

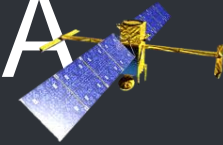


podaac

Physical Oceanography Distributed Active Archive Center



PO.DAAC SWOT DATA Access



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Jet Propulsion Laboratory, California Institute of Technology

June 19th, 2019
SWOT Science Team Meeting 2019
Bordeaux, France

PO.DAAC : NASA Archive For SWOT



Missions Supported
PO.DAAC supports a large fleet of Earth Observing missions, putting key data directly into the hands of Earth science researchers so that they can address key questions about the oceans, environment, and global climate change.
podaac.jpl.nasa.gov/missions

Data Parameters
Learn about core measurements, related missions and instruments
podaac.jpl.nasa.gov/CoreMeasurements

- 600+ datasets
- 250+ TB of data
- 15+ million data files
- 50,000 distinct users served
- 50+ datasets published each year
- 20+ earth observing missions supported

Launch: Sept 2021



Home Dataset Discovery Data Access Measurements Missions Multimedia Community Forum About

Search Access Visualize Help

Announcements

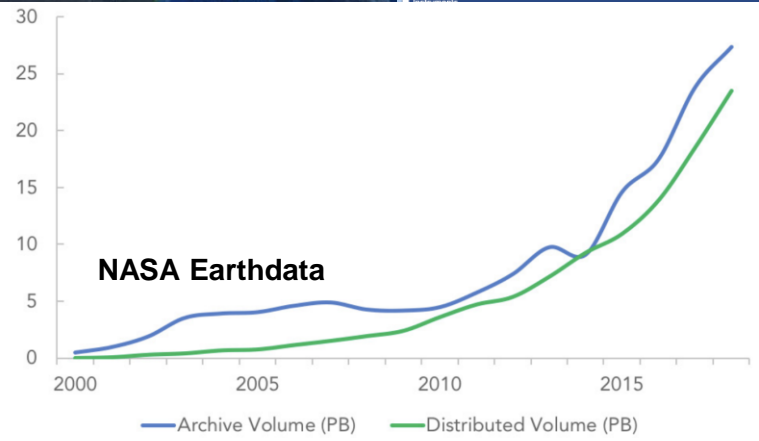
SWOT
The Surface Water and Ocean Topography (SWOT) mission aims to provide valuable data and information about the world's oceans and its terrestrial surface water such as lakes, rivers, and wetlands. SWOT is being developed jointly by NASA and Centre National d'Etudes Spatiales (CNES), with contributions from the Canadian Space Agency (CSA) and United Kingdom Space Agency (UKSA). The mission is targeted to launch September 2021.

SWOT will measure ocean surface topography and land surface water elevation with great accuracy, using interferometry to achieve two-dimensional mapping. Observations from SWOT can be used to better understand ocean currents and processes happening at spatial scales on the order of 15-150 km, something that has not been done before. SWOT will enable high resolution (within 1 km from land) monitoring of coastal regions, including coastal currents, storm surges, and regional sea level change. On land, SWOT will provide measurements of water storage changes (surface water area and water depth) of major lakes, reservoirs, rivers, and wetlands, and support derived estimates of river discharge, which aid in assessing water resources.

<https://podaac.jpl.nasa.gov/SWOT>

Stay Connected

- ✓ Learn about datasets, tools, and services release timelines
- ✓ Test-Drive SWOT tools and services
- ✓ PO.DAAC SWOT road shows: When and Where?
- ✓ Training and user engagement [*In partnership with the SWOT Applications Early Adopters program*]



Data Links

- Data Coming Soon (mission launch September 2021)

Related Links

- SWOT Mission Page
- SWOT Science Requirements
- How SWOT Will Work
- SWOT Cal/Val Plan
- Learn more about Ocean Surface Topography
- Ocean Surface Topography from Space
- NASA Sea Level Change

Mission Characteristics

Altitude	890.582 km
Inclination	77.67°
Mean Eccentricity	0.00105
Number of Orbits per Cycle	292
Number of Passes per Cycle	584
Nodal Period	6173.62 sec
Duration of one pass	3086.81 sec
Exact repeat cycle duration	96c
Longitude gap between tracks at the Equator	20.86455 days
Repeat orbit parameters (N+P/Q)	13+19/21
Mean semi-major axis	7268.72 km

References

- SWOT Bibliography >>

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Search Access Visualize Help

Ocean impacts of Cyclone Idai
The ocean response to Cyclone Idai is examined using PO.DAAC's State Of The Ocean

Announcements

Home » Missions

SWOT

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Instruments

- KaRIn** – Ka-band Radar Interferometer will measure ocean and surface water levels over a 120-km (75-mi) wide swath with a ~20 km (~12 mi) gap along nadir. It will operate in two modes: 1) Low-Resolution over the ocean with significant onboard processing to reduce data volume and 2) High-Resolution over broad, primarily continental, regions defined by the SWOT Science Team, focusing on hydrology studies.
- Poseidon-3 like Altimeter** – There will be a Ku and C band nadir altimeter, similar to that of the Jason series. It measures altimeter range, sigma naught (sigma0), significant wave height and ionospheric correction in the gap between the KaRIn swaths.
- DORIS Antenna** – Doppler Orbitography and Radiopositioning by Satellite is a Precise Orbit Determination (POD) system. It receives at the 401.25 MHz and 2036.25 MHz frequencies. It is used for the all weather global tracking and calculates the orbit ephemeris.
- Microwave Radiometer** – It measures the 18.7 GHz, 23.8 GHz and 34.0 GHz sea surface microwave brightness temperatures. The 18.7 GHz channel provides the wind induced effects in the sea surface background emissions correction. The 23.8 GHz channel measures water vapor. The 34.0 GHz channel measures the cloud liquid water to be corrected. All together the three frequencies provide the error in the satellite range measurement caused by pulse delay due to water vapor.
- X-band Antenna** – will be used for high-rate data downlink to the ground station.
- Laser Reflector Assembly** – LRA is an array of mirrors that will provide a target for laser tracking measurements from the ground. It supports the calibration and validation for the POD.
- GPS Receiver** – will pick up tracking signals from the constellation of Global Positioning System satellites.

SWOT Datasets

Level 1B KaRIn Datasets:

- KaRIn low-rate Earth located ocean interferogram in 9 beams and robustness
- Single look complex
- Radiometer brightness temperatures

Level 2 KaRIn Ocean Datasets:

<https://podaac.jpl.nasa.gov/SWOT>

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PO.DAAC Science Team Support

Pre-launch

Cal/Val Support:

- Archive and distribution of Cal/Val datasets (As Needed)
- Data Engineering support for effective integration of Cal/Val data in support of SWOT
- Support data access across Hydrology and Ocean Cal/Val Sites (Example Hydrology: Tier 1 Gold Standard and Tier 2 Sites; Ocean: California Site)

Supporting datasets:

- Collocate AirSWOT datasets (e.g. ABOVE campaign)
- Access to pre-SWOT datasets

Dataset publication workflow:

- Simplified and Efficient dataset submission workflow into PO.DAAC
- *Improved communication within PO.DAAC and with data providers*
- *Uniform data provider experience*

Early Adopter

- Working with the SWOT Early adopter program

Post-launch

- Restricted Access to Cal/Val datasets (Project Requirement)
- Download or Subscribe to data
- User services support (e.g. on-boarding hydrology users)
- Impact metrics
- *Dataset Citation metrics, Download metrics etc.*



PO.DAAC SWOT Capabilities

2019

Services Development

2020

Service & Data Integration

2021

Services, Advanced Cloud Usage

SWOT Launch

Today
June 2019

★ 2020 SWOT STM
Hands-on Workshop 1

★ 2021 SWOT STM
Hands-on Workshop 2

Search and Download

- Geometry Type
- HUC
- SWOT Feature ID
- Spatial and Temporal Search

Dissemination

- Subscribe
- Subset (space, time, variable, polygon, Quality)

Transformations

- On-Demand Raster
- Re-grid
- Reformat
- Data Product Specific: e.g. River Reach Averaging

Analysis

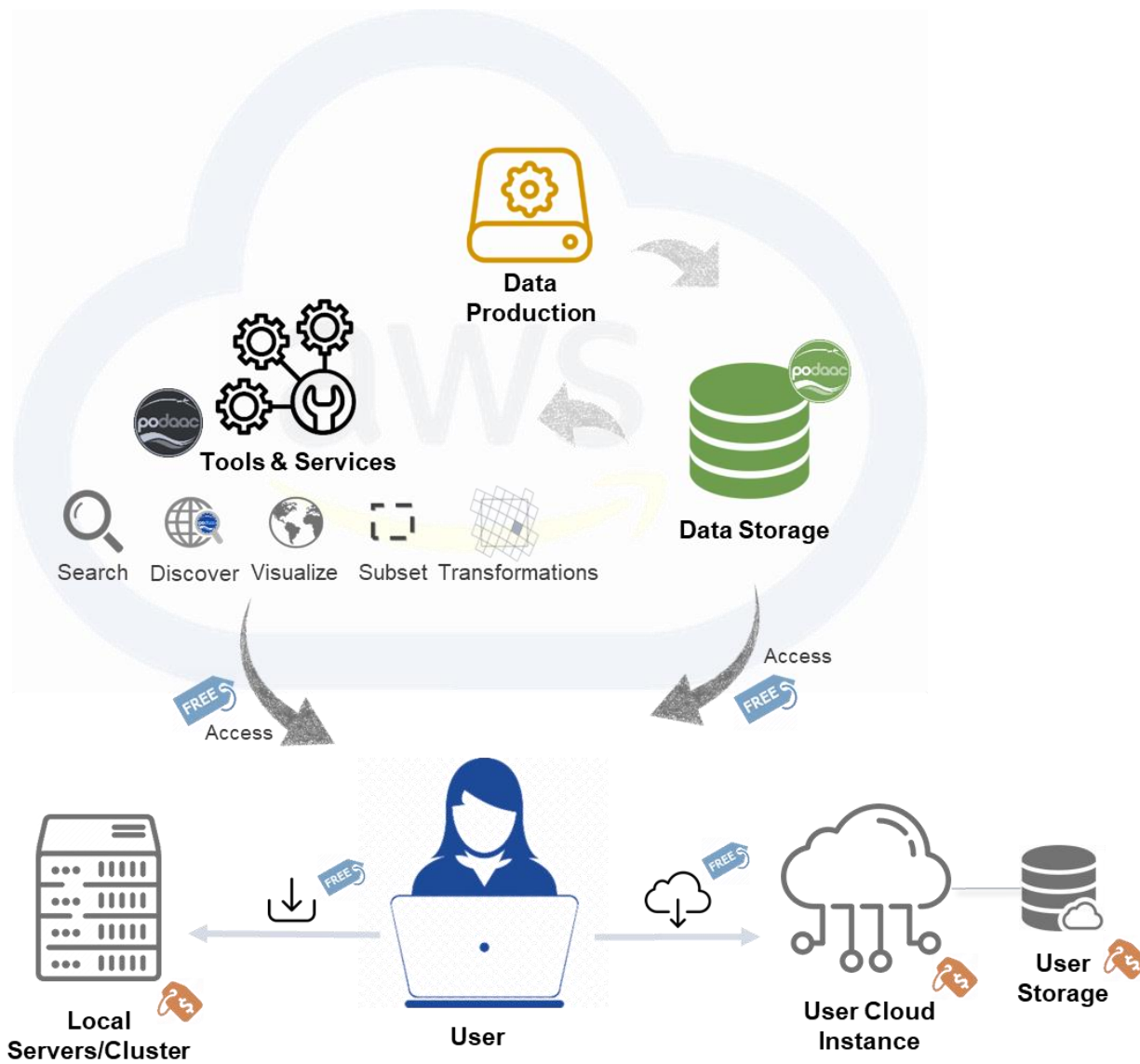
- Analysis in place (Cloud)
- Integration with other datasets



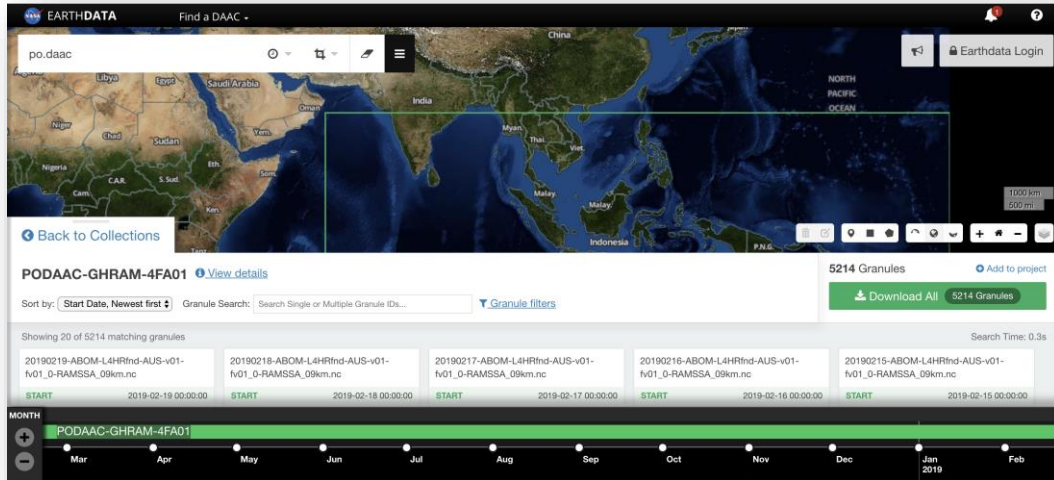
<https://podaac.jpl.nasa.gov/SWOT>

Website: Major update coming Fall 2019

PO.DAAC SWOT (Cloud) Data Flow



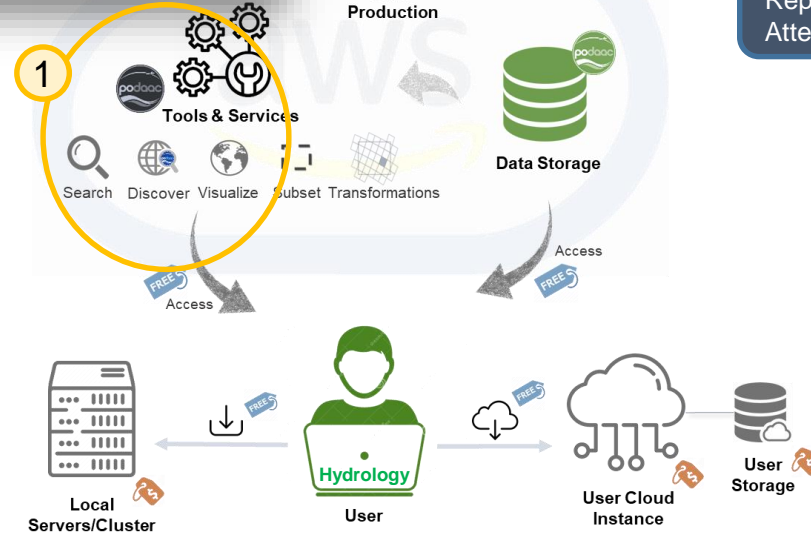
PO.DAAC SWOT – Hydrology User Workflow



1 SWOT Data Search Portal

<https://search.earthdata.nasa.gov/portal/SWOT/search>

→ Earthdata Search available now
→ SWOT Search portal available **fall 2019**

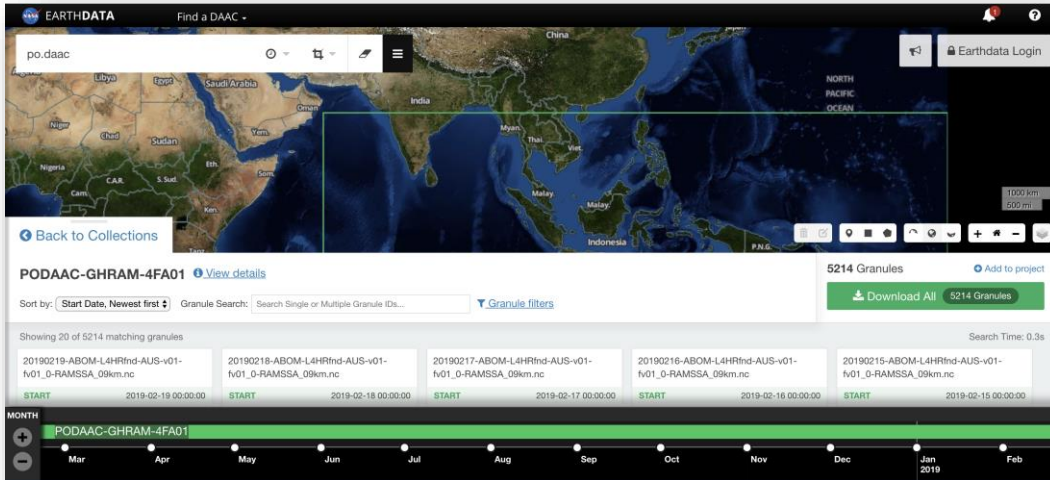


More Information



Meet with PO.DAAC
Representatives
Attend the Hydro Splinter

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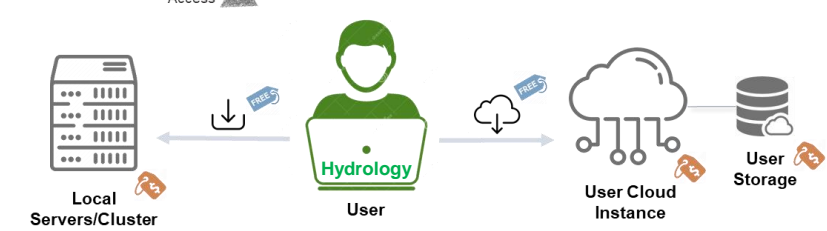
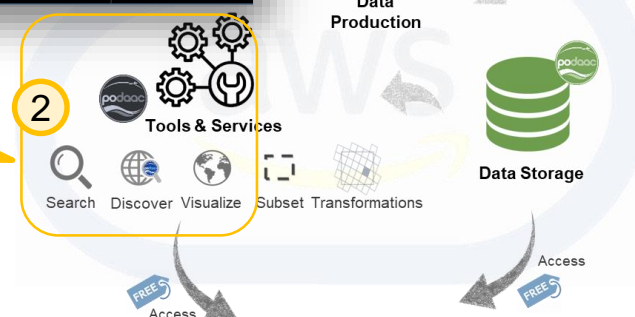
→ Earthdata Search available now
 → SWOT Search portal available fall 2019

More Information ?

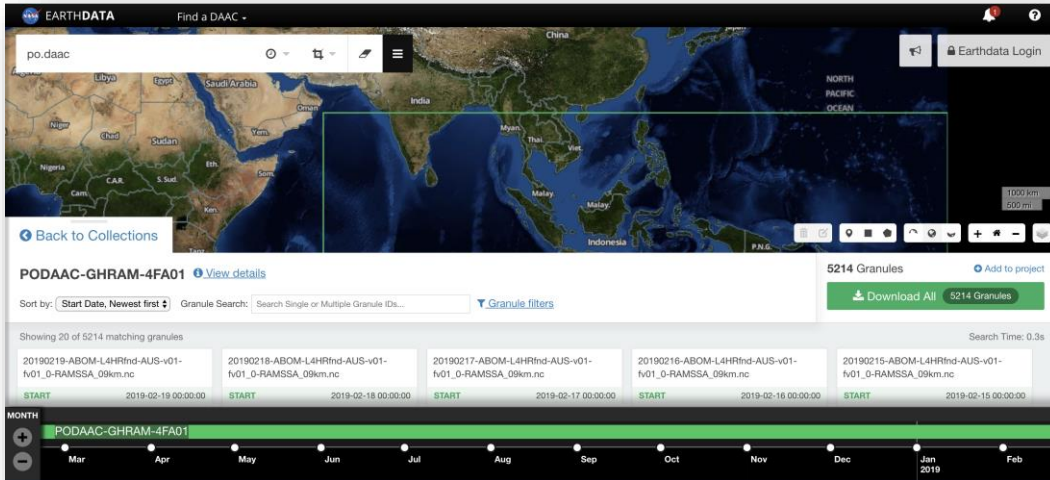
Meet with PO.DAAC Representatives Attend the Hydro Splinter

2

- SWOT Feature Search
- HUC Search
- Subscribe by HUC (Search-based Subscription)



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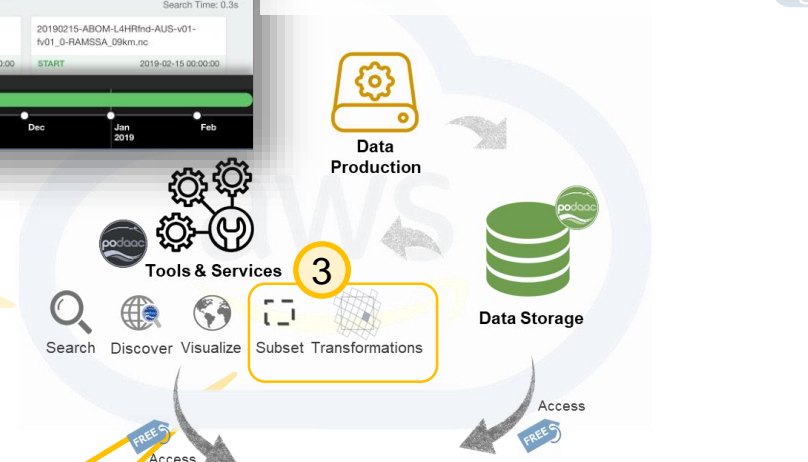
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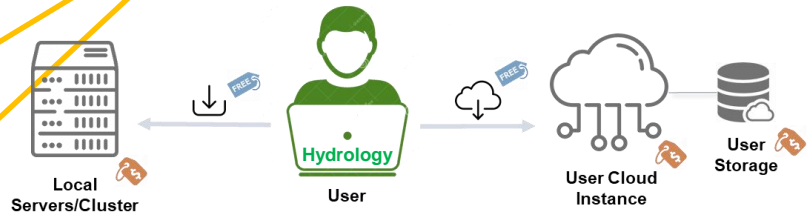
GIS Services, Integrations and Standards



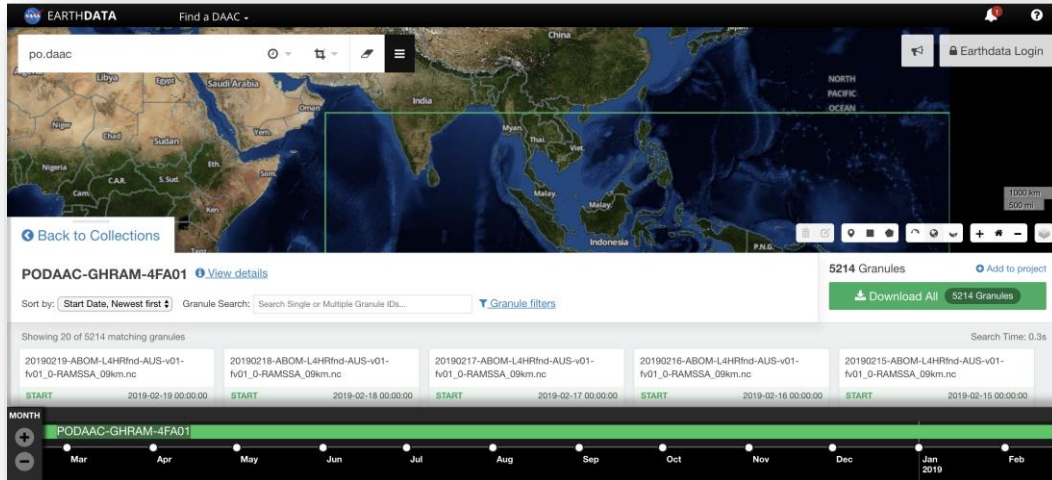
3

- On-demand Raster Generation
- Re-project
- Subset by user-defined shapefile or geometry
- Subset, Reformat, Mosaic
- Re-grid
- Time series

.tiff
.gpk
.shp
.kmz



PO.DAAC SWOT – Hydrology User Workflow



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→ Earthdata Search available now
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More Information ?

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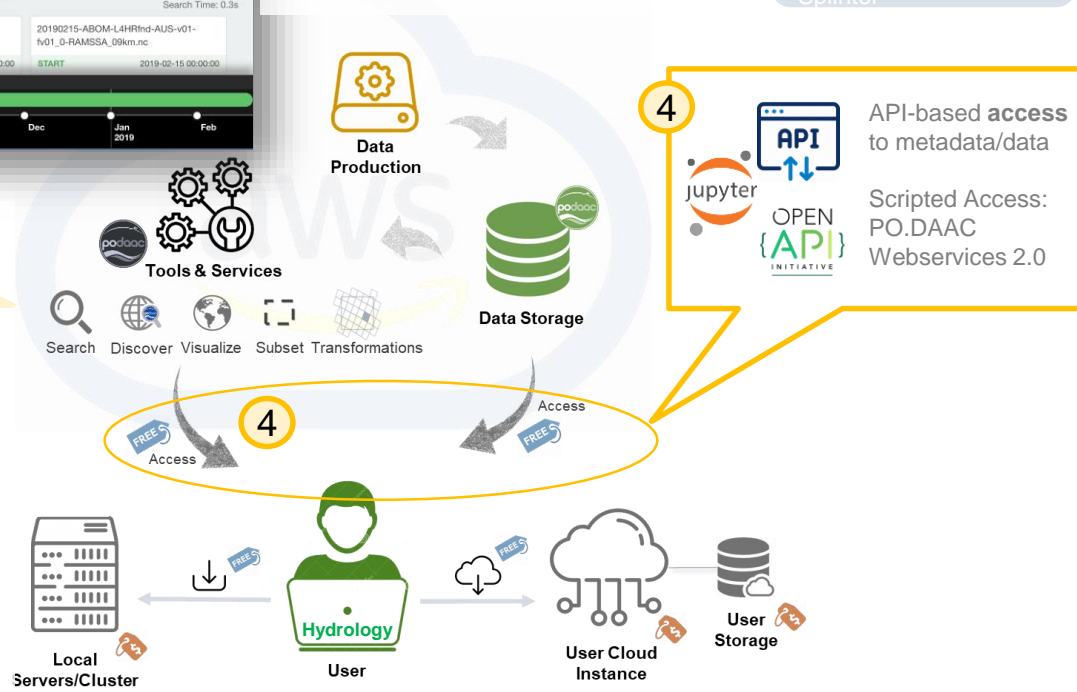
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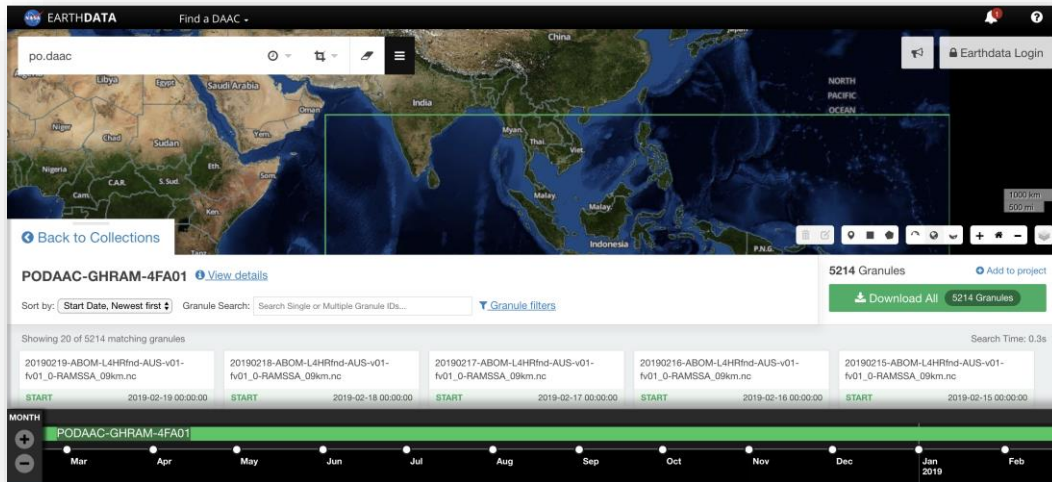
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2

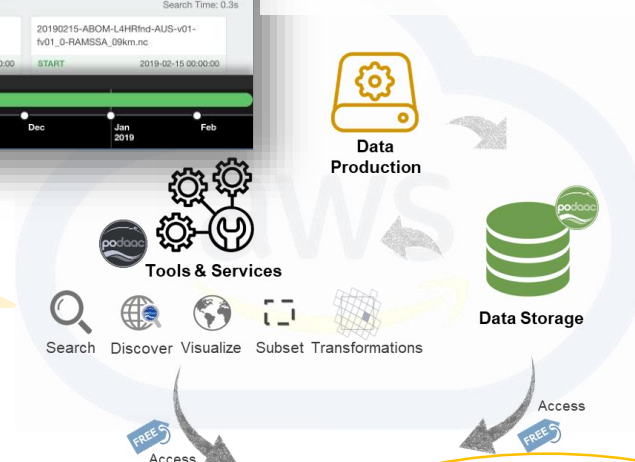
SWOT Feature Search
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On-demand Raster Generation

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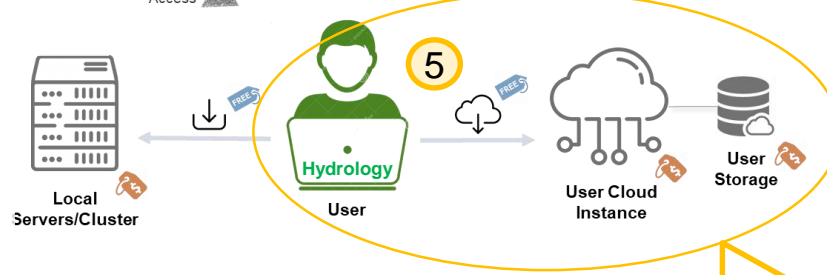


4

API-based access to metadata/data

Scripted Access: PO.DAAC Webservice 2.0

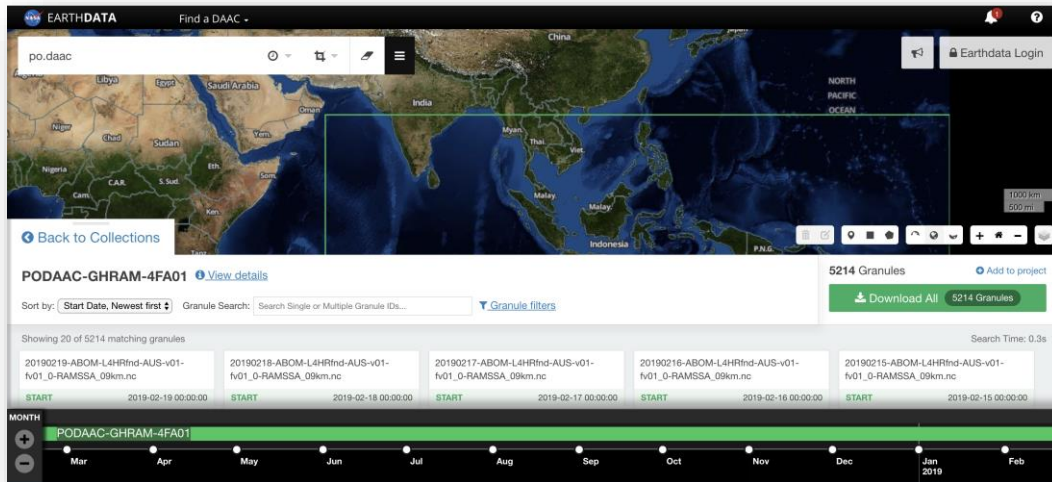
Logos: jupyter, OPEN (API) INITIATIVE



5

Access from User Cloud-based workspace, or View in GIS Client

PO.DAAC SWOT – Oceans User Workflow



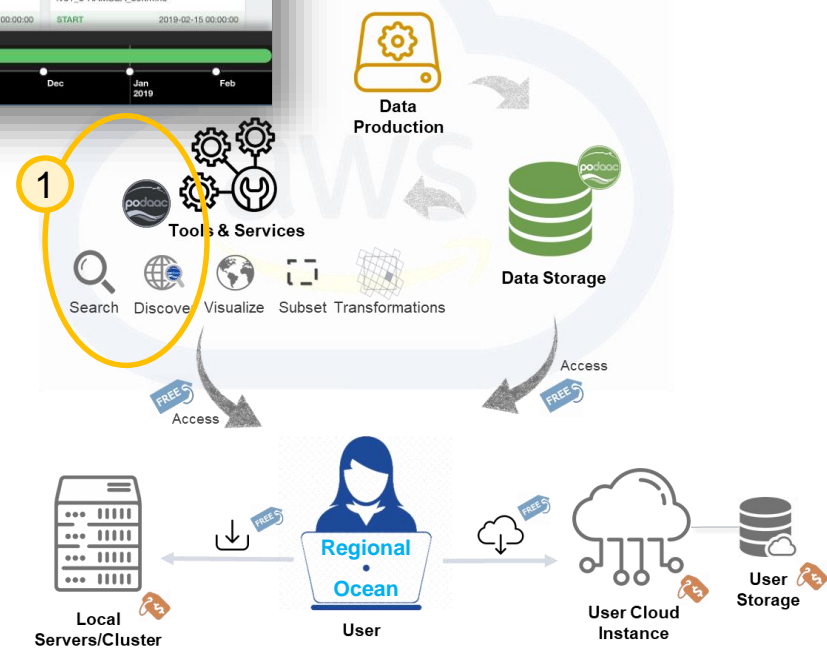
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<https://search.earthdata.nasa.gov/portal/SWOT/search>

- Earthdata Search available now
- SWOT Search portal available **fall 2019**

More Information

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PO.DAAC SWOT – Oceans User Workflow

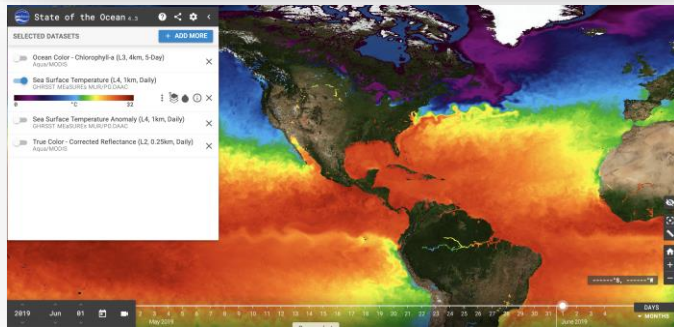
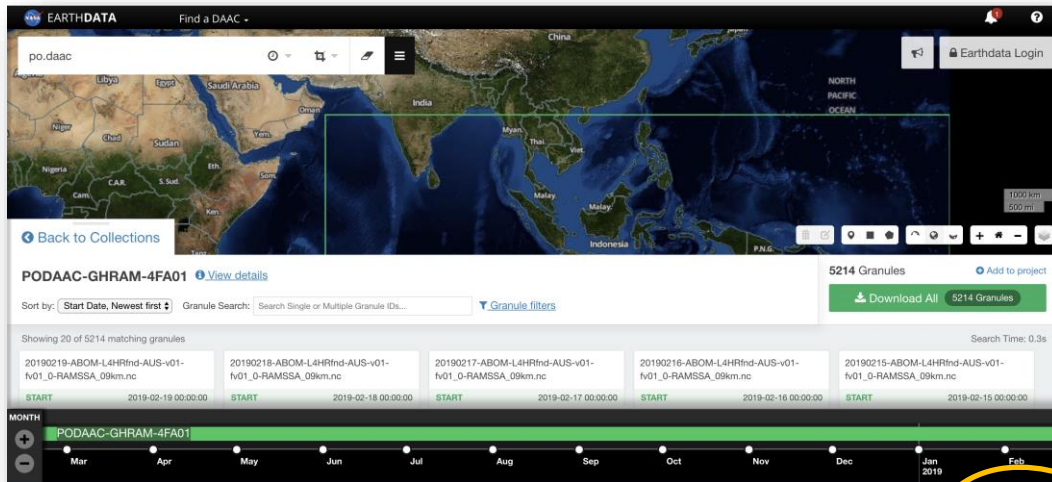
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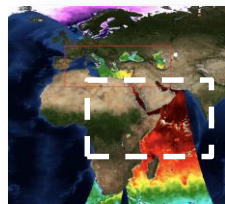
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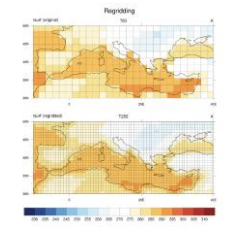
More Information
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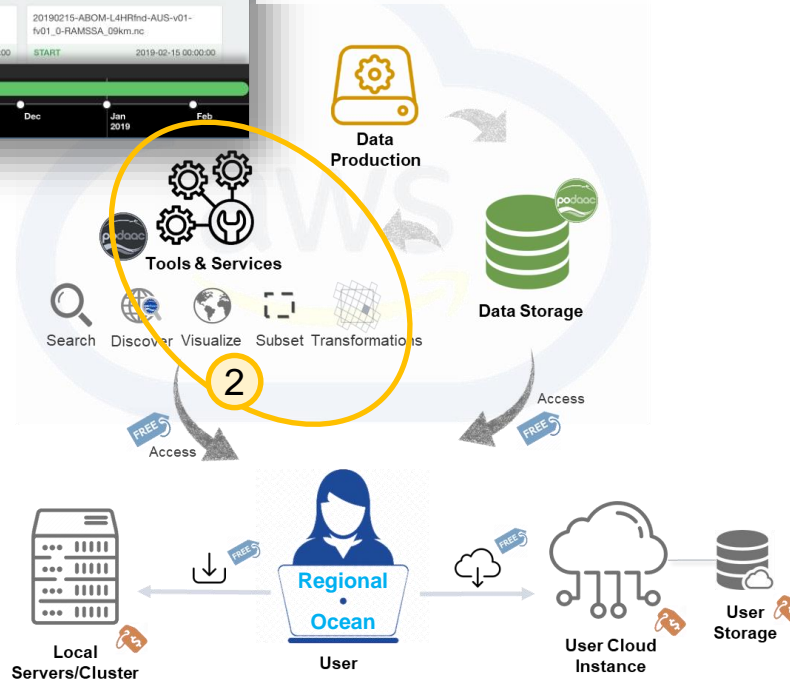
Visualize SWOT Products
 State of the Ocean (SOTO)



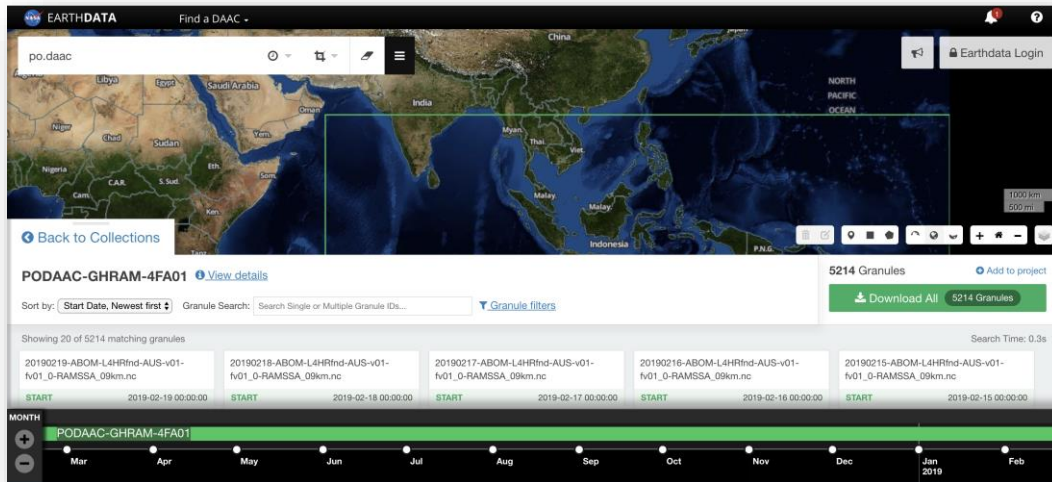
Subset
 by area of interest



Re-grid
 to model resolution



PO.DAAC SWOT – Oceans User Workflow



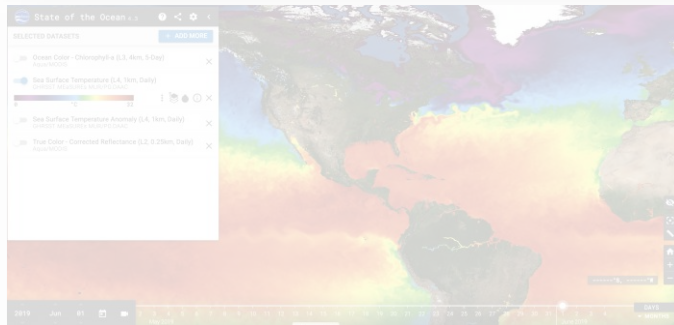
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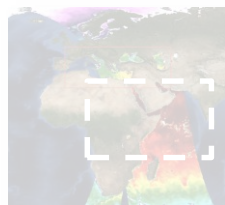
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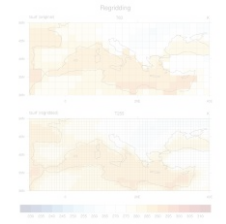
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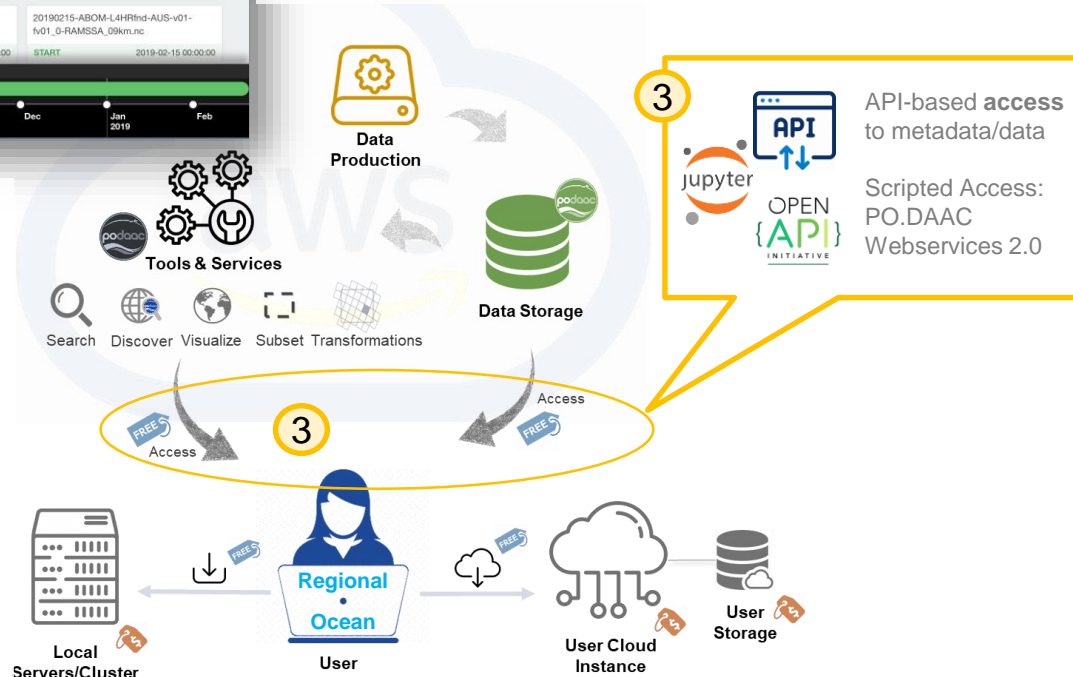
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Re-grid to model resolution



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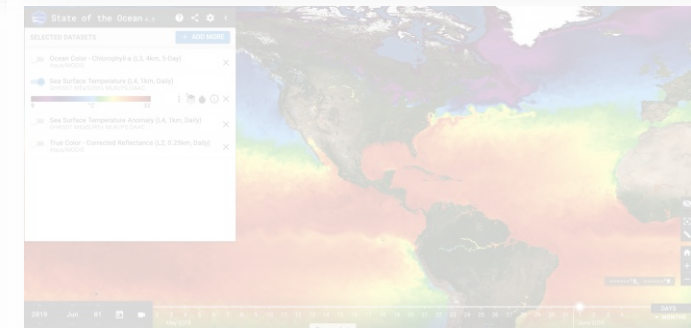
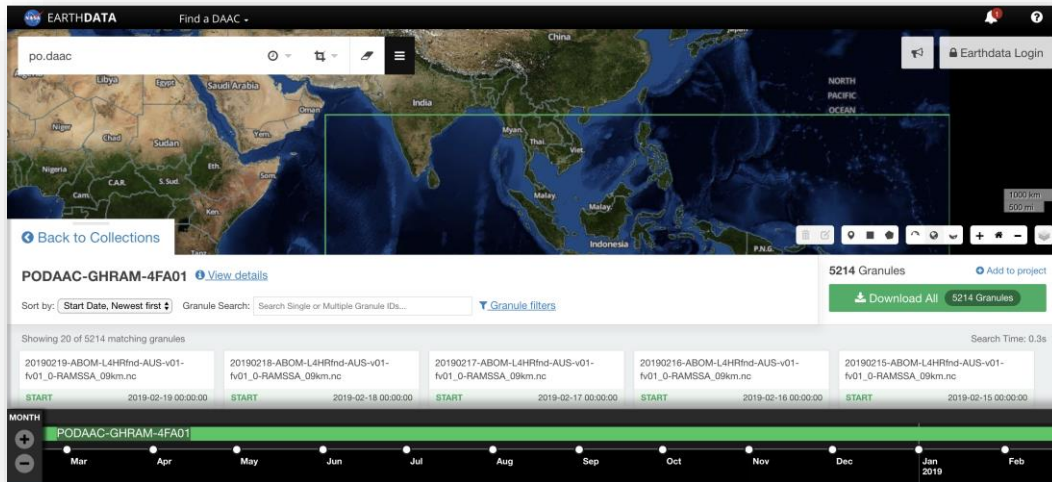
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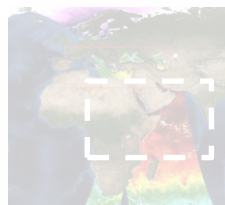
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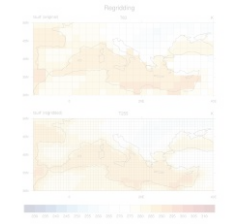
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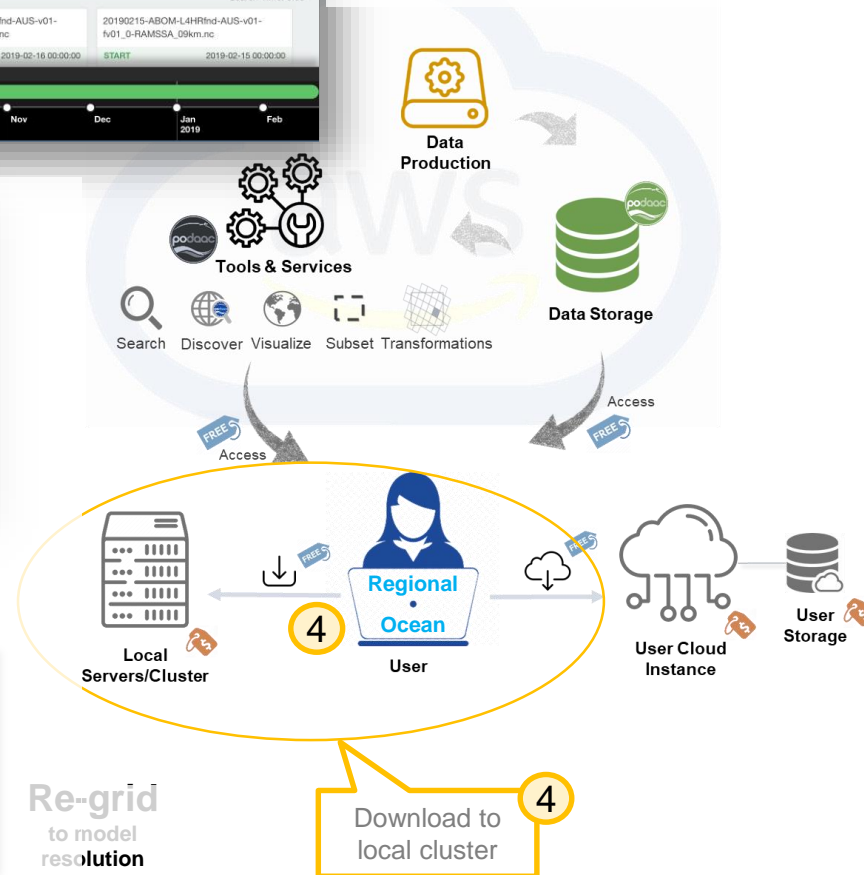
Visualize SWOT Products
State of the Ocean (SOTO)



Subset by area of interest



Re-grid to model resolution



4 Download to local cluster



Will I be charged for downloading data from PO.DAAC?

- No. There is no charge involved. NASA's policy is free and open data
- End-user computational costs are not PO.DAAC's responsibility
- Understanding computational costs is an important aspect when working with SWOT like data volumes. PO.DAAC will assist as needed by providing primer documents, tutorials, webinars etc.

Will there be a FTP service?

No, per NASA Policy. There is an equivalent service. Login will be required per NASA Policy.

Need More Details:
Meet with PO.DAAC
Representatives
Attend the Hydro Splinter

Are you working with Google Earth Engine?

Yes, We are working with Google. Ongoing discussion is to determine protocols to help them find, access, and update NASA data that Google would like to host on the platform

Who helps guide PO.DAAC's tools and Services development?

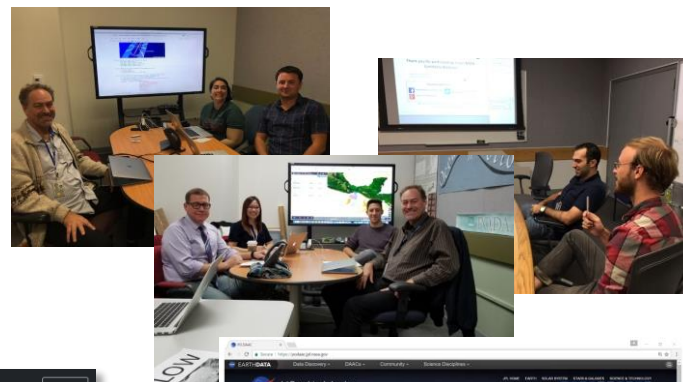
You.

This science team.

The next science team.

PO.DAAC cloud Early adopters (14 individuals representing the community)

PO.DAAC User Working Group

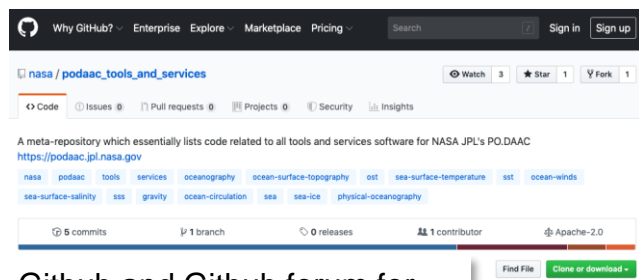


What is your outreach plan?

Hands-on training

Sign up to test-drive

Handbook and tutorials



Github and Github forum for community adoption



PO.DAAC SWOT Levels of Service

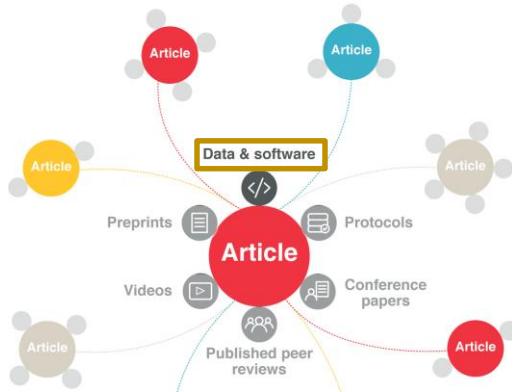


Data Package

Documentation
Metadata
Browse
Imagery
Data Files

- ✓ Curator of data files, metadata, browse images, and documentation
- ✓ Provide tools to explore, access, and extract data
- ✓ Provide long-term, secure archiving (back-up and recovery)
- ✓ Address user questions, and serve as a buffer between users and data contributors
- ✓ Provides usage & download statistics and data citation statistics

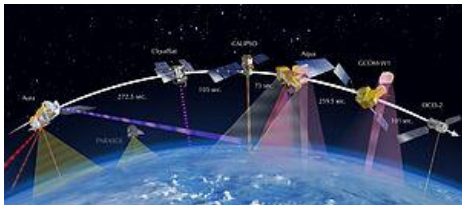
Measuring Impact



SWOT usage



Data Integration Across Missions, Organizations



- PO.DAAC would like to be plugged in to cross-mission integration topics/discussions (Important to understand and support value added product capabilities)
- Cognizant of complementary capabilities across AVISO and NASA (PO.DAAC would like to propose a joint data workshop for 2020)

Questions?



@podaac

<https://podaac.jpl.nasa.gov/SWOT>



<https://podaac.jpl.nasa.gov/rss.xml>