Access *Aquarius* Data

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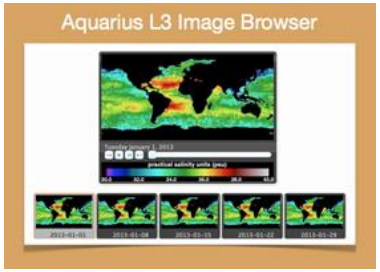
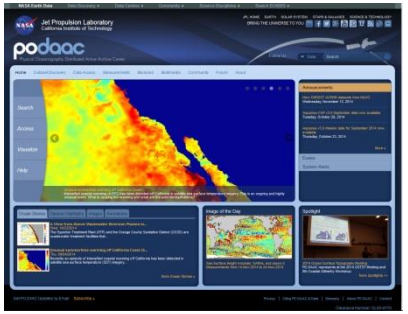
PO.DAAC Services & Tools



Visualization



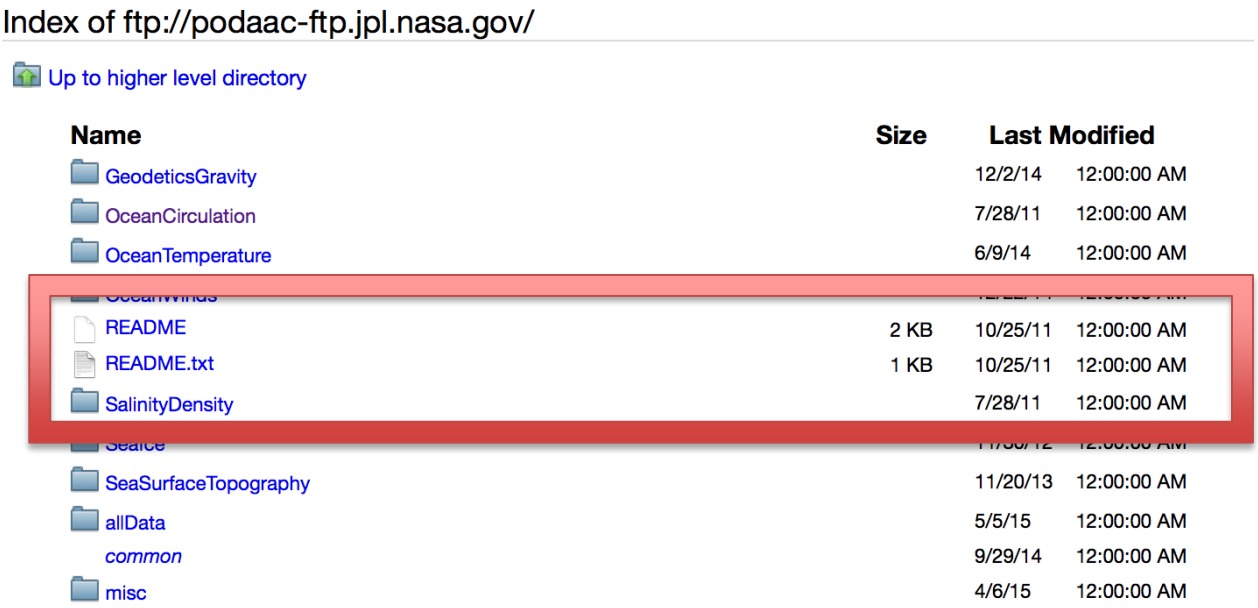
Web Portal

Services & Tools for Accessing & Subsetting Data

**Also have visualization capabilities*

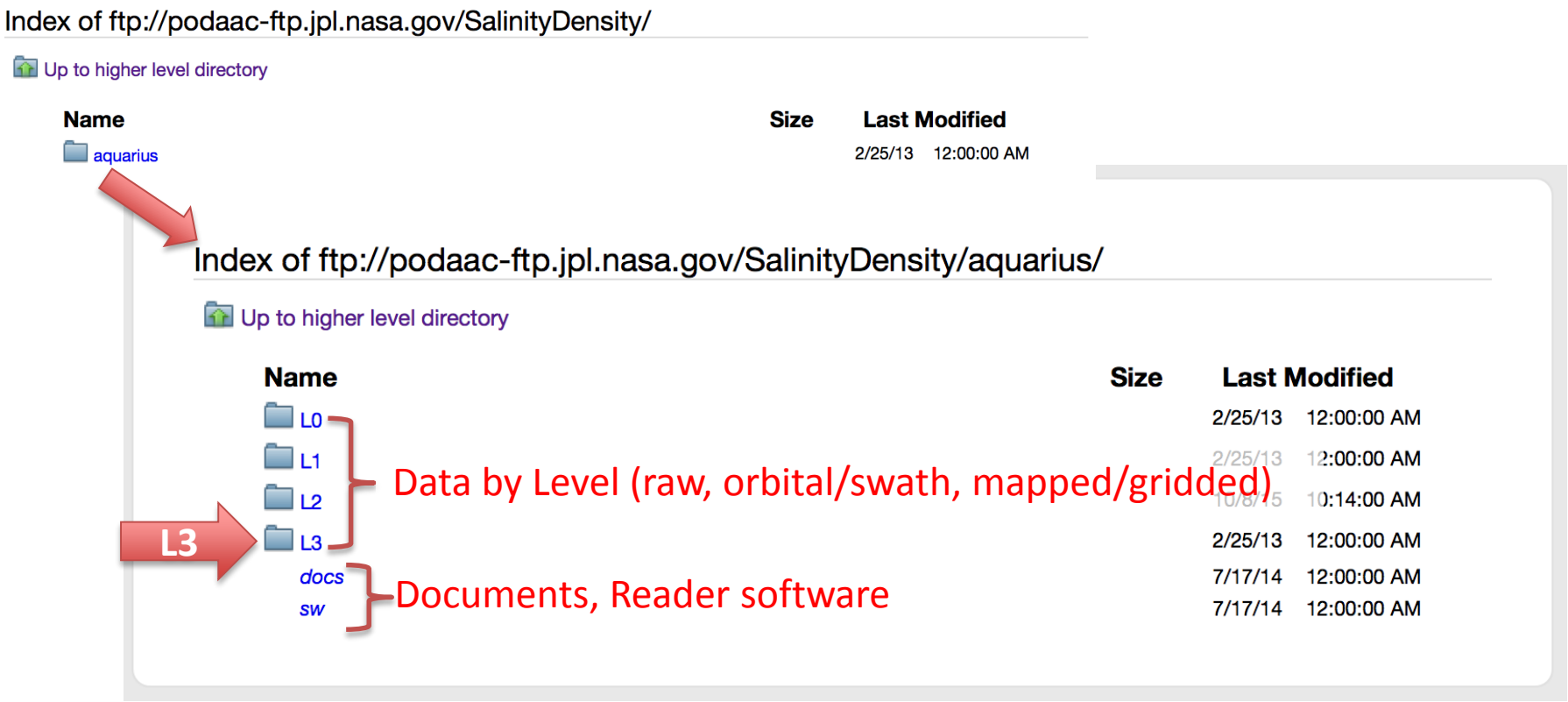
FTP-based Access

- PO.DAAC anonymous FTP site via web browser (Firefox, Chrome, IE, etc.)
  - **ftp://podaac-ftp.jpl.nasa.gov**
  - Interactive/Graphical User Interface (GUI)



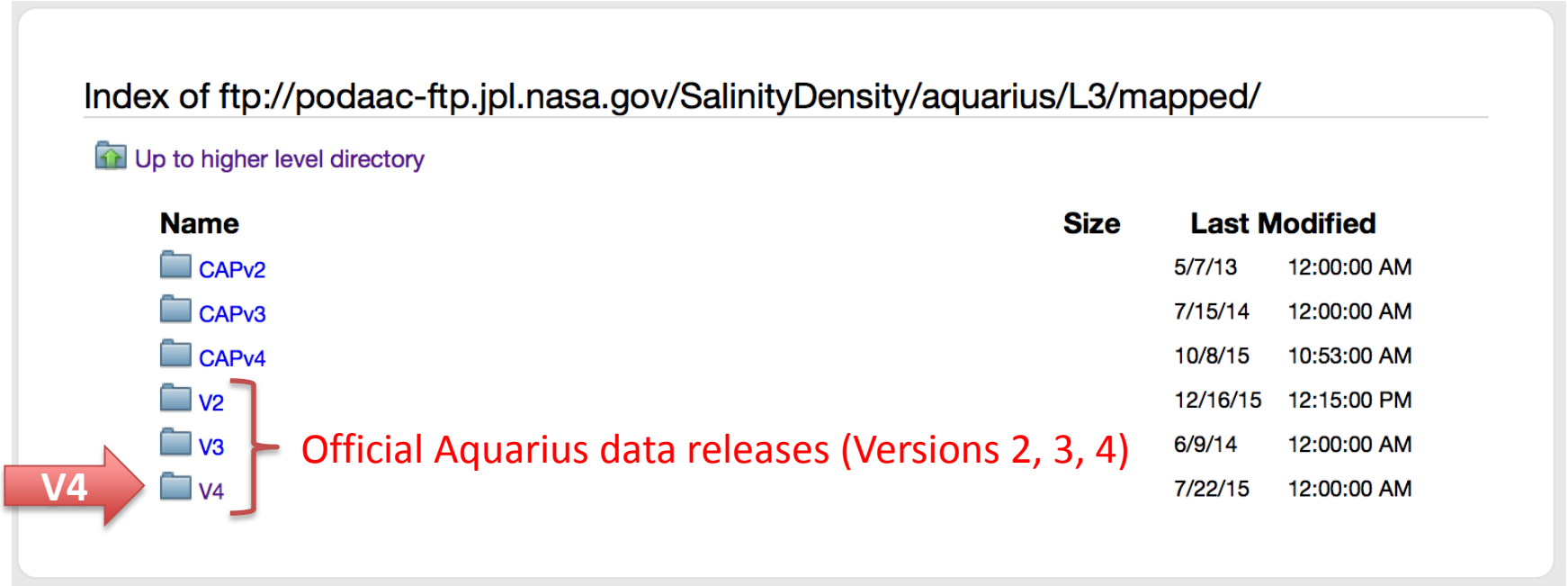
FTP-based Access

Directory organization: Aquarius data, documents & reader software



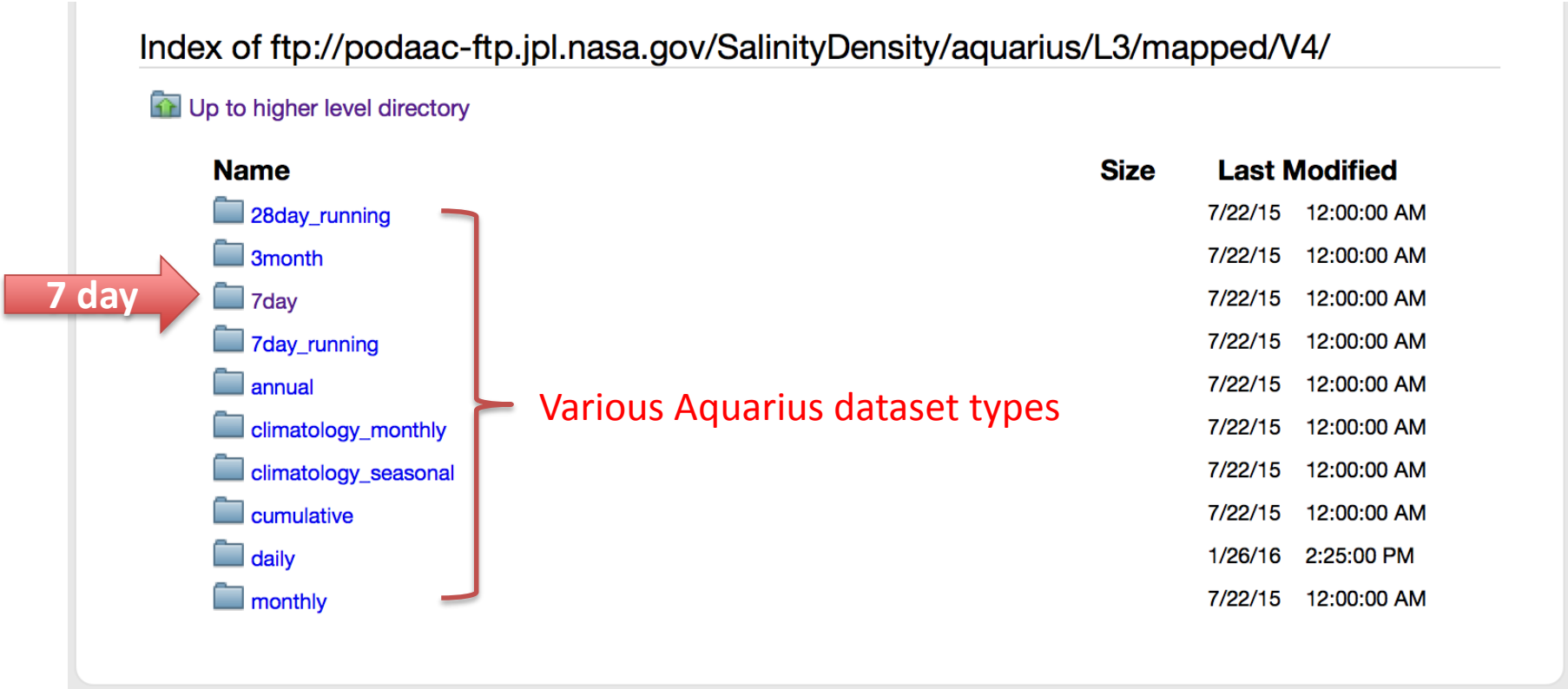
FTP-based Access

Directory organization: Aquarius data by Version …



FTP-based Access

Directory organization: … then by Product Time Interval …



FTP-based Access

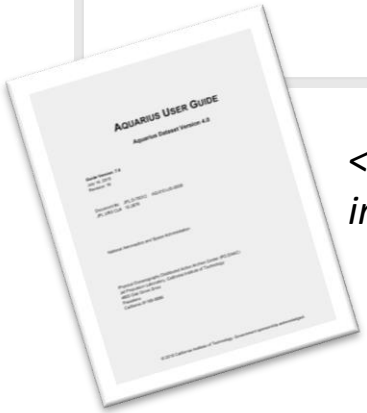
Directory organization: … then by Product Type …

Index of ftp://podaac-ftp.jpl.nasa.gov/SalinityDensity/aquarius/L3/mapped/V4/7day/

Up to higher level directory

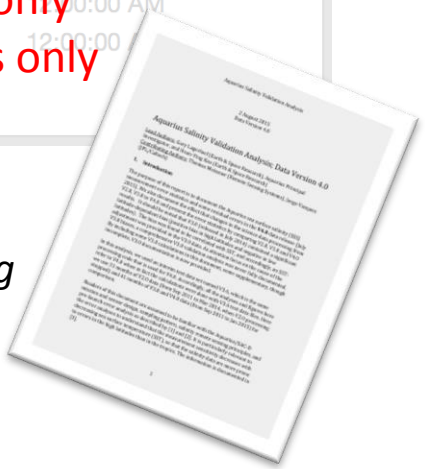
Name	Size	Last Modified
SCI		7/22/15 12:00:00 AM
SCIA		7/22/15 12:00:00 AM
SCID		7/22/15 12:00:00 AM

SCI = Maps based on all/combined data
SCIA = Maps based on data from *ascending* passes only
SCID = Maps based on data from *descending* passes only



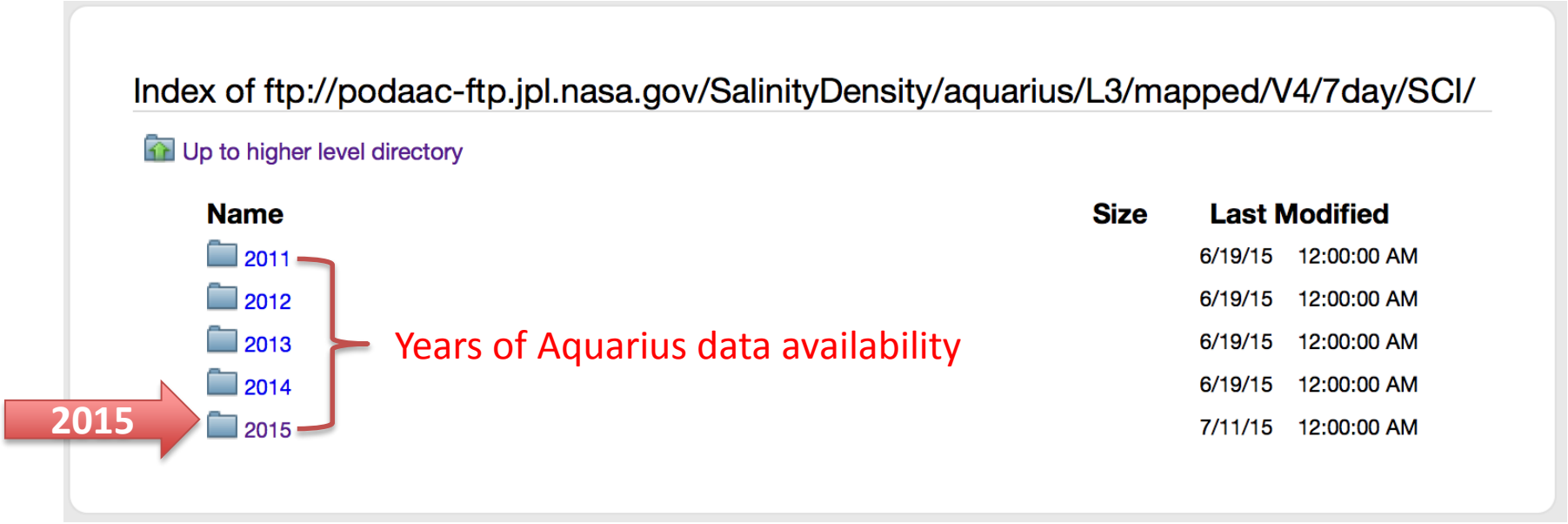
<< Designations are described in the "Aquarius User Guide"

>> Differences between ascending and descending passes are described in the "Aquarius Salinity Validation Analysis"



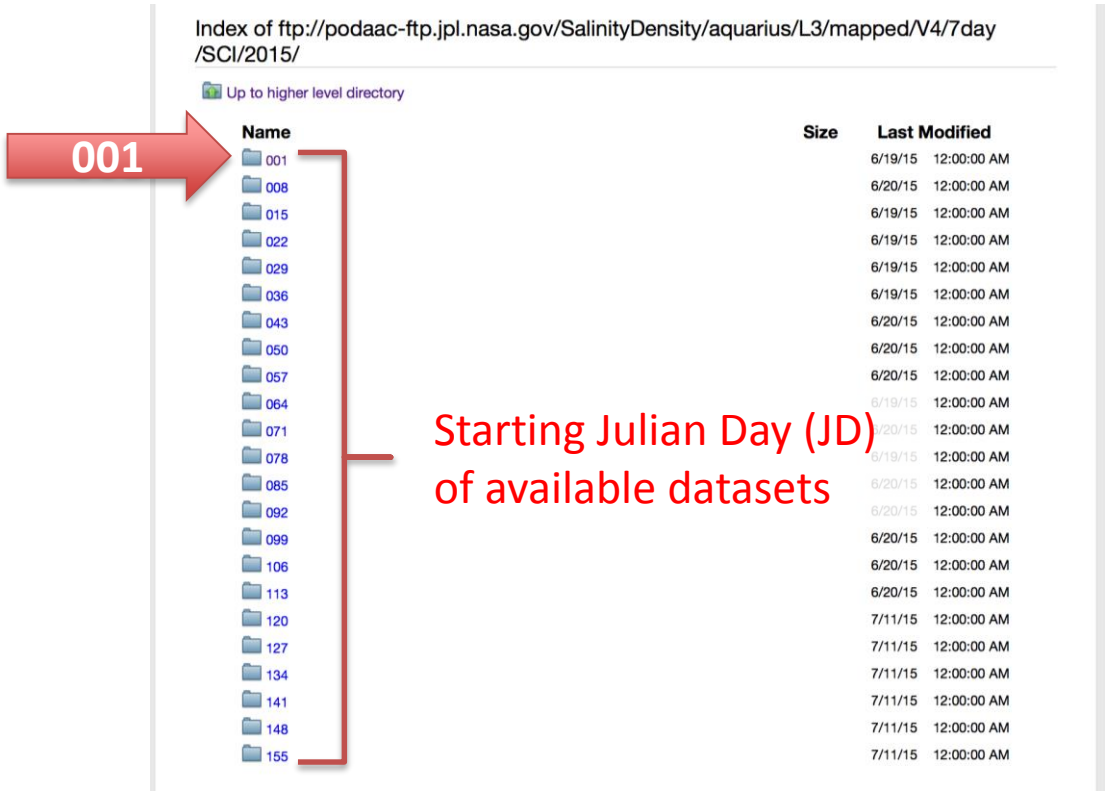
FTP-based Access

Directory organization: … then by Year …



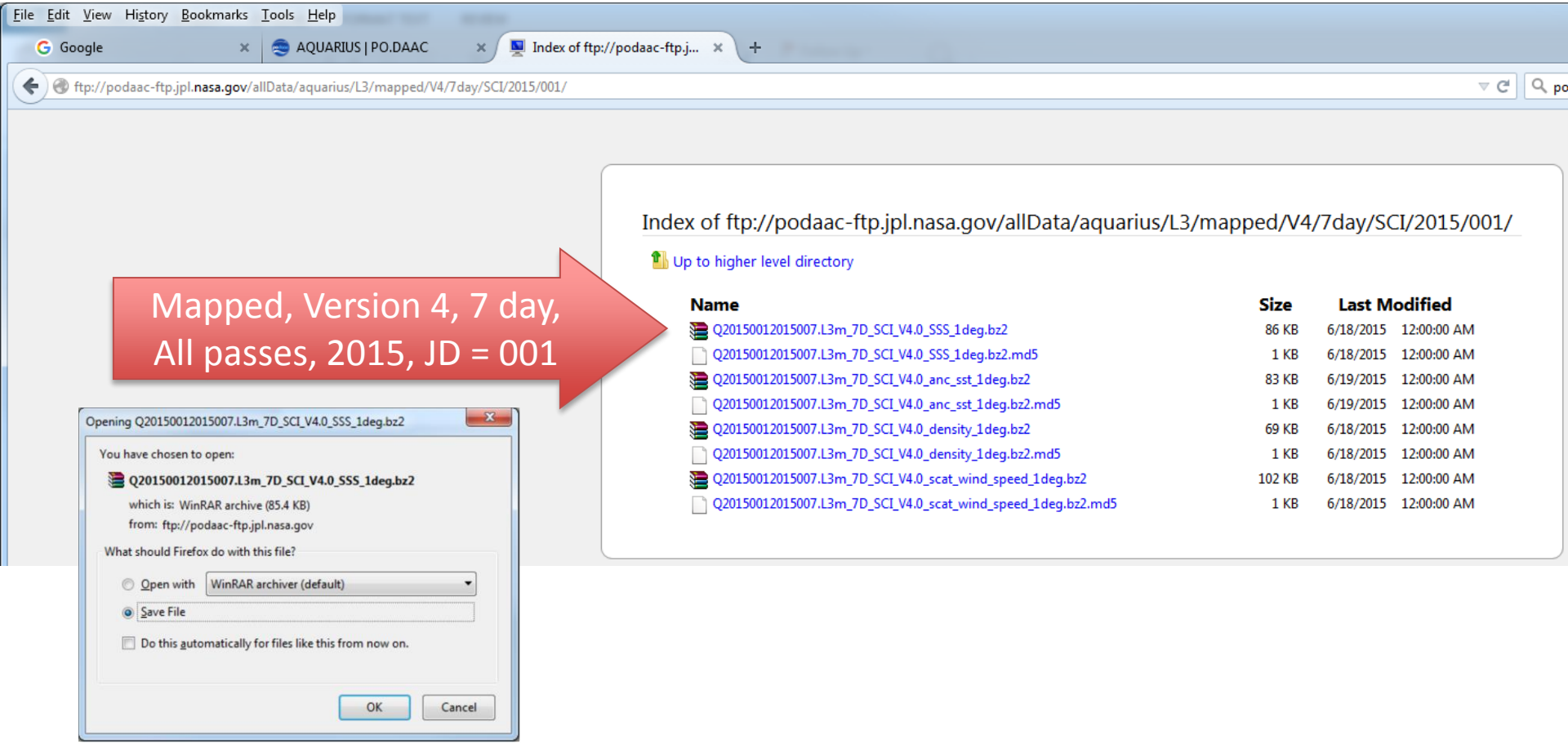
FTP-based Access

Directory organization: … then by Day of Year …



FTP-based Access

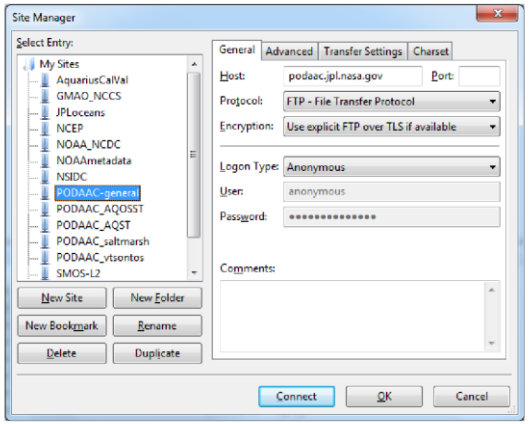
- Listings of complete global Level-3 (mapped) or Level-2 (orbital) files for download



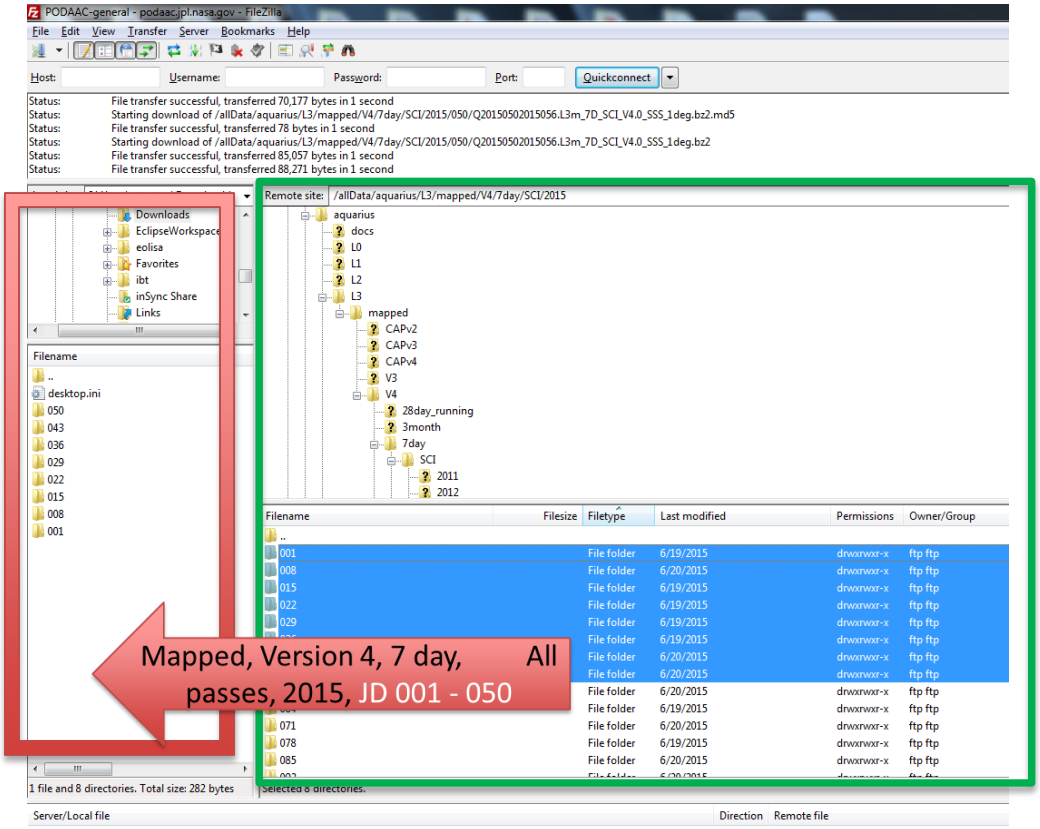
FTP-based Access

Specialized FTP-client tool: eg. *FileZilla*

- Interactive “Drag-n-Drop” GUI-based downloads
- Supports:
  bulk file downloads , filtering, site/login management



Login specification
User: anonymous
Password: your email address



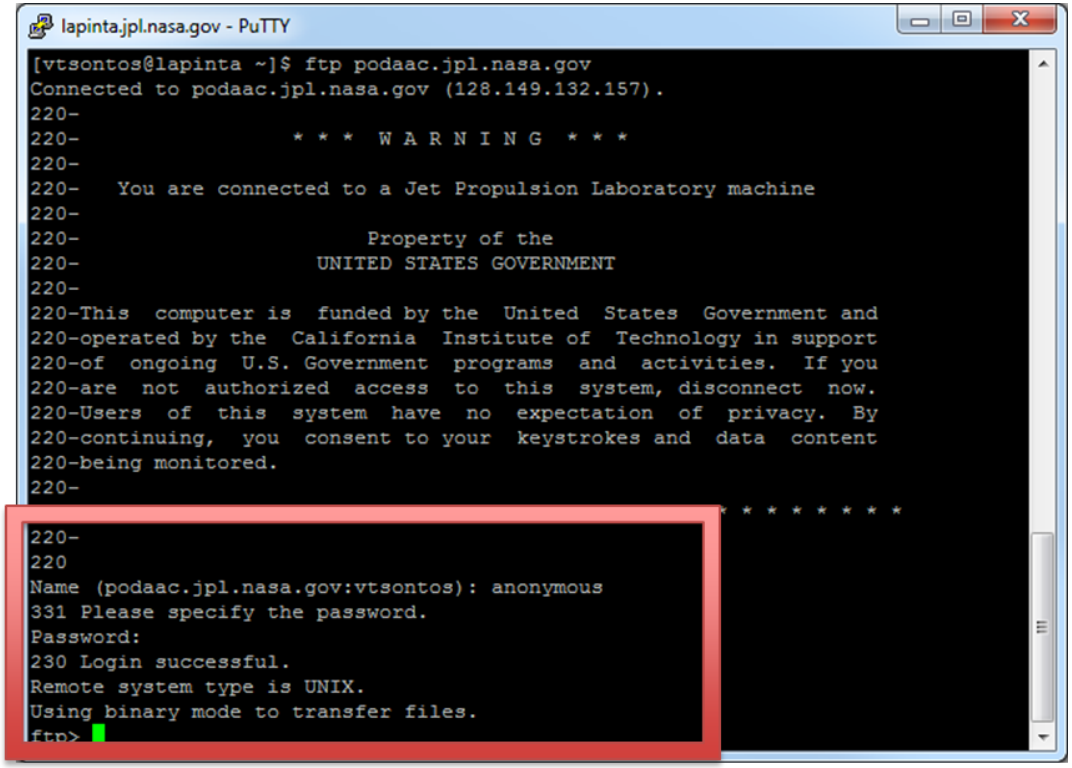
Local destination directory

Remote FTP source data folder(s)

FTP-based Access

- **FTP access via OS command line**
  - Facilitates routine/automated **script-based access** via *cronjob* *(eg.* scheduled downloading)
  - Bulk downloads using ***mget*** command

Syntax: *ftp://**anonymous@**podaac-ftp.jpl.nasa.gov* (password prompt: enter your email)



FTP-based Access

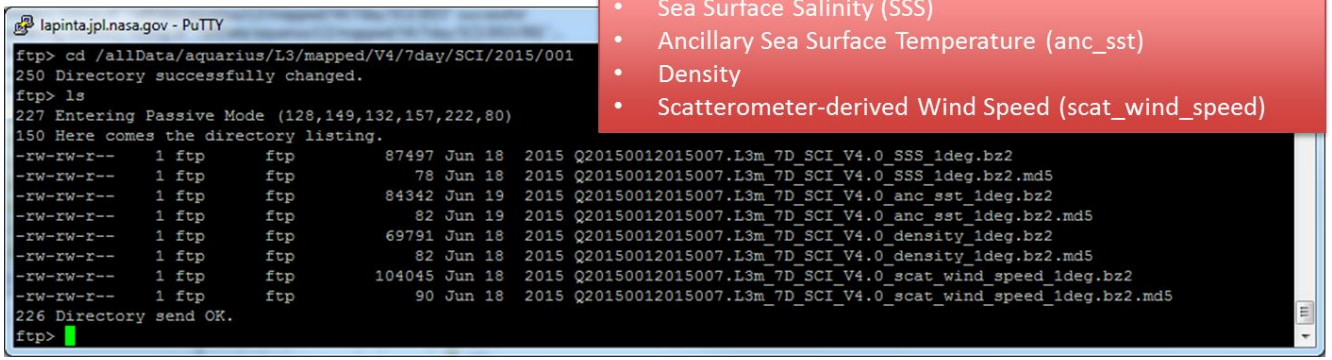
ftp> cd /allData/aquarius/L3/mapped/V4/7day/SCI2015/001

cd = change directory

ftp> ls

ls = list directory items

This directory file list includes:
- Sea Surface Salinity (SSS)
- Ancillary Sea Surface Temperature (anc_sst)
- Density
- Scatterometer-derived Wind Speed (scat_wind_speed)

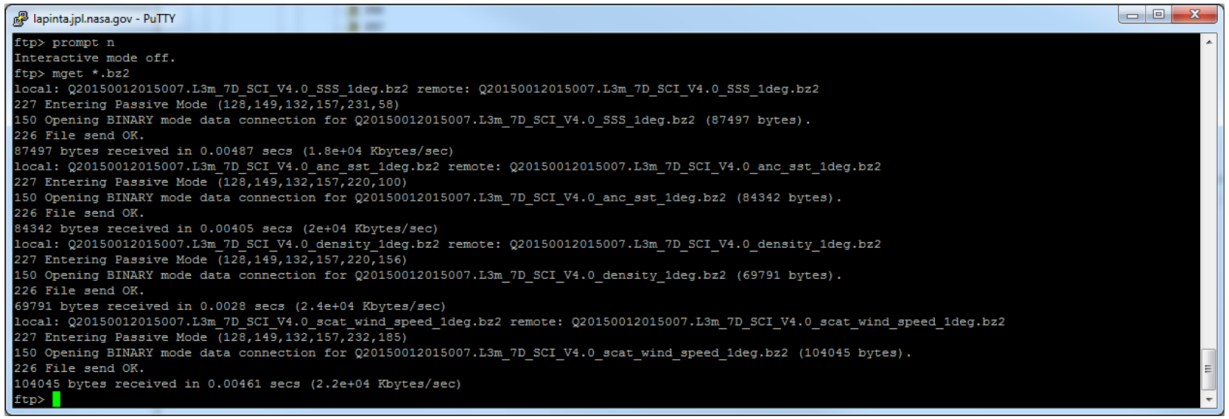


ftp > prompt n

by default prompt is on; mget transfers all files if prompt is off

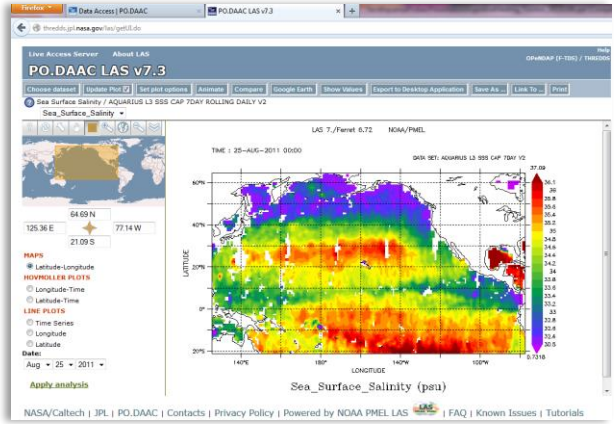
ftp> mget *.bz2

*copies remote files to the local computer (e.g. all * files ending with .bz2 extension)*



Web services for Accessing Aquarius Data from PO.DAAC

- WS: Application programming interface (API) that can be accessed through standard web protocols (HTTP) with well-defined parameter extensions
- General Form: Extended URL with parameters
  eg. *http://ServerAddress/ws-path/service-request?parameters*
- Utility: - programmatic calls over the web to the service via standard HTTP request
  - automated machine-to-machine data access/queries
  - Request: Metadata, subset data, process data, extract/download
  - Returns: a data object: eg. XML/JSON (*JavaScript Object Notation*) structure, data file, image file



LAS (Live Access Server) uses *THREDDS* for L3 data subsetting/extraction

Example of PO.DAAC visualization client tools leveraging Web services on the Back-end

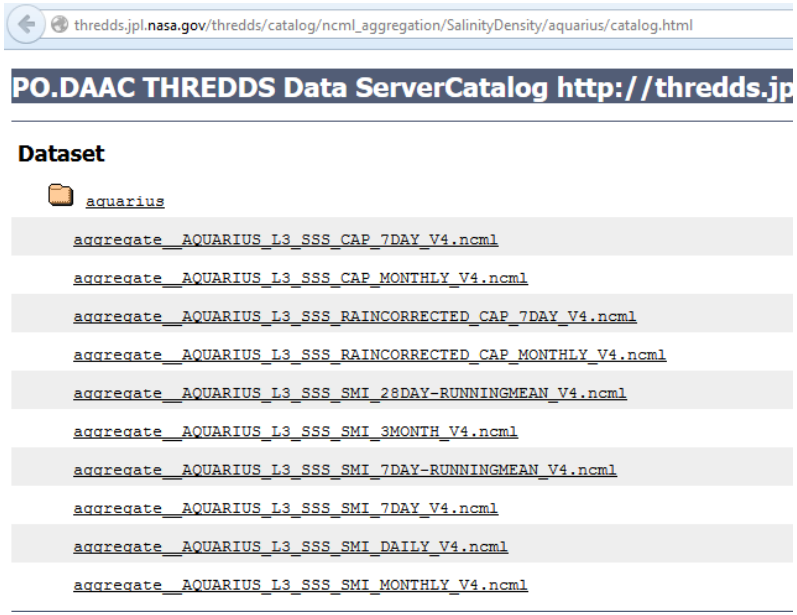
THREDDS

http://podaac.jpl.nasa.gov/podaac_thredds

- HTTP-based Web service widely used to aggregate, serve and subset earth science data
- THREDDS catalogs: logical dataset/granule aggregations (eg. time series of Aquarius L3m data)

  http://thredds.jpl.nasa.gov/thredds/catalog/ncml_aggregation/**SalinityDensity/aquarius**/catalog.html
  http://thredds.jpl.nasa.gov/thredds/catalog/ncml_aggregation/**OceanWinds/aquarius**/catalog.html

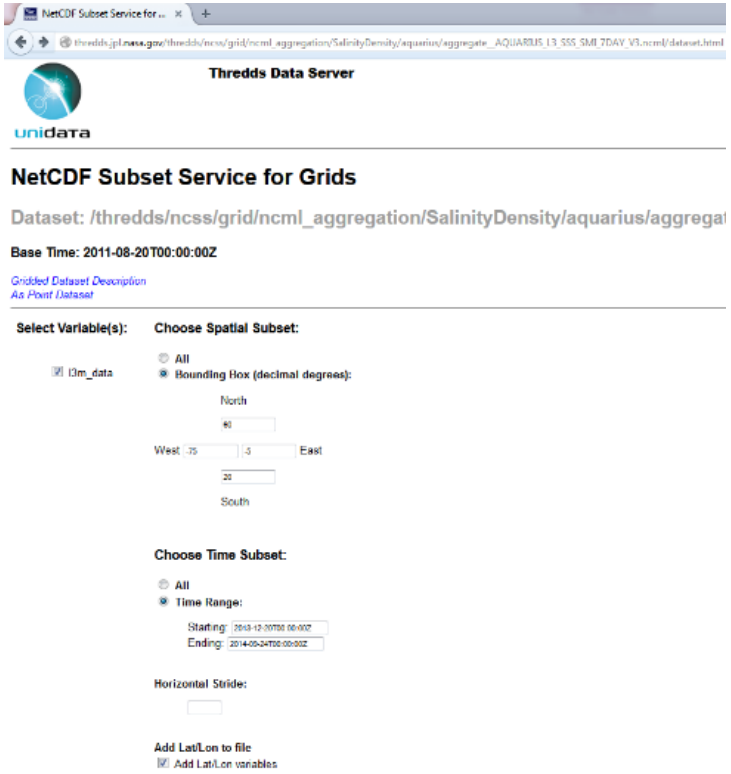
- Subsetting of gridded data "by-value" (*Lat/Lon/Time)*
- Supports output file conversion to netCDF



THREDDS

Interactive subsetting via THREDDS NCSS Form

http://thredds.jpl.nasa.gov/thredds/**ncss**/grid/ncml_aggregation/SalinityDensity/aquarius/aggregate__AQUARIUS_L3_SSS_CAP_7DAY_V4.ncml/dataset.html



Subsetting via structured THREDDS URL with parameters

HTTP service request

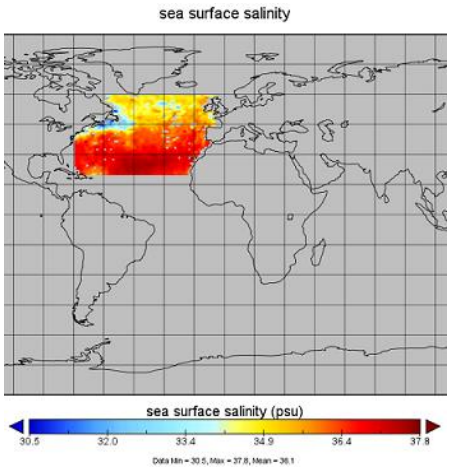
Catalog reference

http://thredds.jpl.nasa.gov/thredds/ncss/grid/ncml_aggregation/SalinityDensity/aquarius/aggregate__AQUARIUS_L3_SSS_SMI_7DAY_V4.ncml?var=l3m_data&north=60&south=20&east=-5&west=-75&time_start=2013-12-20T00:00:00Z&time_end=2014-09-24T00:00:00Z

Variable list

Spatial bounding box

Time range filters



OPeNDAP

- Web service architecture/HTTP-based protocol widely used to serve, subset, deliver earth science data
- Data array *Index-based* subsetting at the granule level
- PO.DAAC Aquarius OPeNDAP collection

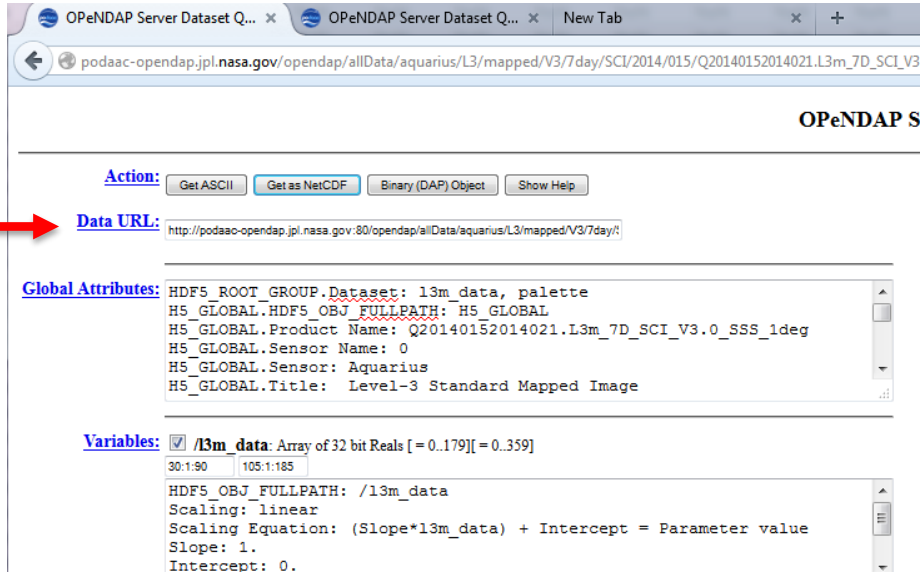
  http://podaac-opendap.jpl.nasa.gov/opendap/allData/aquarius/

Output Format

OPeNDAP

Interactive subsetting and file metadata exposure via OPeNDAP Form

http://podaac-opendap.jpl.nasa.gov/opendap/allData/aquarius/L3/mapped/V4/7day/SCI/2011/239/Q20112392011245.L3m_7D_SCI_V4.0_SSS_1deg.bz2.html



Granule subsetting via extended OPeNDAP URL with parameters

HTTP request

OPeNDAP Data Path

http://podaac-opendap.jpl.nasa.gov/opendap/allData/aquarius/L3/mapped/V4/7day/SCI/2011/239/Q20112392011245.L3m_7D_SCI_V4.0_SSS_1deg.bz2.ascii?l3m_data[30:1:90][105:1:185],lon[0:1:359]

Output Format

Variable List

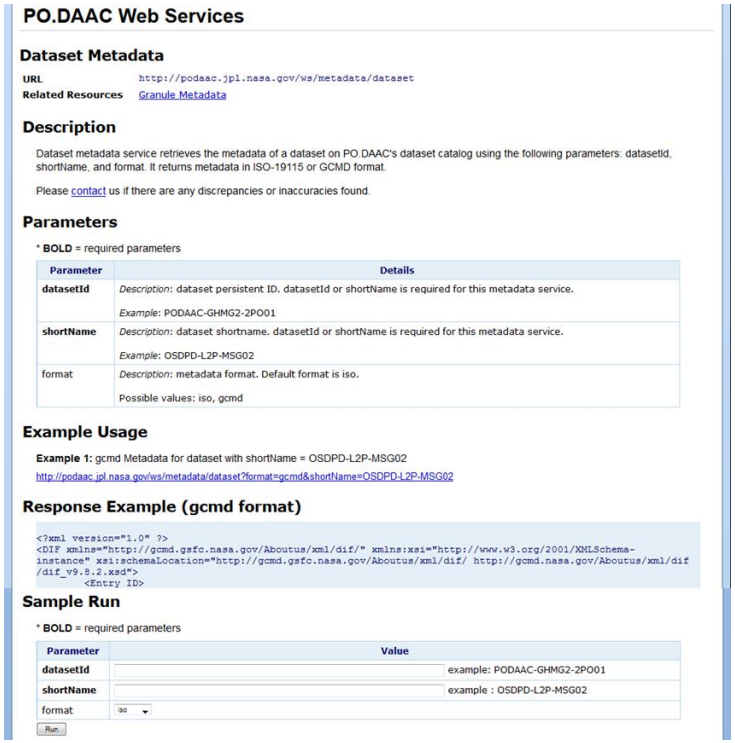
Subset Array index range & step

PO.DAAC Web services (ws)

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

- Integrated set of PO.DAAC Web-services for dataset/granule metadata search & subsetting
- Returns: HTML, XML structure or in JSON format
- Utility: programmatic sequential drill down information hierarchy via “chained” ws calls

Interactive Querying via WS-Forms



PO.DAAC Web Services

Dataset Metadata

URL http://podaac.jpl.nasa.gov/ws/metadata/dataset
Related Resources Granule Metadata

Description

Dataset metadata service retrieves the metadata of a dataset on PO.DAAC's dataset catalog using the following parameters: datasetId, shortName, and format. It returns metadata in ISO-19115 or GCMD format.

Please contact us if there are any discrepancies or inaccuracies found.

Parameters

* **BOLD** = required parameters

Parameter	Details
datasetId	*Description*: dataset persistent ID. datasetId or shortName is required for this metadata service. *Example*: PODAAC-GHMG2-2PO01
shortName	*Description*: dataset shortname. datasetId or shortName is required for this metadata service. *Example*: OSDPD-L2P-MSG02
format	*Description*: metadata format. Default format is iso. Possible values: iso, gcmd

Example Usage

Example 1: gcmd Metadata for dataset with shortName = OSDPD-L2P-MSG02
http://podaac.jpl.nasa.gov/ws/metadata/dataset?format=gcmd&shortName=OSDPD-L2P-MSG02

Response Example (gcmd format)

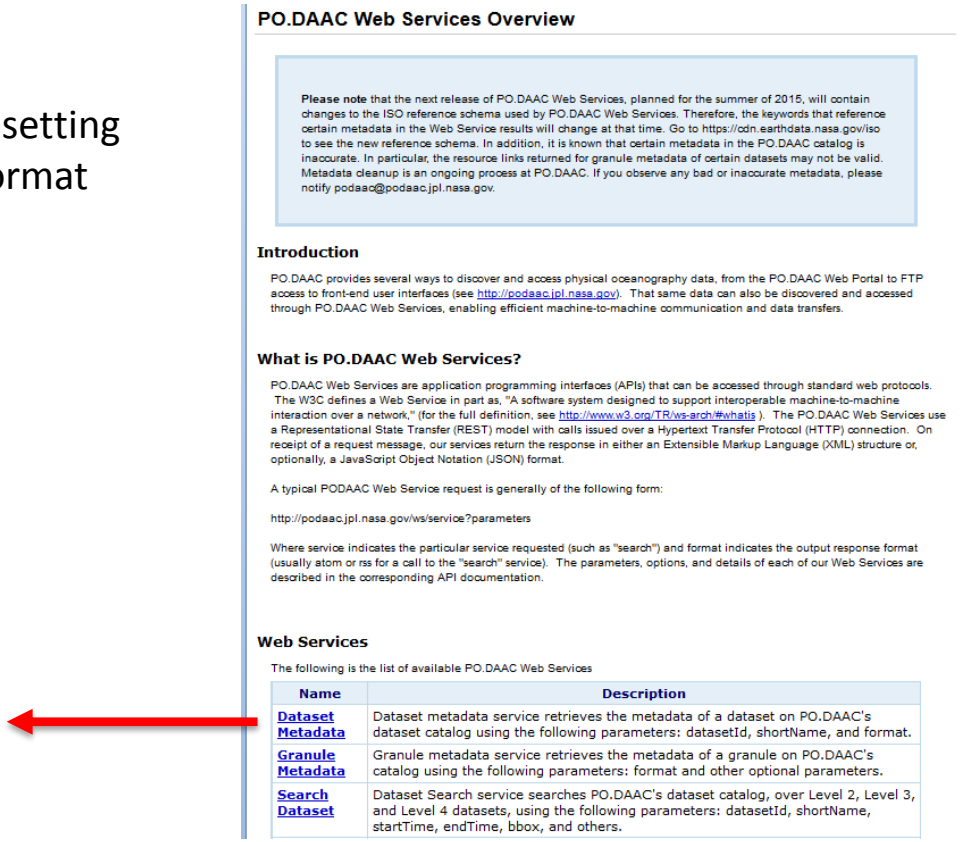
```
<?xml version="1.0" ?>
<DIF xmlns="http://gcmd.gsfc.nasa.gov/Aboutus/xml/dif/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://gcmd.gsfc.nasa.gov/Aboutus/xml/dif/ http://gcmd.nasa.gov/Aboutus/xml/dif
/dif_v9.8.2.xsd">
        <Entry ID>
```

Sample Run

* **BOLD** = required parameters

Parameter	Value
datasetId	example: PODAAC-GHMG2-2PO01
shortName	example : OSDPD-L2P-MSG02
format	iso

Run



PO.DAAC Web Services Overview

Please note that the next release of PO.DAAC Web Services, planned for the summer of 2015, will contain changes to the ISO reference schema used by PO.DAAC Web Services. Therefore, the keywords that reference certain metadata in the Web Service results will change at that time. Go to https://cdn.earthdata.nasa.gov/iso to see the new reference schema. In addition, it is known that certain metadata in the PO.DAAC catalog is inaccurate. In particular, the resource links returned for granule metadata of certain datasets may not be valid. Metadata cleanup is an ongoing process at PO.DAAC. If you observe any bad or inaccurate metadata, please notify podaac@podaac.jpl.nasa.gov.

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 a 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 PODAAC 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 for a call to the "search" service). The parameters, options, and details of each of our Web Services are described in the corresponding API documentation.

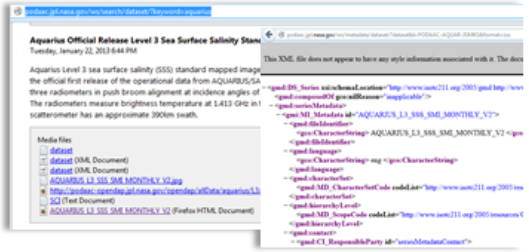
Web Services

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.

PO.DAAC Web services (ws)

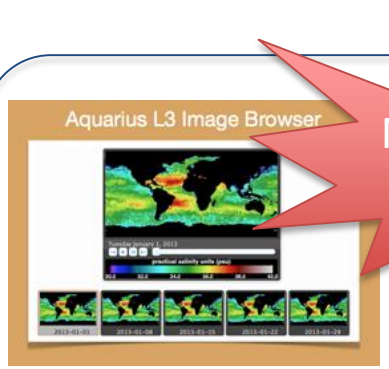
Example WS Metadata Query Workflow for Aquarius

Step	CWS Request	Response / Result
1. List Aquarius datasets	http://podaac.jpl.nasa.gov/ws/search/dataset/?keyword=aquarius	
2. Get dataset metadata for monthly SSS product	http://podaac.jpl.nasa.gov/ws/metadata/dataset/?format=gcmd&shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V4	
3. List all related granules within a date range	http://podaac.jpl.nasa.gov/ws/search/granule/?shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V4&startTime=2013-01-01T08%3A10%3A07Z&endTime=2013-06-30T23%3A10%3A07Z&format=html&pretty=true	
4. Get metadata for a specific granule	http://podaac.jpl.nasa.gov/ws/metadata/granule/?format=iso&shortName=AQUARIUS_L3_SSS_SMI_MONTHLY_V4&granuleName=Q20130322013059.L3m_MO_SCI_V4.0_SSS_1deg	
5. Get spatial subset of granule data *(CWS L2-SSS)*		

Summary of Web Services @ PO.DAAC

Feature	THREDDS	OPeNDAP	PODAAC-ws
Mode of Access	Interactive Form Extended URL	Interactive Form Extended URL	Interactive Form Extended URL
Dataset Applicability	L3 - 4 (gridded)	L1 – 4 (swath & gridded)	L1 – 4 (swath & gridded)
Operation Level	Granule Collection	Individual Granule	Dataset/Granule
Subset Query	By-value	By-index	By-value
Exposes/Returns	Metadata/Data	Metadata/Data	Metadata/Data
Query Limitations	lg. aggregate queries	-	-
Subservices	NCCS, WMS, WCS	-	Metadata: Dataset, Granule Image, extract: Granule
Ease of Use	High	Lower (but v. flexible)	Mid

PO.DAAC Services & Tools



Next week's topic!

Visualization

Web Portal

Services & Tools for Accessing & Subsetting Data

**Also have visualization capabilities*