

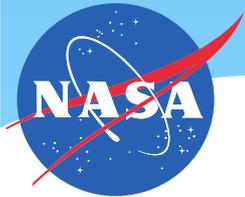
Web Services for Earth Science Data DAS-TAG presentation

Edward Armstrong, Thomas Huang, Charles Thompson, Nga
Quach, Richard Kim, Zhangfan Xing

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National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Web Services and Tools

- * New and emerging PO.DAAC web services
 - * Concerned with search, discovery, data subsetting, data and metadata extraction, imaging services
 - * Integrated.....output of one service an input to another
 - * Available in 6 months (some components are available now)
 - * Work through a use case
- * Other Tools and Services
 - * HiTIDE improvements
 - * PO.DAAC GUI subsetter
 - * Webification
 - * Data subsetting and virtualization

PO.DAAC Portal

The screenshot shows the PO.DAAC web portal interface. At the top, there is a NASA logo and the text 'Jet Propulsion Laboratory California Institute of Technology'. Below this is a navigation bar with links for 'HOME', 'DATASET DISCOVERY', 'DATA ACCESS', 'MEASUREMENTS', 'MISSIONS', 'MULTIMEDIA', 'USER COMMUNITY', 'HELP', and 'FORUM'. A search bar is located on the right side of the navigation bar. The main content area is divided into several sections: a sidebar on the left with navigation options (Parameter, Collections, Platform, Sensor, Spatial Coverage, Latency), a central search bar, and several featured content blocks. These include 'NEW OCEAN STORY' with a QuikSCAT Arctic Sea Ice image, 'DATA ACCESS TOOLS & SERVICES' listing various protocols, 'VISUALIZATION' with a State of the Ocean (SOTO) image, 'ANIMATION & IMAGES', 'PO.DAAC SERVICES & TEAM', and 'EOSDIS NASA EARTH SCIENCE DATA CENTERS'. There are also sections for 'EVENTS', 'ANNOUNCEMENTS', and 'LEARN ABOUT'.

- * PO.DAAC Web Portal for Human Consumption
- * Find Datasets
- * Learn Datasets
- * Download Datasets
- * Through Graphical User Interface (GUI)

Use Case

- * I know what I am looking for: e.g., WindSat level2 SST granules.
- * I want to get the latest granules every day, subset them and create browse images.
- * I want to write/run a script or program and schedule to run it everyday through PO.DAAC Web Services.

Available Web Services

- * Metadata for Dataset/Granule Web Service
- * Search Dataset/Granule Web Service
- * Image Granule Web Service
- * Extract Granule Web Service

PO.DAAC Web Services

- * PO.DAAC Web Services can be invoked from any programming languages or scripts over HTTP.
- * Java, Python, Perl, IDL, Matlab, etc.
- * Each Web Service has API Documentation.
- * API Doc contains
 - * Description
 - * Endpoint
 - * Input parameters
 - * Output
 - * Example
 - * Sample Run

Demo

- * Find ASCAT level 2 dataset
- * Generate ISO Metadata for the dataset
- * Find Granule on startTime 2009-02-02 to 2009-02-03
- * Run Image Service
- * Run Extract Service

1. Find ASCAT Level 2 Dataset

- * From the browser, go to <http://podaac-test.jpl.nasa.gov/ws/search/dataset>
- * Generate the Web Service call
 - * in the sample run section on the API Doc, type “ascat” as keyword and “2” as the process level and click “run”
 - * The follow URL will be generated
<http://podaac-test.jpl.nasa.gov/ws/search/dataset/?keyword=ascat&processLevel=2&pretty=true&format=html>
- * From the html result page, copy the Entry ID of the second result which is ASCAT L2 25km.

PODAAC-ASOP2-25X01 ← this Dataset persistent ID is needed to call other services.

2. Generate ISO Metadata

- * From the browser, go to

<http://podaac-test.jpl.nasa.gov/ws/metadata/dataset>

- * From the API Doc, in the Sample Run section, paste the selected dataset id from the previous slide “PODAAC-ASOP2-25X01” and click run

- * Following URL will be generated

<http://podaac-test.jpl.nasa.gov/ws/metadata/dataset/?format=gcmd&datasetId=PODAAC-ASOP2-25X01>

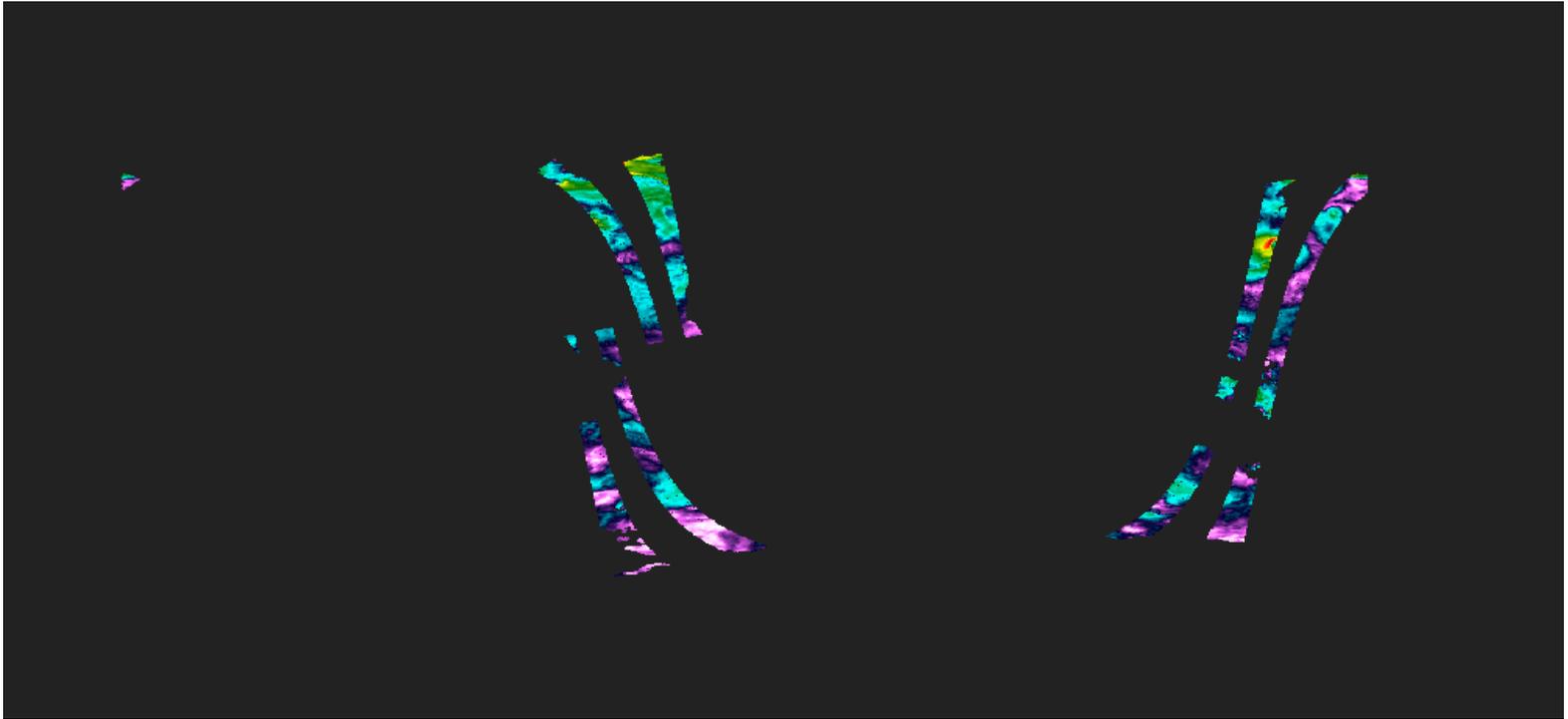
3 Find Granule

- * Go to : <http://podaac-test.jpl.nasa.gov/ws/search/granule>
- * From the sample run, paste “PODAAC-ASOP2-25X01” to datasetId and 2009-02-02 as startTime and 2009-02-03 as endTime and click run
- * From the result, copy the granule name (Entry ID)
ascat_20090203_071800_metopa_11900_eps_o_250_1015_ovw.l2.nc

4. Run image service

- * Go to <http://podaac-test.jpl.nasa.gov/ws/image/granule>
- * `://podaac-tools.jpl.nasa.gov/ws/image/granule/?datasetId=PODAAC-ASOP2-25X01&granuleName=ascat_20130122_224800_metopa_32495_eps_o_250_2101_ovw.l2.nc&request=GetMap&version=1.3.0&format=image%2Fpng&bbox=-180%2C-90%2C180%2C90&height=400&width=800&Transparent=true&layers=&styles=&srs=`

Image result



5. Run Extract service

- * Go to <http://podaac-test.jpl.nasa.gov/ws/extract/granule>
- * http://podaac-tools.jpl.nasa.gov/ws/extract/granule/?datasetId=PODAAC-ASOP2-25X01&granuleName=ascatscat_20130122_224800_metopa_32495_eps_o_250_2101_ovw.l2.nc&bbox=-180%2C-90%2C180%2C90&format=netcdf

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HITIDE

PO.DAAC Subsetter
PHYSICAL OCEANOGRAPHY
DISTRIBUTED ACTIVE ARCHIVE CENTER

Filters

- DataSets (+) REMSS-L2P-AMSRE
- Region (+) (-99.0, -54.0) to (36.0, 78.0)
- DateRange (+) 2010-06-14 to 2010-06-15

Data Preview

* Displaying the first 10 items

<input type="checkbox"/>	Granule Name	Start Time	End Time	Lower Bou...	Upper Bou...	NetCDF3	HDF4
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43160.dat-v01.nc	2010-06-14T23:55...	2010-06-15T00:01...	24.65 61.82	165.91 88.65		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43159.dat-v01.nc	2010-06-14T21:34...	2010-06-14T22:59...	-107.64 -6...	43.78 -11.03		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43158.dat-v01.nc	2010-06-14T19:55...	2010-06-14T21:20...	-106.71 -6...	43.76 35.0		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43157.dat-v01.nc	2010-06-14T18:16...	2010-06-14T18:57...	-135.51 -6...	-37.53 83.9		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43156.dat-v01.nc	2010-06-14T16:37...	2010-06-14T17:18...	-127.98 -6...	-12.77 83.88		
<input checked="" type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43155.dat-v01.nc	2010-06-14T14:58...	2010-06-14T15:41...	-158.91 -6...	11.89 83.9		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43154.dat-v01.nc	2010-06-14T13:20...	2010-06-14T14:04...	-179.48 -6...	36.66 88.62		
<input type="checkbox"/>	20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43153.dat-v01.nc	2010-06-14T11:41...	2010-06-14T12:27...	-154.85 -6...	49.08 88.67		

Get Next 10 Download Selected Download All

Coverage Preview - displaying Granule Name : 20100614-AMSRE-REMSS-L2P-amstr_l2b_v05_r43155.dat-v01.nc
Variable: sea_surface_temperature

Generate Image Preview Legend

(lon,lat) : 14.20° E , 69.83° N

The **High-level Tool for Interactive Data Extraction (HITIDE)** is a web-based interface facilitating the search, imaging, and extraction of select Level 2 "swath" data products from PO.DAAC's archive.

HITIDE Status

- * HITIDE
 - * Hardened tools, services
 - * Better swath coverage display
 - * Paged results
 - * Multi-dataset search
 - * Multi-granule selection for swath polygon display, extraction, and imaging
 - * Faster spatial & temporal search

Ongoing & Future Work

- * **Features**

- * **Planned for 2013**

- * Adding More Datasets (SST, ASCAT 12.5km & Coastal, Aquarius), ongoing.

- * Colocation searching

- * Spatially and temporally related data

- * Non-truncated swath scans in extraction

- * **Other possible features**

- * Search on events

- * Re-enable statistical search

Webification

The goal: make data easy to use in the “web” way

The idea: Inner components of an arbitrary data store, such as attributes, labels, image bands, and data arrays, are directly **addressable** and **accessible** by **well-defined** and **meaningful** URLs.

Example:

[http://data/earth/climatology.nc/SST\[0:2,45:55,85:95\]?output=nc](http://data/earth/climatology.nc/SST[0:2,45:55,85:95]?output=nc)

Another Example:

[http://data/saturn/N1506378043_1.IMG/o/image\[\(10,20\)300x200\]?output=gif](http://data/saturn/N1506378043_1.IMG/o/image[(10,20)300x200]?output=gif)

Webification is an enabling technology. Abbreviated as w10n.

Webification

Open specification:

<http://w10n.org>

Summary:

- Resource is viewed as a tree of nodes and leaves.
- They have semantic URLs, accessible through HTTP.
- Meta info exchange format is JSON, by default.
- Full ReSTful style request/response. Read/Write.

Disciplines:

Earth science (NetCDF, HDF 4/5, GRIB)

Planetary Science (VICAR/PDS)

Astronomy (FITS) and more

Extended URL Syntax - Identifier

Identifier	What is identified
/	Meta information about the store.
/node/	Meta info of a particular node in the store.
/node/leaf/	Meta info of a leaf under a node.
/node/leaf[]	Entire byte array for that leaf.
/node/leaf[indexer]	A subset of that leaf indicated by an indexer.
more can be defined.	

Extended URL Syntax - Indexer

Indexer	Type	Example
[start:end:step,start:end:step,...]	range	[0:100,100:200:2]
[no,n1,n2,...]	list	[2,4,6,8,10]
[(x,y)width*height]	tile	[(10,20)300*200]
More can be introduced.		

URL Syntax - Parameters defined for `query_string`

Parameter	Value	Type	Meaning
output	json/html/raw/nc/...	String	Format of output
ignoreCache	false/true	Boolean	If cached output is used
flatten	false/true	Boolean	If array is flattened
traverse	false/true	Boolean	If traverse

More can be introduced.

`query_string` is a string of parameter-value pairs concatenated by '&'.

W10N HTTP Request

Whether meta or data info, the HTTP request is unambiguous by the URL used.

GET Request – Read API

`http://host:port/path/identifier?query_string`

Message body is absent.

PUT Request – Write API

`http://host:port/path/identifier?query_string`

Message body contains data.

Use Case – Quality filtering the SST observations

- * Subset a L2P granule
 - * [http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature\[130<lon<-120,35<lat<45\]?output=format](http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature[130<lon<-120,35<lat<45]?output=format)
- * Apply quality filter
 - * [http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature\[quality_flag>=4\]?output=format](http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature[quality_flag>=4]?output=format)
- * Quality filter, wind screen, subset all in one step !
 - * [http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature\[quality_flag>=4,wind_speed>6,130<lon<-120,35<lat<45\]?output=format](http://host:port/path/2013/123/20130503-MODIS_T-JPL-L2P-T2013123065500.L2_LAC_GHRSSST_N-v01.nc.bz2/sea_surface_temperature[quality_flag>=4,wind_speed>6,130<lon<-120,35<lat<45]?output=format)