



Tools, Services and Support of Aquarius/SAC-D Data Archival and Distribution through PO.DAAC

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8th Aquarius Science Team Meeting

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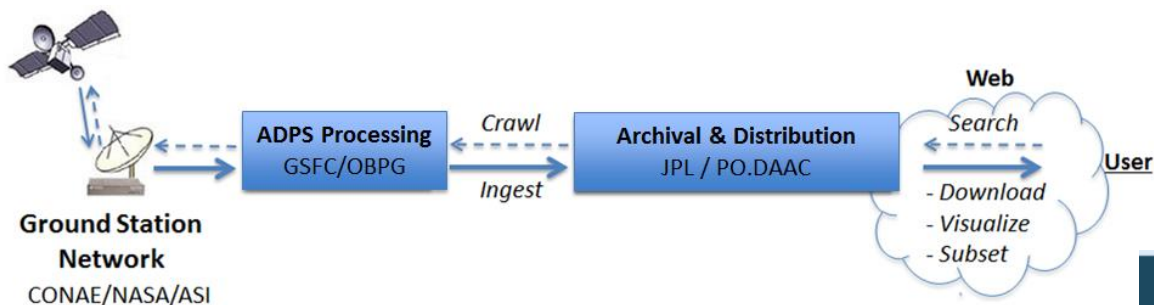
PO.DAAC Aquarius Support



- PO.DAAC: NASA's Physical Oceanographic Data Center
- Designated archive & distribution center for Aquarius data

<http://podaac.jpl.nasa.gov>

Aquarius Data Flows



- OBP interface : Published granule listings by type/date
- Delivery/Ingest Frequency: L0 & L1A: daily
L2 & L3: monthly



<http://oceandata.sci.gsfc.nasa.gov/Recent/Aquarius/>

PO.DAAC Aquarius Data Holdings

Public Datasets

accessible via FTP, THREDDS & OPeNDAP

- Level 0, 1A
- V2.0 Products: Level 2
 Level 3: Mapped Salinity & Wind Speed (*Daily, 7-day, Monthly, Seasonal, Annual*)
- Data Reader Software: Matlab, IDL
- V2.0 Documentation Package: (12 items) *eg. User's Guide, ATBD, Validation Analysis*

Public Evaluation Versions

accessible via Registered User FTPsite (*saltmarsh*)

- v2.0 Level Ascending/Descending
- 6 Prior Versions : 1.1-1.3
- Products: Level 2 (*all versions*), Level 3 (*since v1.2*)
 Level 3: Binned, Mapped Salinity & Wind Speed (*Daily, 7-day, Monthly, Seasonal*)

CAL/VAL Datasets

accessible via AQST-FTP (controlled)

Aquarius Interim-Evaluation Versions

- 12 total: V2.5.1 (*current*)
- Products: Level 2 & L3 (*binned/mapped, Daily, 7-day, Monthly, Seasonal*)

MWR Microwave Radiometer Data *University of Central Florida*

- Versions: 6 (*beta 1 & 2*), 5, 4

WWAV Wave Model Data *University of New Hampshire*

- V1.3.5 (*current*), 1.2.3 , 1.2

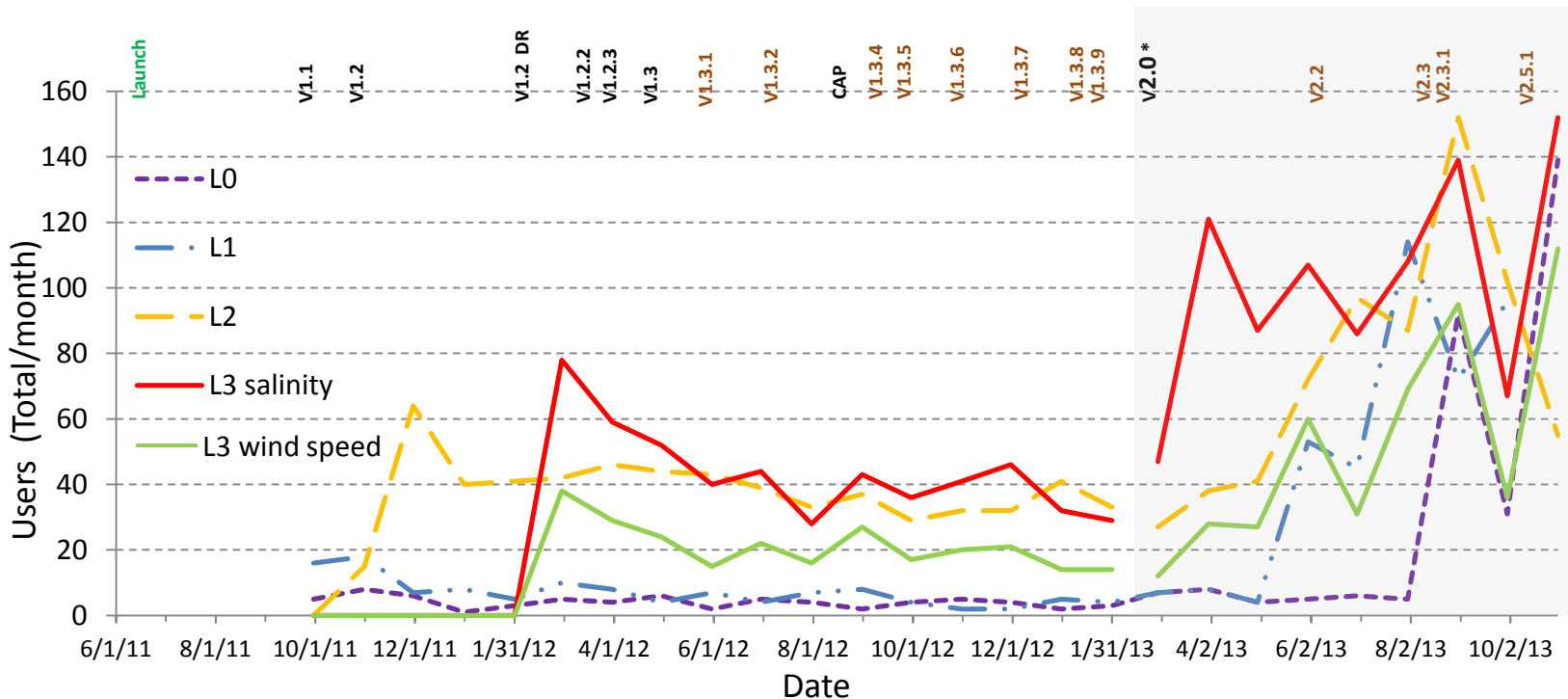
Aquarius Data Distribution Metrics

- Registered Aquarius Users: **960** (*Registration required pre-v2.0*)
- PO.DAAC DMAS: advanced monitoring/reporting capability (*access mode, dataset, granule, user*)
- Distribution Metrics & Usage Patterns:

Monthly Reports to Project Managers

PO.DAAC Aquarius Distribution Report						
2013-10-30						
Data Type	Year to Date			This Week		
	Users	GB	Files	New Users	GB	Files
Level 0	226	386.4	40068	1	0.1	1
Level 1	199	247.9	147108	2	3.3	665
Level 2	586	5333.8	2029180	4	425.2	85101
Level 3 Mapped Salinity	782	21.7	286833	18	3.1	24978
Level 3 Mapped Wind	381	2.0	77348	9	0.0	-3782
Level 3 binned	20	26.6	5918	0	0.0	0
Total for All Data Types	1280	6018.4	2586455	21	431.8	106963
Registered FTP Users	959			1		

Aquarius FTP + OPeNAP Data Access by Product Level/Type



Aquarius Data User Support

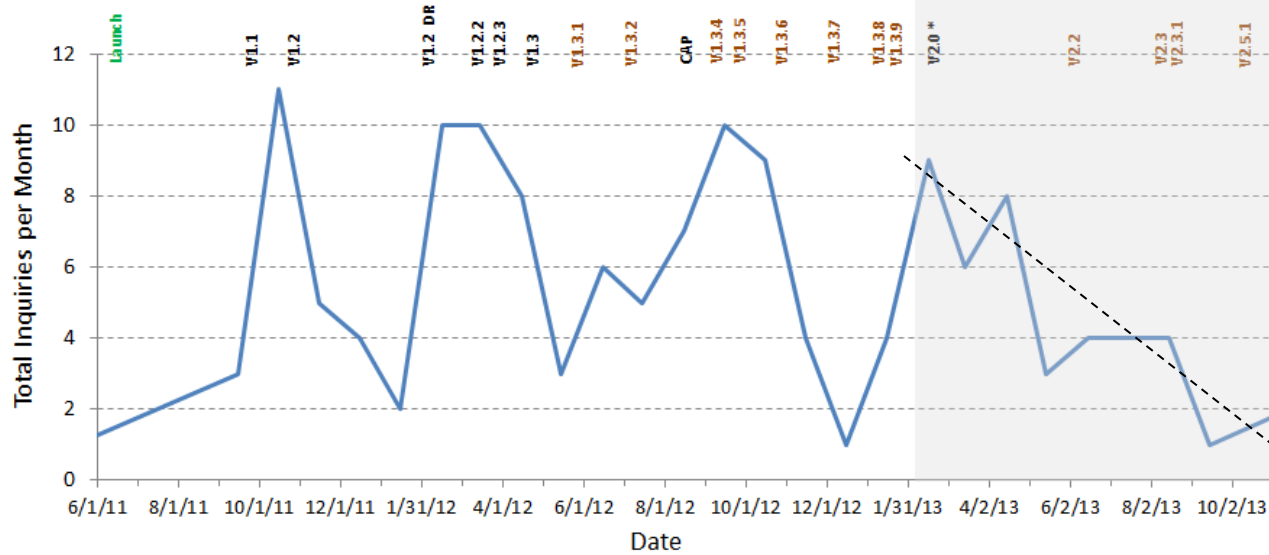
HELP

Questions? Answers.  FOLLOW US

 Ask PO.DAAC.

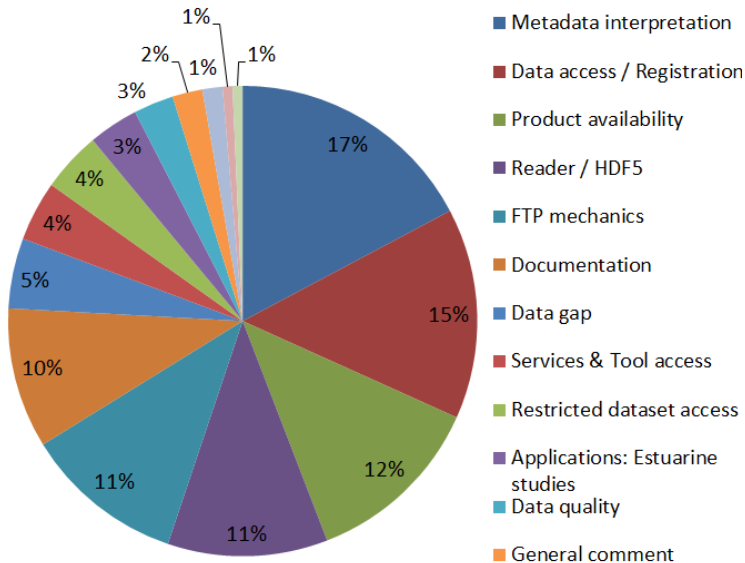
You can reach us by email at: podaac@podaac.jpl.nasa.gov

- User support services: podaac@podaac.jpl.nasa.gov , salinity@podaac.jpl.nasa.gov
- Inquiries to date: **145** from **86** users
- Help-Desk System: catalog, assign, track status, report
- Aquarius User Inquiry Metrics:

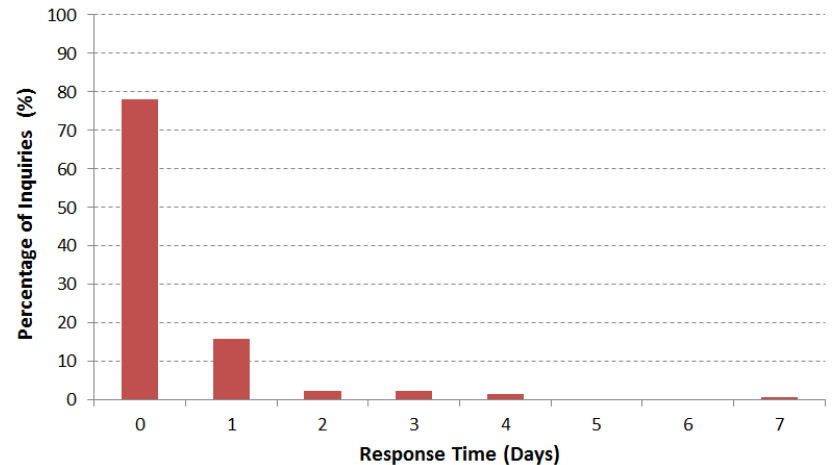


Types of Aquarius User Inquiries to PO.DAAC





















Total Inquiries = 145 from 86 Users
4/14/2011 - 11/1/2013





PO.DAAC Help-Desk Response Times to Aquarius Inquiries



Summary of Available PO.DAAC Tools & Services for Aquarius

Functionality	Tool/Service	Registration Phase		
		pre-V2.0	V2.0	V3.0
Data Discovery	PO.DAAC Portal			
	Consolidated Web-services (PO.DAAC-CWS)			
Data Access	FTP			
	THREDDS			
	OPeNDAP			
Visualization/Subsetting	PO.DAAC L3-Browser			
	PO.DAAC SOTO (L3)			
	LAS (L3)			
	HiTIDE (L2)			
	PO.DAAC-CWS (L2 & 3)			

 Aquarius mission data
 CAP data

PO.DAAC Tools & Services for Aquarius

Web-Portal <http://podaac.jpl.nasa.gov/>

- Gateway to PO.DAAC data holdings/resources
- Faceted Search of Dataset Metadata
- By: keyword, mission, platform, parameter, sensor, collection spatio-temporal attributes
- Exposure of key descriptive dataset metadata with access links

<http://podaac.jpl.nasa.gov/datasetlist?ids=&values=&search=aquarius+%2Bproject>

Aquarius Mission Page @ PO.DAAC

- Brief Overview of Aquarius mission
- Pointers to Key Resources:

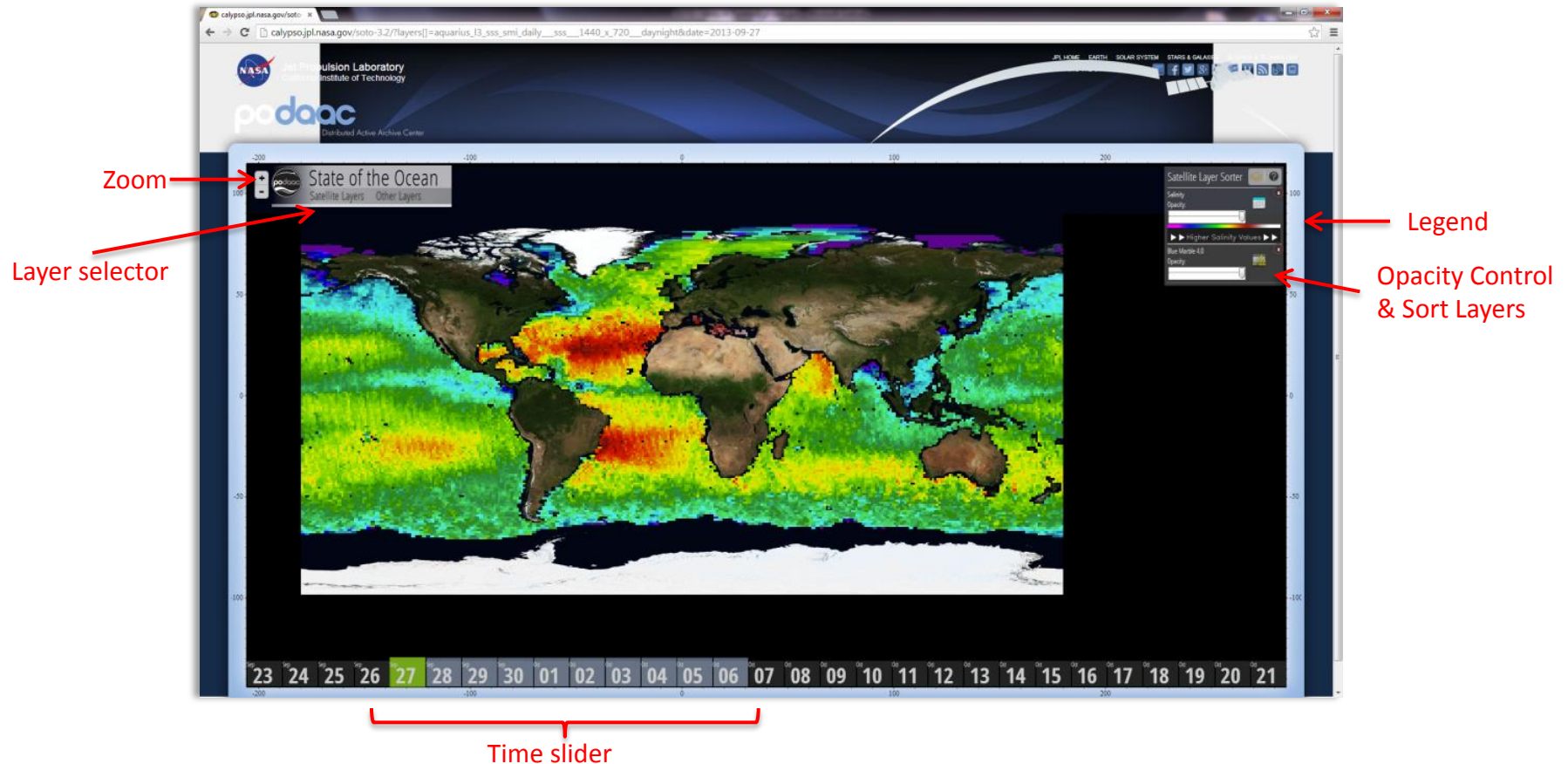
Data access, Tools/Services, Documentation, External Links (eg. <http://aquarius.nasa.gov/>) Announcements

<http://podaac.jpl.nasa.gov/aquarius>

SOTO (*"State of the Ocean"*)

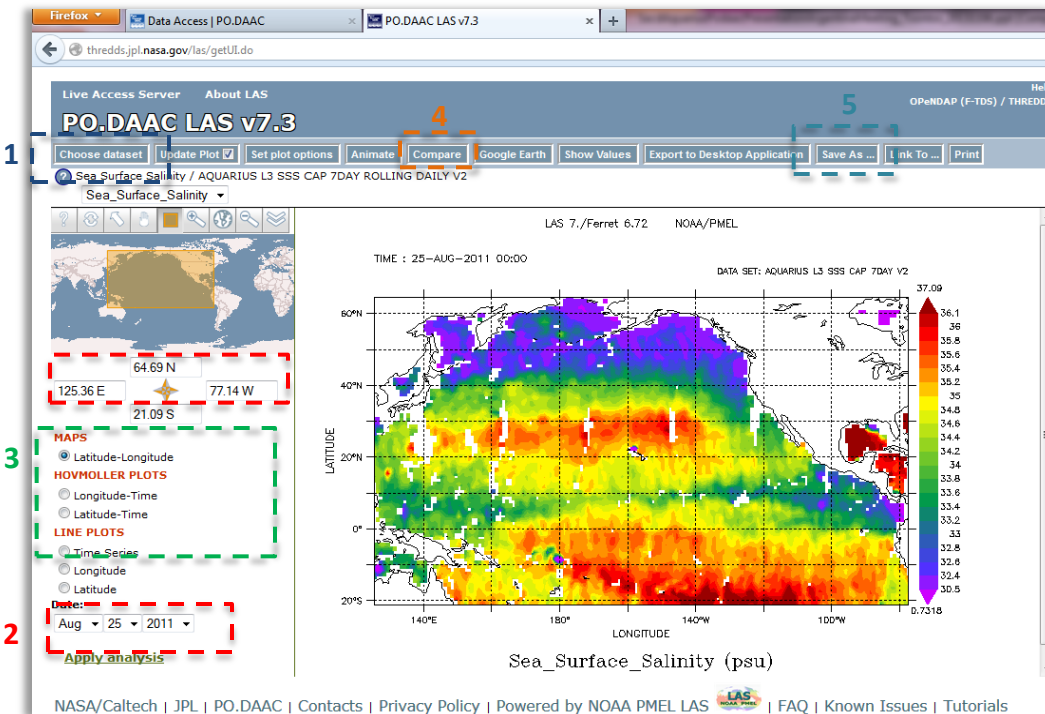
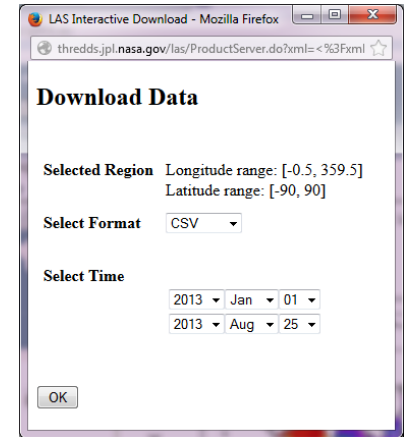
- Browse/Animate Aquarius Salinity and other mapped L3 satellite data products (eg.SST,SSH,CHL,Winds, Currents)
- 30 day series (*currently*)
- New 2D interface: additionally supports layering via opacity controls, Stateful URL sharing ...
- Status: available for Aquarius v2.0 & v3.0 (SOTO-2D)

<http://podaac-tools.jpl.nasa.gov/soto/>

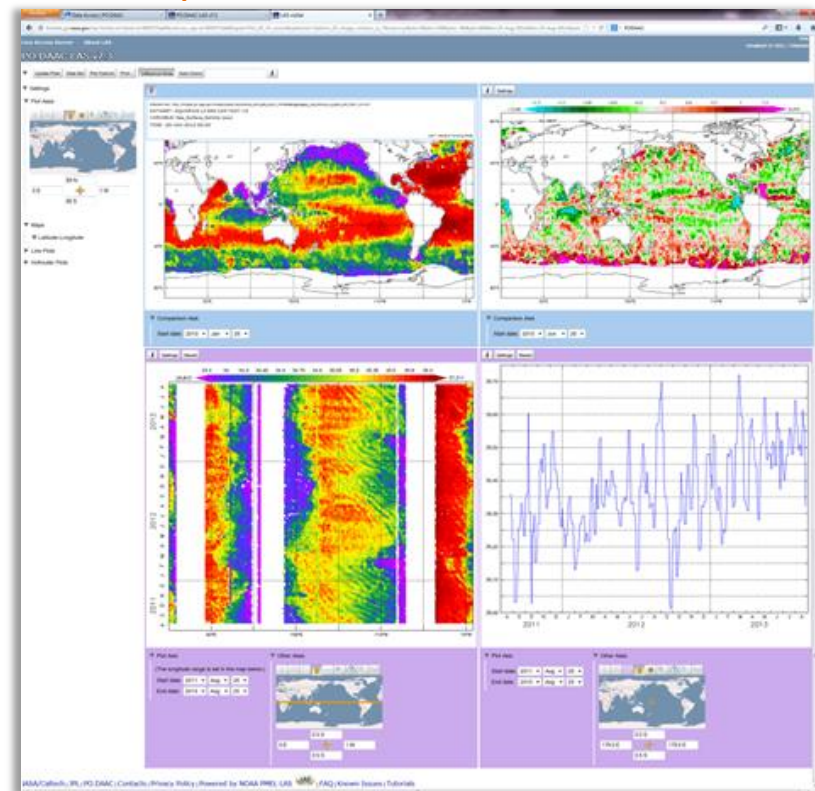


LAS (Live Access Server)

- Visualize various L3 satellite data series: SSS is currently CAP 7d & Monthly
- Spatio-temporal subsetting
- Plotting: Maps, Hovmoller, Line-plots (Transect & Point Time series)
- Analysis: visual comparisons, data transformations, layer differencing
- Export: various formats (eg. ASCII, CSV, NetCDF)
- Status: currently CAP v2.0; Aquarius v3.0



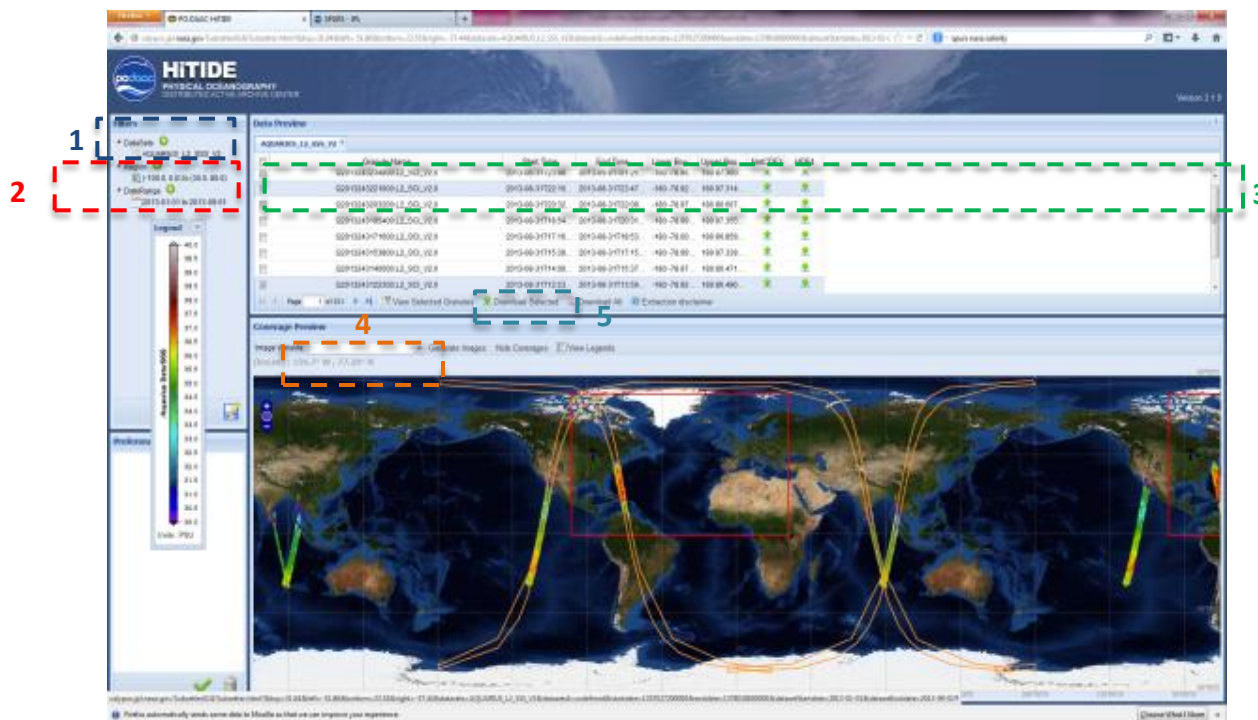
Comparison Panel



<http://thredds.jpl.nasa.gov/las/getUI.do>

HiTIDE (*High-level Tool for Interactive Data Extraction*)

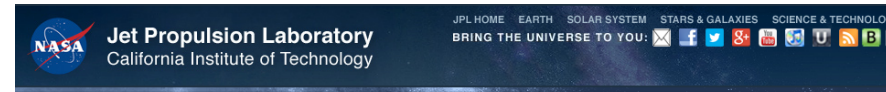
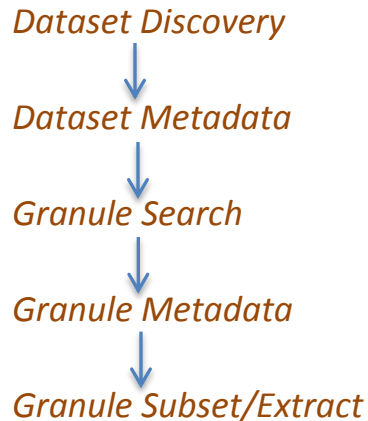
- Web-based tool for interactive search, imaging & extraction of L2 "swath" data from PO.DAAC's archive
- Intuitive Interface: Filter specification, Mapping (zoom, pan etc.)
- Filtering: Dataset-type, Temporal, Spatial (bounding box)
- Returns: list of data files matching filter criteria with mapped swaths
- Imaging of select variables (backend - customizable variable list per dataset)
- Export subsetting granule data (NetCDF, HDF)
- Utilizes: CWS, OPeNDAP
- Status: v2.0 Aquarius integrated in HiTIDE test. Publicly available for v3.0



<http://podaac.jpl.nasa.gov/ws/>

CWS (*Consolidated Web-Services*)

- Integrated set of PO.DAAC Web-services for dataset/granule search & subsetting
- WS: application programming interfaces (APIs) that can be accessed through standard web protocols (HTTP) with well-defined parameter extensions
(General Form: <http://podaac.jpl.nasa.gov/ws/service?parameters>)
- Returns: response as XML structure or in JSON (*JavaScript Object Notation*) format
- Utility: - programmatic calls to CWS via HTTP request
- sequentially drill down dataset information hierarchy



PO.DAAC Web Services Overview

Introduction

PO.DAAC provides several ways to discover and access physical oceanography data, from the PO.DAAC Web Portal to FTP access to front-end user interfaces (see <http://podaac.jpl.nasa.gov>). That same data can also be discovered and accessed through PO.DAAC Web Services, enabling efficient machine-to-machine communication and data transfers.

What is PO.DAAC Web Services

PO.DAAC Web Services are application programming interfaces (APIs) that can be accessed through standard web protocols. The W3C defines Web Service in part as, "A software system designed to support interoperable machine-to-machine interaction over a network," (for the full definition see <http://www.w3.org/TR/ws-arch/#whatis>). The PO.DAAC Web Services use a Representational State Transfer (REST) model with calls issued over a Hypertext Transfer Protocol (HTTP) connection. On receipt of a request message, our services return the response in either an Extensible Markup Language (XML) structure or, optionally, a JavaScript Object Notation (JSON) format.

A typical PO.DAAC Web Service request is generally of the following form:

<http://podaac.jpl.nasa.gov/ws/service?parameters>

Where service indicates the particular service requested (such as "search") and format indicates the output response format (usually atom or rss a call to the "search" service). The parameters, options, and details of each of our Web Services are described in the corresponding API documentation.

WebServices

The following is the list of available PO.DAAC Web Services

Name	Description
Dataset Metadata	Dataset metadata service retrieves the metadata of a dataset on PO.DAAC's dataset catalog using the following parameters: datasetId, shortName, and format.
Granule Metadata	Granule metadata service retrieves the metadata of a granule on PO.DAAC's catalog using the following parameters: format and other optional parameters.
Search Dataset	Dataset Search service searches PO.DAAC's dataset catalog, over Level 2, Level 3, and Level 4 datasets, using the following parameters: datasetId, shortName, startTime, endTime, bbox, and others.
Search Granule	Search Granule does granule searching on PO.DAAC level 2 swath datasets (individual orbits of a satellite), and level 3 & 4 gridded datasets (time averaged to span the globe). The following parameters are supported: datasetId, shortName, startTime, endTime, bbox, and others.

Example Aquarius use case & CWS workflow:

Step

CWS Request

Response / Result

1. List Aquarius datasets

<http://podaac.jpl.nasa.gov/ws/search/dataset/?keyword=aquarius>

The screenshot shows the search results for 'aquarius' on the Podaac website. It displays a list of media files, including 'dataset (XML Document)', 'AQUARIUS L3 SSS SMI MONTHLY V2.jpg', and 'AQUARIUS L3 SSS SMI MONTHLY V2 (Firefox HTML Document)'. To the right, there is an XML snippet showing metadata for the selected dataset, including schema location, dataset title, and series name.

2. Get dataset metadata for monthly SSS product

http://podaac.jpl.nasa.gov/ws/metadata/dataset/?format=gcmd&shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V2

The screenshot shows the metadata page for the dataset 'AQUARIUS_L3_SSS_SMI_MONTHLY_V2'. It displays XML metadata including the dataset title 'Aquarius Official Release Level 3 Sea Surface Salinity Standard Mapped Image Monthly Data V2.0', the dataset creator 'Frank Wentz, Simon Yueh, Gary Lagerloef', and the dataset series name 'Aquarius Sea Surface Salinity Products'.

3. List all related granules within a date range

http://podaac.jpl.nasa.gov/ws/search/granule/?shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V2&startTime=2013-01-01T08%3A10%3A07Z&endTime=2013-06-30T23%3A10%3A07Z&format=html&pretty=true

The screenshot shows the granule search results for the dataset. It lists several granules, including 'Q20131522013181.L3m_MO_SCI_V2.0_SSS_1deg' and 'Q20131212013151.L3m_MO_SCI_V2.0_SSS_1deg'. Each granule entry includes the entry ID, update time, and a link to the granule metadata.

4. Get metadata for a specific granule

http://podaac.jpl.nasa.gov/ws/metadata/granule/?format=iso&shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V2&granuleName=Q20130322013059.L3m_MO_SCI_V2.0_SSS_1deg

The screenshot shows the metadata page for the specific granule 'Q20130322013059.L3m_MO_SCI_V2.0_SSS_1deg'. It displays XML metadata including the granule name, dataset title, and series name.

5. Get spatial subset of granule data (CWS L2-SSS)



Conclusions

- Regular ingestion of Aquarius data from OBPG via new interface is going smoothly
- **ALL Aquarius public, evaluation and Cal/Val datasets produced are archived & available via PO.DAAC**
- Active monitoring/reporting of Aquarius usage and inquiry patterns & responsive to user community
- Range of PO.DAAC tools & Services already available for Aquarius v2.0 data
- Full suite of Tools & Services will be in place for v3.0

Including exciting, new capabilities:

- | | |
|---------------------------------|--------------------------------------|
| ✓ SOTO-2D | (L3 visualization) |
| ✓ LAS | (L3 subsetting) |
| ✓ HiTIDE | (L2 subsetting) |
| ✓ CWS/Consolidated Web-Services | (L2&3 search-dataset/granule & L2SS) |

