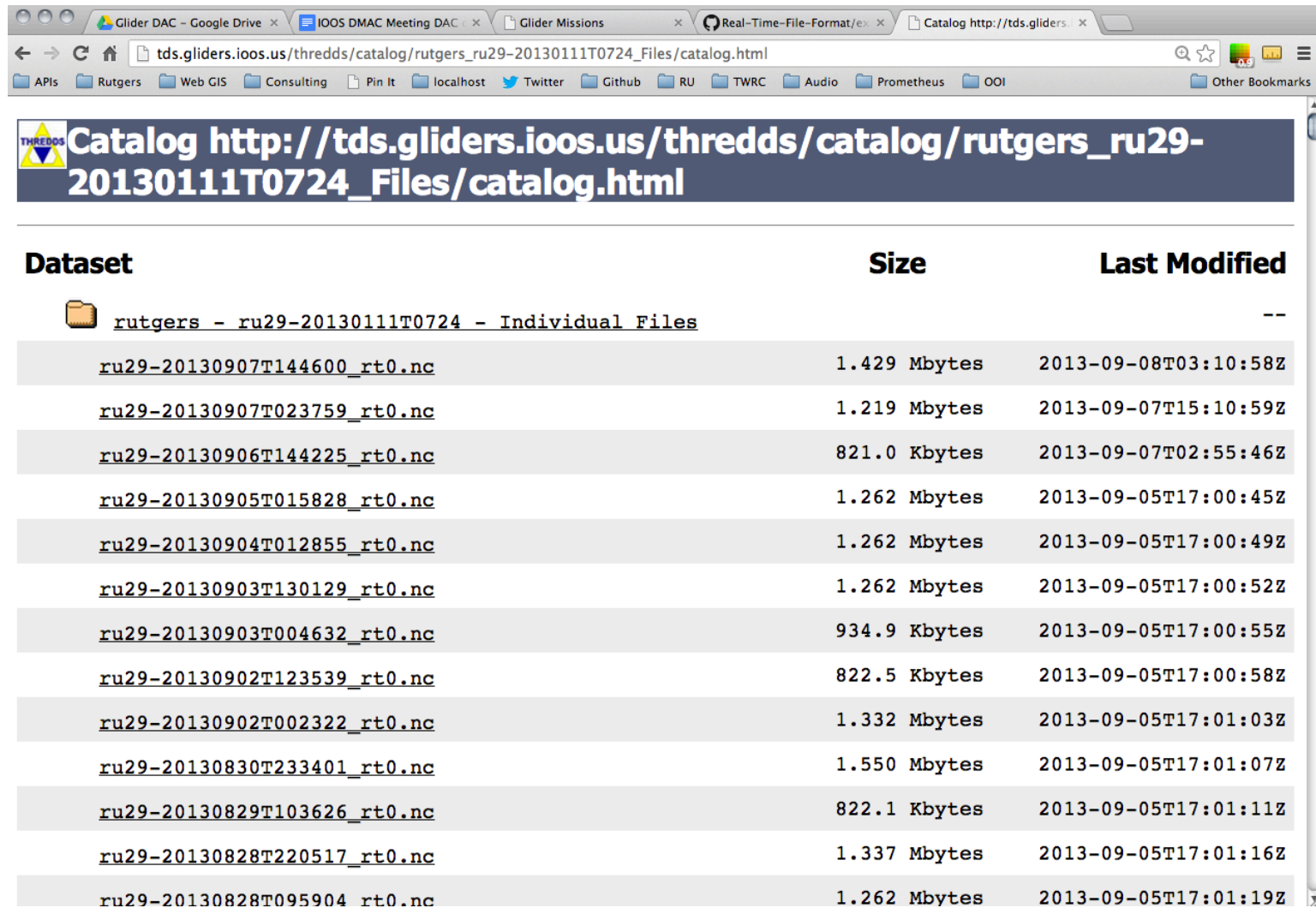
Access:

1. **OPENDAP:** /thredds/dodsC/rutgers_ru29-20130111T0724_Time.ncml
2. **NCML:** /thredds/ncml/rutgers_ru29-20130111T0724_Time.ncml
3. **UDDC:** /thredds/uddc/rutgers_ru29-20130111T0724_Time.ncml
4. **ISO:** /thredds/iso/rutgers_ru29-20130111T0724_Time.ncml
5. **SOS:** /thredds/sos/rutgers_ru29-20130111T0724_Time.ncml


Viewers:

- [NetCDF-Java ToolsUI \(webstart\)](#)

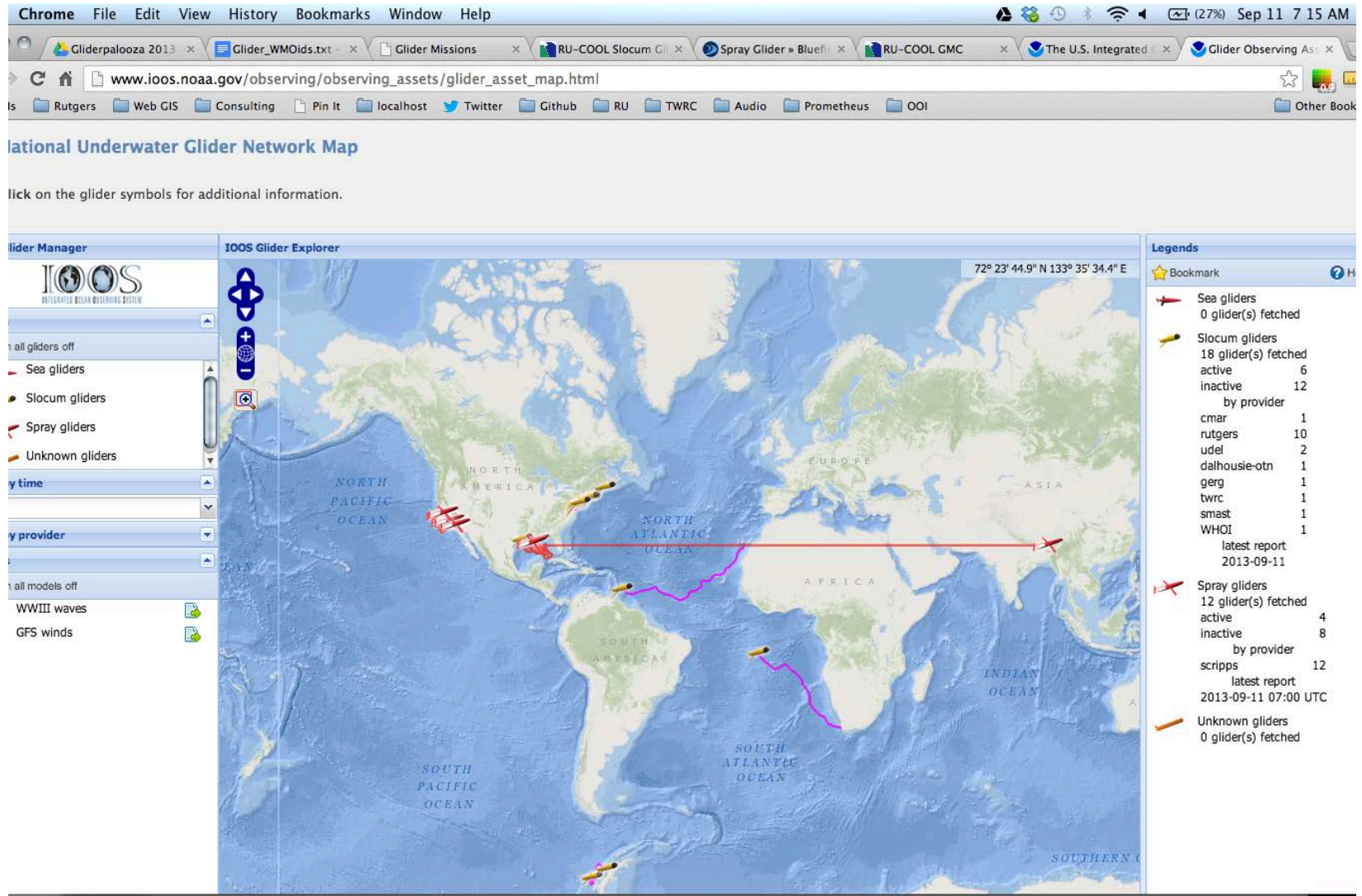
Individual Segments



The screenshot shows a web browser window with multiple tabs. The active tab is titled "Catalog http://tds.gliders.ioos.us/thredds/catalog/rutgers_ru29-20130111T0724_Files/catalog.html". The address bar shows the full URL. Below the browser window, a table displays the catalog data.

Dataset	Size	Last Modified
 <u>rutgers - ru29-20130111T0724 - Individual Files</u>		--
<u>ru29-20130907T144600_rt0.nc</u>	1.429 Mbytes	2013-09-08T03:10:58Z
<u>ru29-20130907T023759_rt0.nc</u>	1.219 Mbytes	2013-09-07T15:10:59Z
<u>ru29-20130906T144225_rt0.nc</u>	821.0 Kbytes	2013-09-07T02:55:46Z
<u>ru29-20130905T015828_rt0.nc</u>	1.262 Mbytes	2013-09-05T17:00:45Z
<u>ru29-20130904T012855_rt0.nc</u>	1.262 Mbytes	2013-09-05T17:00:49Z
<u>ru29-20130903T130129_rt0.nc</u>	1.262 Mbytes	2013-09-05T17:00:52Z
<u>ru29-20130903T004632_rt0.nc</u>	934.9 Kbytes	2013-09-05T17:00:55Z
<u>ru29-20130902T123539_rt0.nc</u>	822.5 Kbytes	2013-09-05T17:00:58Z
<u>ru29-20130902T002322_rt0.nc</u>	1.332 Mbytes	2013-09-05T17:01:03Z
<u>ru29-20130830T233401_rt0.nc</u>	1.550 Mbytes	2013-09-05T17:01:07Z
<u>ru29-20130829T103626_rt0.nc</u>	822.1 Kbytes	2013-09-05T17:01:11Z
<u>ru29-20130828T220517_rt0.nc</u>	1.337 Mbytes	2013-09-05T17:01:16Z
<u>ru29-20130828T095904_rt0.nc</u>	1.262 Mbytes	2013-09-05T17:01:19Z

Real Time Fleet Status



Resources

- National Glider Network Plan:
 - <http://www.ioos.noaa.gov/glider/strategy/welcome.html>
- IOOS Gliders Github:
 - <https://github.com/IOOSProfilingGliders/Real-Time-File-Format>

Gliderpalooza 2013

- Dalhousie University, University of Maine, WHOI, UMass Dartmouth, Rutgers University, University of Delaware, University of Maryland, VIMS, North Carolina State, Skidaway Institute, Teledyne Webb Research Corporation

