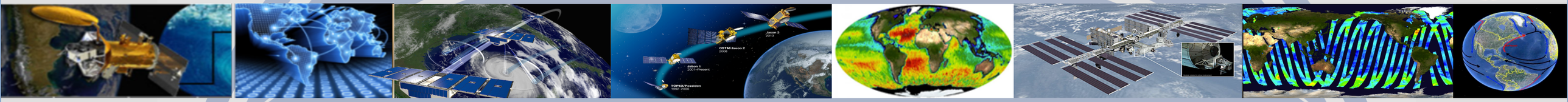

CYGNSS Data Distribution, Tools and Services at the PO.DAAC

David Moroni

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PO.DAAC Data Stewardship and User Services Team (DSUST) Lead

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

These Activities were carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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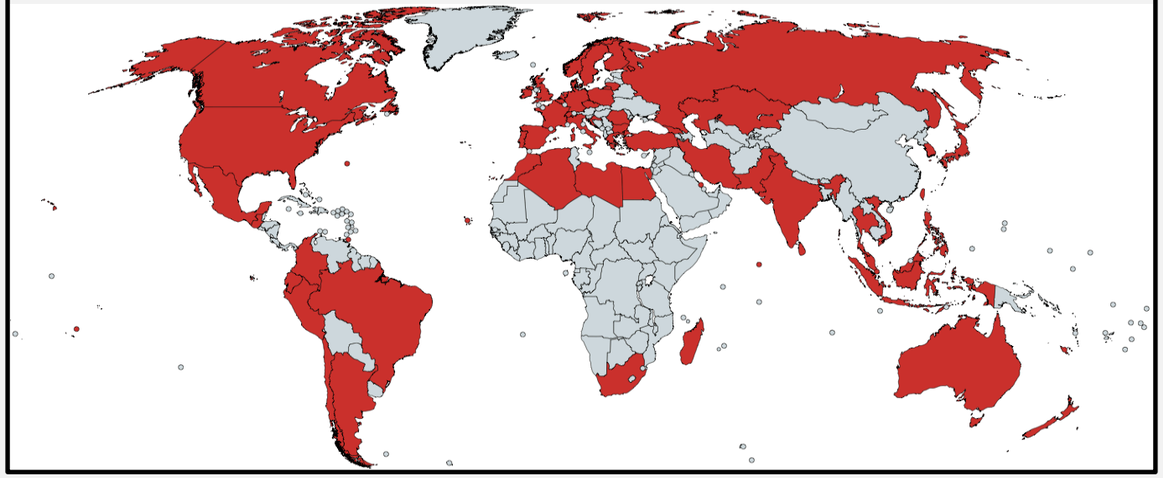
The Role of PO.DAAC

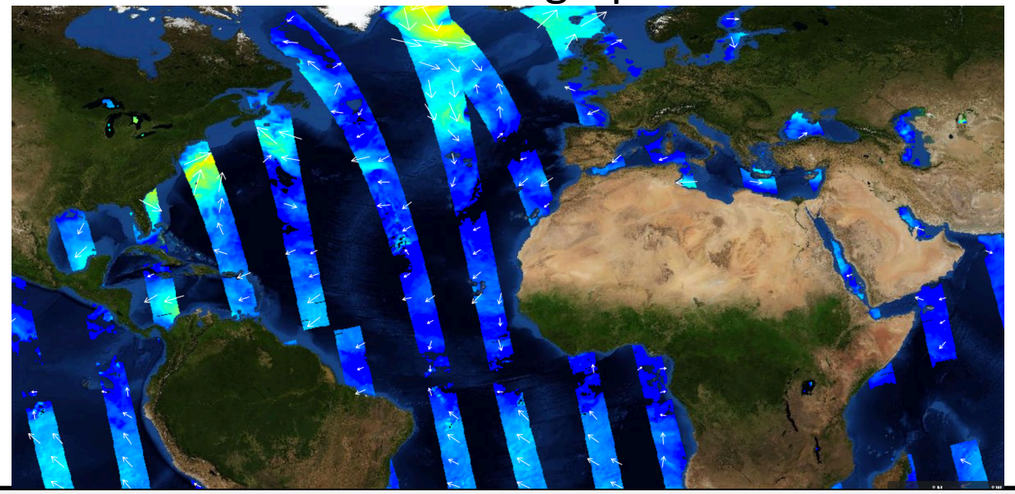
Data Stewardship and User Services

Preserve and distribute oceanographic data for the benefit of future generations domestically and abroad.



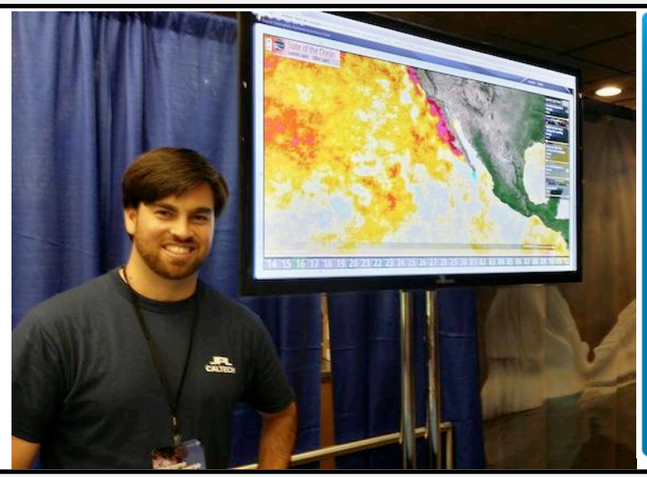
Data Access

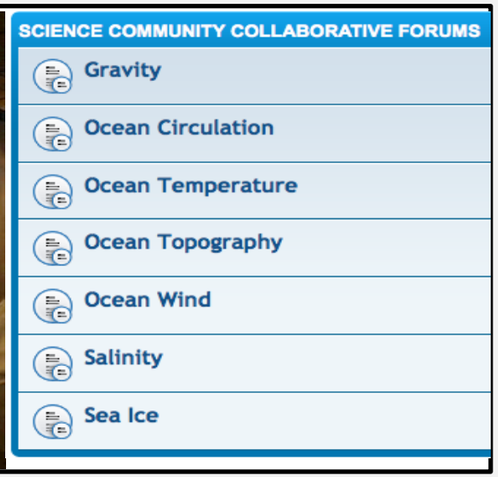
Provide intuitive services to discover, select, extract and utilize oceanographic data.



Information Services and Forum

- Science data specialists
- Human-to-human interaction
- Knowledgebase and FAQs
- Guidance and resource materials





Data Stewardship and User Services Team

- Data Engineers (DEs) merged with User Services (USvcs) in April 2018.
- Continuing the legacy responsibility for defining, maintaining and implementing operational data lifecycle policies and procedures.
- Coordinate and direct all dataset lifecycle implementations:
  - Operational Readiness and Public Release
  - Dataset Retirement
  - Phase-F Mission/project close-out
- USvcs Responsibilities – user inquiries, user engagement, social media, FAQs, tutorials, public announcements, and facilitation of key data lifecycle elements.
- DE Responsibilities – All of the above, plus: direct science support for datasets/tools/services, science team collaboration, UAT, dataset documentation, metadata curating/validation, pre-planning and operational support for missions and projects, etc…

Overview of Data Sources

Supported NASA Missions & Projects

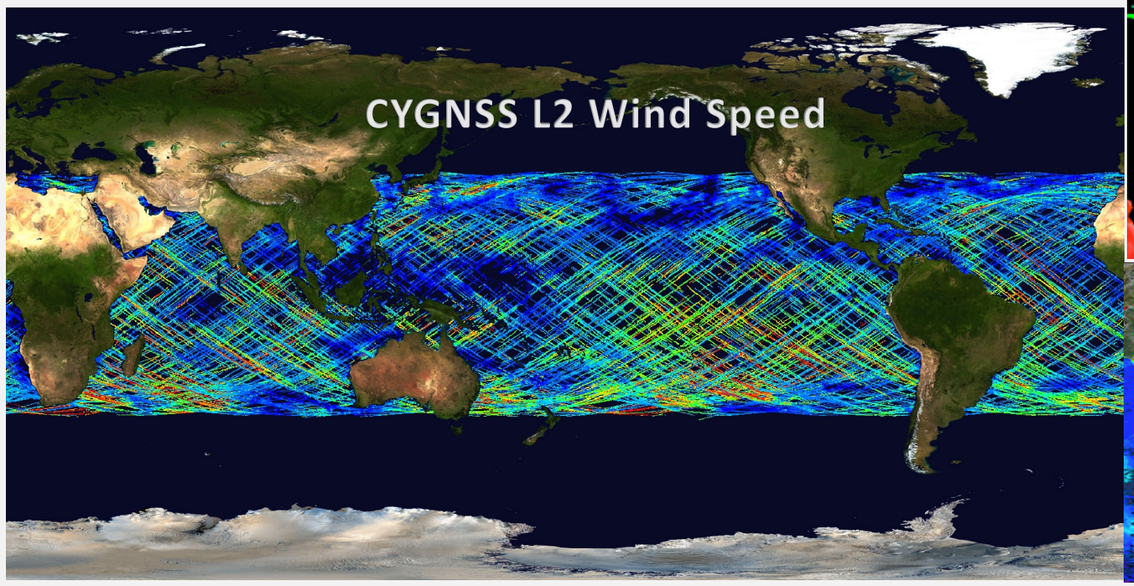
Seasat, TOPEX/Poseidon, Jason-1, ***NSCAT, SeaWinds on ADEOS-II, QuikSCAT, ISS-RapidScat, CYGNSS***, Terra, Aqua, GRACE, GHRSST, MeASUREs, Aquarius, SPURS

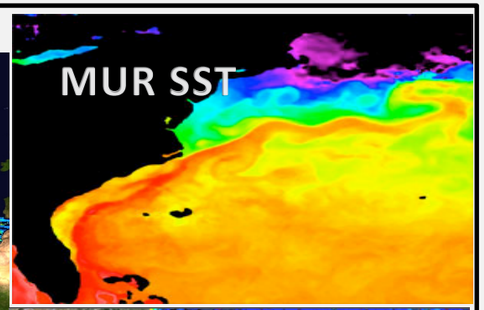
Other Missions & Projects

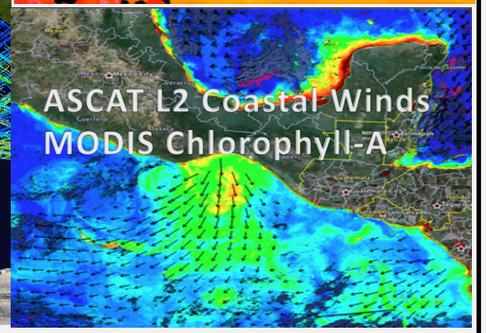
AVHRR-Pathfinder, DMSP (SSMI, SSMIS), GEOS-3, GOES, ***MetOp-A/B***, ***Oceansat-II, WindSat***.

Physical Oceanographic Data

- ***624*** *Publicly Distributed Datasets*
- ***122*** *in Near-Real-Time (NRT, < 24 hr)*
  - Gravity
  - Ocean Circulation & Currents
  - Ocean Surface Salinity
  - Ocean Surface Topography
  - ***<u>Ocean Winds (104)</u>***
  - Sea Surface Temperature
  - Sea Ice







15 New Wind Datasets

Version 5.0 Aquarius/SAC-D Wind Speed

- Released 7 Dec. 2017.
- Daily, 7 day, monthly, seasonal, annual

SMAP L2/L3 CAP Version 4.0 (JPL) Wind Speed

Released 22 Feb 2018.

- Daily, 8-Day, Monthly; 60 km L2; 0.25x0.25 degree L3.

RapidScat L2B Climate Version 2.0, 12.5-km netCDF-4

- Released 11 April 2018
- SST-dependent GMF with cross-swath bias corrections.
- Simplified flagging schema with new flags.

QuikSCAT L2B Version 4.0 @ 12.5 km, netCDF-4

- Released 5 April 2018.
- Complete historical reprocessing, provides closer land retrieval using Land Contamination Ratio (LCR) algorithm.

MetOp-A ASCAT L2 Wind Vector CDR

- 12.5-km (Coastal) and 25-km
- Consistently reprocessed, CMOD7, 1Jan2007 to 31Mar2014

CYGNSS Version 2.0 L1, L2, and L3 netCDF

- Released 19 Dec. 2017.
- First science quality, full public release.
- 18 March 2017 to present day.
- Approximate 6-day latency.

Note: DOIs are now available for all "Open" Datasets! Please cite accordingly when publishing.
https://podaac.jpl.nasa.gov/CitingPODAAC

File **T**ransfer **P**rotocol **(FTP)**: ftp://podaac.jpl.nasa.gov

Open-source Project for a **N**etwork **D**ata **A**ccess **P**rotocol (**OPeNDAP**): http://opendap.jpl.nasa.gov

FTP Replacement: PO.DAAC Drive interface with WebDAV client: https://podaac-tools.jpl.nasa.gov/drive/

Thematic **R**eal-time **E**nvironmental **D**istributed **D**ata **S**ervice (**THREDDS**): https://thredds.jpl.nasa.gov

Web Services (search/subset/extract): https://podaac.jpl.nasa.gov/ws

PO.DAAC-PY (Python Library Toolkit): https://github.com/nasa/podaacpy

Data Recipes: http://bit.ly/datarecipes

State of the Oceans (SOTO) upgraded to **Version 4.2.1.**

- Enhanced Map functionality and Full Time Series Backfill!
- Added layers: Sea-Ice Concentration, Soil Moisture, Surface Precip.
- Extended browser compatibility: Chrome, Firefox, Safari.
- **https://podaac-tools.jpl.nasa.gov/soto/**

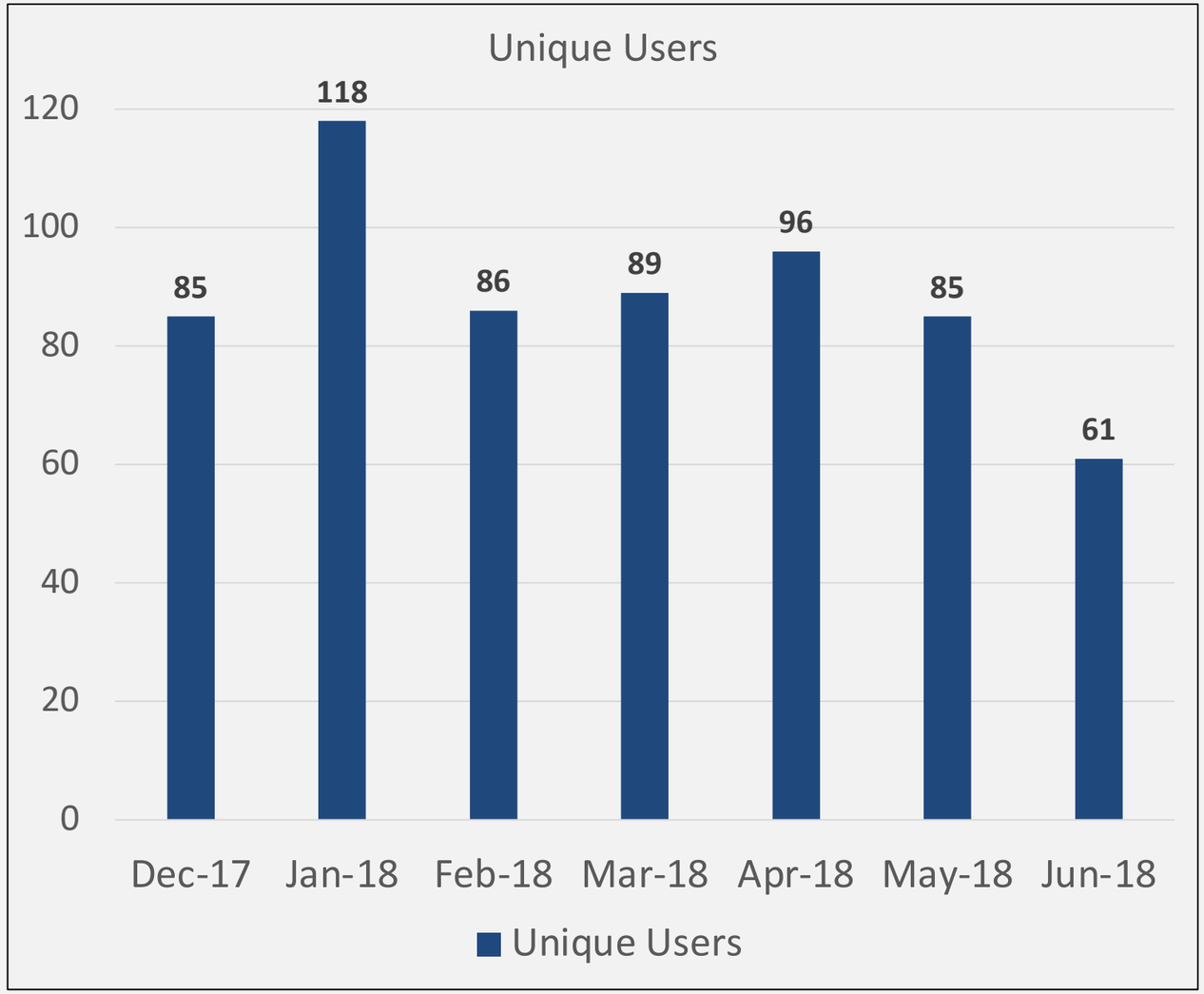
HiTIDE L2 Subsetter Updated: Version 4.2.0

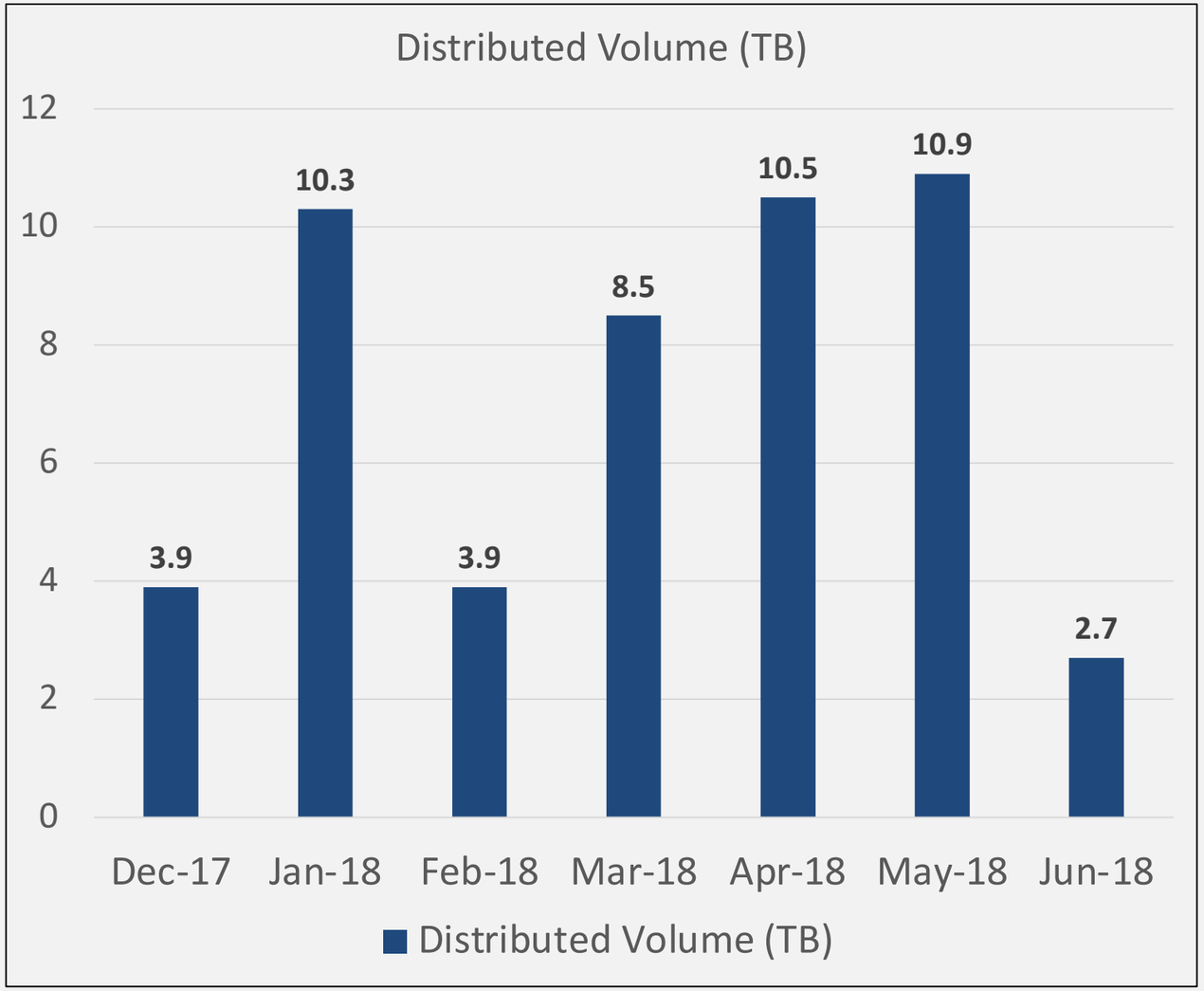
- Granule Merge Feature
- ASCAT, QuikSCAT, and RapidScat Available!
- CYGNSS coming soon!

Version 2.0 CYGNSS Data Available Since Dec. 2017

- L0 is restricted access. Ask Tim Butler for access credentials.
- Fully discoverable on the Web Portal:
  - https://podaac.jpl.nasa.gov/datasetlist?ids=Platform&values=CYGNSS
- FTP:
  - L1: ftp://podaac.jpl.nasa.gov/allData/cygnss/L2/v2.0
  - L2: ftp://podaac.jpl.nasa.gov/allData/cygnss/L2/v2.0
  - L3: ftp://podaac.jpl.nasa.gov/allData/cygnss/L2/v2.0
- OPeNDAP:
  - L1: https://opendap.jpl.nasa.gov/opendap/allData/cygnss/L1/v2.0
  - L2: https://opendap.jpl.nasa.gov/opendap/allData/cygnss/L2/v2.0
  - L3: https://opendap.jpl.nasa.gov/opendap/allData/cygnss/L3/v2.0
- Mission Page: ***https://podaac.jpl.nasa.gov/CYGNSS***

CYGNSS V2.0/2.1 Usage Metrics: Jan-to-Dec 2018.

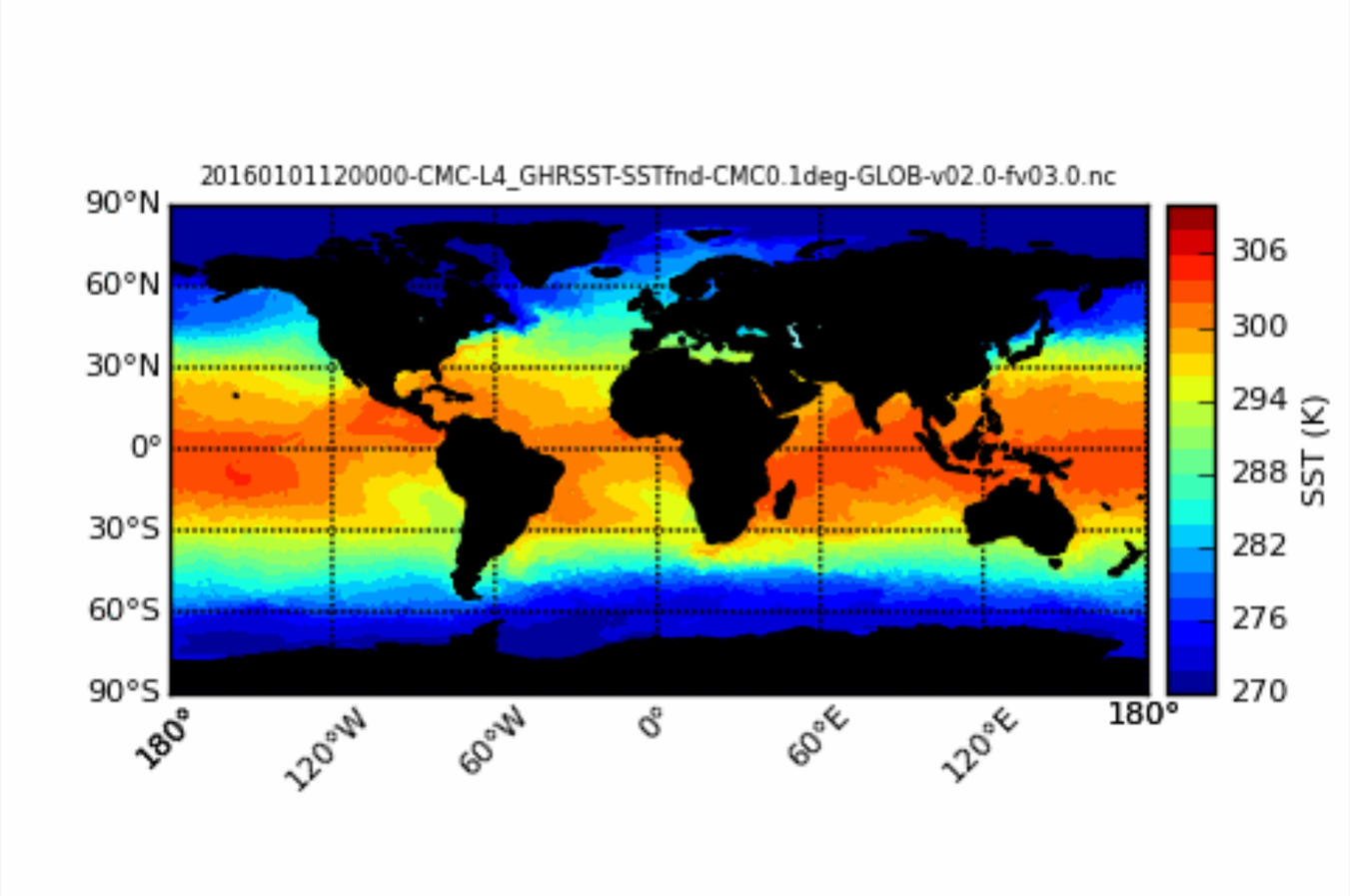




PO.DAAC Data Recipes

podaac.jpl.nasa.gov/recipes

- 59 Total; Recipes added include:
  - Data Access Services (29)
  - Visualization (11)
  - Numerical Analysis (8)
  - Miscellaneous (11)
- Authors/Developers:
  - Yibo Jiang (primary)
  - Ed Armstrong
  - Vardis Tsontos
  - Jessica Hausman
  - David Moroni
  - Lewis McGibnney (podaacpy)
  - Mike Gangl (Drive)



PO.DAAC Tools/Services Tutorials

podaac.jpl.nasa.gov/tutorials (19)

- Data Access Webinar: PO.DAAC Drive (FTP Replacement)
- How to Use PODAAC Docker Images for Data Recipes
- Jumpstart on Docker
- PO.DAAC Webinar: NASA PO.DAAC State Of The Ocean
- Tutorial: PO.DAAC 101 – Web Portal Navigation
- Tutorial: PO.DAAC 101 - How to Use OPeNDAP to Access Data

User Services

PODAAC FORUMS	TOPICS	POSTS	LAST POST
General Questions	20	36	by brianood Sat May 13, 2017 3:13 am
Data Recipes Programming scripts on how to read, analyze and access PO.DAAC data	75	77	by yiboj Fri May 19, 2017 8:35 am
Data Access Tools and services	82	191	by podaac Thu May 18, 2017 2:26 pm
Ocean Stories Discussions A forum where our User community can discuss about Ocean Stories we've published in our Web Portal.	21	27	by podaac Wed May 10, 2017 10:28 am
Tutorials PODAAC products and services related tutorials	11	7	by podaac Fri Jan 20, 2017 9:15 am
PO.DAAC Meetings and Workshops PO.DAAC team members participation at recent and upcoming meetings and workshops	4	5	by podaac Mon Apr 17, 2017 12:23 pm

FREQUENTLY ASKED QUESTIONS	TOPICS	POSTS	LAST POST
General Information FAQ	24	25	by podaac Mon Nov 21, 2016 10:50 am
User Registration System (URS) FAQ	4	4	by podaac Tue Jul 29, 2014 1:33 pm

ANNOUNCEMENTS	TOPICS	POSTS	LAST POST
PODAAC General Announcements	126	127	by podaac Tue May 02, 2017 1:48 pm
System Monitor Announcements	19	20	by podaac Wed Apr 19, 2017 3:31 pm

SCIENCE COMMUNITY COLLABORATIVE FORUMS	TOPICS	POSTS	LAST POST
Gravity	3	3	by dmoroni Tue Mar 08, 2016 2:35 pm
Ocean Circulation	1	2	by podaac Mon Apr 04, 2016 9:04 am
Ocean Temperature	13	38	by yiboj Tue Feb 28, 2017 1:39 pm
Ocean Topography	7	9	by podaac Thu Apr 28, 2016 10:14 am
Ocean Wind	19	25	by dmoroni Wed Mar 29, 2017 12:38 pm
Salinity	25	33	by vtsontos Wed Jun 29, 2016 4:07 pm
Sea Ice	0	0	No posts

- ***https://podaac.jpl.nasa.gov/forum/***
- *Announcements (new datasets, outages, system upgrades)*
- *Tutorials (Data Access/Discovery, Visualization and Subsetting)*
- *Data Recipes (how to use **Drive**, **OPeNDAP**, **THREDDS**, **Web Services**, **PODAACPY**, etc…)*
- *Frequently Asked Questions (FAQs)*
- *User Questions*
- *Ocean Stories*

Summary and Conclusions

NEW Access Interface!: PO.DAAC Drive interface with WebDAV client: https://podaac-uat.jpl.nasa.gov/drive/

- ***Version 2.0 Data Access on Portal:*** https://podaac.jpl.nasa.gov/datasetlist?ids=Platform&values=CYGNSS
- ***Version 2.1 Data Coming Soon! (pending updates from Cal/Val)***
- ***Data Recipes: https://podaac.jpl.nasa.gov/recipes***
- ***Tools/Services Tutorials: podaac.jpl.nasa.gov/tutorials***
- ***DOIs are now available for all "Open" Datasets! Please cite accordingly when publishing. https://podaac.jpl.nasa.gov/CitingPODAAC***
- **PO.DAAC Python Library (podaacpy): *https://github.com/lewismc/podaacpy***
- **Primary Web Portal Home Page: *http://podaac.jpl.nasa.gov***
- **User Forum: *https://podaac.jpl.nasa.gov/forum/***
- How to get **URS Account**: ***https://urs.earthdata.nasa.gov/users/new***
- Join our **Mailing list***: podaac@podaac.jpl.nasa.gov*

Recent Papers/Publications

- OceanObs 2019 White papers Accepted:
  - "Addressing the Challenge of Ocean Data Interoperability: Framework Evolution for Improved Data Discovery and Access" submitted by Vardis.
  - "When Data Play FAIR, Everyone Wins" Submitted by Jessica.
  - "An Integrated Ocean Science Data Analytics Platform" Submitted by Thomas; co-authors Lewis, Ed and Vardis.
- Ramapriyan, H K, Peng G, ***Moroni D***, Shie C-L, Ensuring and **Improving Information Quality for Earth Science Data and Products**. *D-Lib Magazine*, 23 (7/8), July/August **2017**, DOI: https://doi.org/10.1045/july2017-ramapriyan
- Jiang, Y., Li, Y., Yang, C., Liu, K., ***Armstrong, E.M***., Huang, T., **Moroni, D.F., Finch, C.J**. **A comprehensive methodology for discovering semantic relationships among geospatial vocabularies using oceanographic data discovery as an example**. International Journal of Geographical Information Science. **2017**, 31:11, 2310-2328, DOI: 10.1080/13658816.2017.1357819
- Jiang, Y., Li, Y., Yang, C., Hu, F., ***Armstrong, E.M***., Huang, T., **Moroni, D.**, McGibbney, L.J., **Finch, C.J**. **Towards intelligent geospatial data discovery: a machine learning framework for search ranking, International Journal of Digital Earth**. **2017**. DOI: 10.1080/17538947.2017.1371255
- Jiang, Y., Li, Y., Yang, C., Hu, F., ***Armstrong, E.M***., Huang, T., ***Moroni, D***., McGibbney, L.J., Greguska, F., ***Finch, C.J***. **A Smart Web-Based Geospatial Data Discovery System with Oceanographic Data as an Example**. *ISPRS Int. J. Geo-Inf.* **2018**, *7*, 62. DOI: 10.3390/ijgi7020062
- Smith, S.R., Bourassa, M.A., Elya, J., Huang, T., Gill, K.M., Greguska, F.R., Quach, N., **Tsontos, V.,** Holt, B., Worley, S., Ji Z. **The Distributed Oceanographic Match-Up Service.** Chapter in AGU book "**Big Earth Data Analytics in Earth, Atmospheric and Ocean Sciences**". *2018.* (submitted; under review).