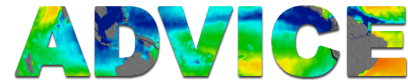


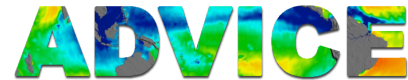
# Overview of *Step-by-Step* Tutorials

Leslie Smith  
ADVICE Team Consultant



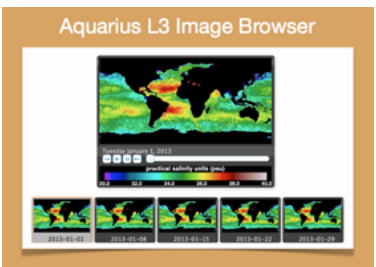
# Step-by-Step Tutorials

- Set of print/videos tutorials have been developed specifically for the ADVICE webinar series
- 11 tutorials are designed to help you:
  - *Access* data;
  - *Customize* data for your own research purposes; and
  - *Create* various types of data products
- These tutorials are **evergreen** resources... please continue to use them as needed!



# Step-by-Step Tutorials

**Aquarius L3 Image Browser**



**Visualization**



**Web Portal**

## Services & Tools for Accessing & Subsetting Data

*\*Also have visualization capabilities*



- \* Panoply**: Interface for viewing Panoply netCDF, HDF and GRIB Data Viewer.
- OPeNDAP**: Interface for OPeNDAP @ Physical Oceanography DAAC.
- FTP**: Index of ftp://podaac-ftp.jpl.nasa.gov/.
- \* Live Access Server**: Interface for PO DAAC LAS v7.3.
- \* THREDDS Data Server**: Interface for THREDDS Data Server.
- Web Services**: Diagram showing REST, JSON, RSS, XML, DATACASTING, ISO, GCMD, and FGDC.

# 1. Introducing the PO.DAAC

The screenshot shows the PO.DAAC website interface. At the top, there is a navigation bar with 'EARTHDATA' and dropdown menus for 'Data Discovery', 'DAACs', 'Community', and 'Science Disciplines'. Below this is the NASA logo and 'Jet Propulsion Laboratory California Institute of Technology'. A secondary navigation bar includes 'JPL HOME', 'EARTH', 'SOLAR SYSTEM', 'STARS & GALAXIES', and 'SCIENCE & TECHNOLOGY', along with social media icons and the slogan 'BRING THE UNIVERSE TO YOU'. The main header features the 'podaac' logo and 'Physical Oceanography Distributed Active Archive Center'. A primary navigation menu includes 'Home', 'Dataset Discovery', 'Data Access', 'Measurements', 'Missions', 'Multimedia', 'Community', 'Forum', and 'About'. A secondary menu on the left has 'Search', 'Access', 'Visualize', and 'Help'. The main content area is titled 'Home » Missions' and features the 'AQUARIUS' mission page. The page includes a 'Mission Specification & Status' section with text about the mission's launch and data collection. Below the text is an image of the Aquarius satellite. A sidebar on the right contains 'Data Links', 'PO.DAAC Tools and Services', and 'Technical Documentation' sections. A red box highlights the 'Missions' menu item, the 'AQUARIUS' mission page content, and the sidebar sections.

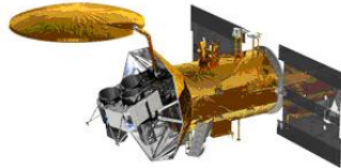
Home » Missions

## AQUARIUS

### Mission Specification & Status

The Aquarius/SAC-D mission, launched on June 10, 2011, is a joint venture between NASA and the Argentinean Space Agency (CONAE). The mission features the sea surface salinity sensor Aquarius and is the first mission with the primary goal of measuring sea surface salinity (SSS) from space. Data from Aquarius will play a large role in understanding both climate change and the global water cycle.

On June 7, 2015 at 12:53:17 UTC the Aquarius/SAC-D observatory suffered a mission-ending hardware failure resulting in the permanent cessation of data flows. The entire Aquarius data record spans a full 3 year, 9 month period from 8/25/2011 – 6/7/2015. Version 4.0 of the Aquarius data is the Official NASA end-of-prime mission data for the Aquarius/SAC-D mission. While no further forward processing of data is possible, a release of a V5.0 end-of-mission dataset is expected in future.



This instrument carries 3 radiometers, and 1 scatterometer. They are operating at 1.4 GHz & 1.2 GHz respectively. The data collected by the radiometer are being used together with sea surface temperature

**Data Links**

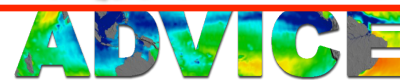
- Browse Datasets for Aquarius Project Data at PO.DAAC
- PO.DAAC FTP Data Access
- Aquarius Soil Moisture Data at NSIDC

**PO.DAAC Tools and Services**

- FTP
- OPeNDAP
- THREDDS: Salinity/Density, Ocean Winds
- PODAAC-WS
- Aquarius Level 3 Image Browser
- LAS
- HITIDE

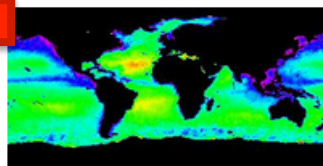
**Technical Documentation**

- Aquarius V4.0 Data Users Guide (.pdf)
- Aquarius V4.0 Summary of Improvements (.pdf)
- L1A Data Specification (.pdf)
- L2 V4.0 Data format description



# 2. How to Access Aquarius Datasets through the PO.DAAC

Related Tutorials:  
PO.DAAC Website<sup>1</sup>  
THREDDS<sup>3</sup>  
OpenDAP<sup>4</sup>



**Aquarius Official Release Level 3 Sea Surface Salinity Standard Mapped Image Monthly Data V4.0**

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[http://podaac.jpl.nasa.gov/dataset/AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4](http://podaac.jpl.nasa.gov/dataset/AQUARIUS_L3_SSS_SMI_MONTHLY_V4)

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

Information **Data Access** Documentation Granule (File) Listing Citation

### Direct Access

**OPENDAP** <http://podaac-opendap.jpl.nasa.gov/opendap/allData/aquarius/L3/mapped/V4/monthly/SCI/>

**FTP** <ftp://podaac-ftp.jpl.nasa.gov/allData/aquarius/L3/mapped/V4/monthly/SCI>

**Format (Compression)** HDF5 (BZIP2)

**THREDDS** [http://thredds.jpl.nasa.gov/thredds/catalog/ncml\\_aggregation/SalinityDensity/aquarius/catalog.html?dataset=ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](http://thredds.jpl.nasa.gov/thredds/catalog/ncml_aggregation/SalinityDensity/aquarius/catalog.html?dataset=ncml_aggregation/SalinityDensity/aquarius/aggregate__AQUARIUS_L3_SSS_SMI_MONTHLY_V4.ncml)  
THREDDS SERVER

Longitude/Latitude Resolution: 1 degrees x 1 degrees  
Start/End Date: 2011-Aug-25 to 2015-Jun-7

Description: Aquarius Level 3 sea surface salinity (SSS) standard mapped image data contains gridded 1 degree spatial resolution SSS averaged over daily, 7 day, monthly, and seasonal time scales. ... more



# 3. Downloading a NetCDF File from the PO.DAAC THREDDS Server

Related Tutorials:  
 Access Data<sup>2</sup>  
 Panoply<sup>5</sup>

## PO.DAAC THREDDS Server

PO.DAAC THREDDS Data Server

**THREDDS Data Server**

Catalog <http://thredds.jpl.nasa.gov/catalog.html>

Dataset: [aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)

- Data format: netCDF
- Data size: 9.323 Kbytes
- Data type: GRID
- ID: [ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)

Documentation:

- [PO.DAAC](#)

Access:


- OPENDAP: [/thredds/dodsC/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- HTTP Server: [/thredds/fileServer/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- WCS: [/thredds/wcs/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- WMS: [/thredds/wms/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- NetcdfSubset: [/thredds/ncss/grid/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- NCML: [/thredds/ncml/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- UDDC: [/thredds/uddc/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)
- ISO: [/thredds/iso/ncml\\_aggregation/SalinityDensity/aquarius/aggregate\\_\\_AQUARIUS\\_L3\\_SSS\\_SMI\\_MONTHLY\\_V4.ncml](#)

Select Variable(s):

Variables with available Times: 212.0 243.0 273.0 304.0 334.0 365.0 396.0 425.0 456.0 486.0 517.0 547.0 578.0 609.0 639.0 670.0 700.0 731.0 762.0 790.0 821.0 851.0 882.0 912.0 943.0 974.0 1004.0 1035.0 1065.0 1096.0 1127.0 1155.0 1186.0 1216.0 1247.0 1277.0 1308.0 1339.0 1369.0 1400.0 1430.0 1461.0 1492.0 1520.0 1551.0 1581.0 1612.0 days since 2011-01-01

l3m\_data = sea\_surface\_salinity

Choose Spatial Subset:



Lat/lon subset Coordinate subset  
 Bounding Box (decimal degrees):  
 north 89.5000  
 west -179.5000 179.5000 east  
 south -89.5000

Disable horizontal subsetting  
[reset to full extension](#)  
 Horizontal Stride: 1

Choose Time Subset:

Time range Single time  
 StartingEnding: 2011-08-01T00:00:00Z  
 Stride: 2015-06-01T00:00:00Z  
 1  
[reset to full extension](#)

Add 2D Lat/Lon to file (if needed for CF compliance)  
 Add Lat/Lon variables

Submit Reset

[NetCDF Subset Service Documentation](#)





# 4. Downloading Files from the PO.DAAC OPeNDAP Server

Related Tutorials:  
[Aquarius Mission<sup>1</sup>](#)  
[Dataset Discovery<sup>2</sup>](#)  
[THREDDS<sup>3</sup>](#)

## Contents of /allData/aquarius/L3/mapped/V4/monthly/SCISMD

Name	Last Modified
<a href="#">Parent Directory/</a>	
<a href="#">2011/</a>	2015-06-20T09:28:...
<a href="#">2012/</a>	2015-06-20T18:40:...
<a href="#">2013/</a>	2015-06-20T14:26:...
<a href="#">2014/</a>	2015-06-20T17:54:...
<a href="#">2015/</a>	2015-07-12T01:57:...

## Contents of /allData/aquarius/L3/mapped/V4/monthly/SCISMD/2014

Name	Last Modified	Size	DAP R
<a href="#">Parent Directory/</a>			
<a href="#">Q20140012014031.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-19T00:43:09	83947	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20140012014031.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-19T00:43:09	81	- - -
<a href="#">Q20140322014059.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-20T10:07:20	84109	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20140322014059.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-20T10:07:20	81	- - -
<a href="#">Q20140602014090.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-19T07:57:45	83506	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20140602014090.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-19T07:57:45	81	- - -
<a href="#">Q20140912014120.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-18T17:42:30	82527	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20140912014120.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-18T17:42:30	81	- - -
<a href="#">Q20141212014151.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-18T06:59:00	81386	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20141212014151.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-18T06:59:00	81	- - -
<a href="#">Q20141522014181.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-18T21:41:19	80943	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20141522014181.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-18T21:41:19	81	- - -
<a href="#">Q20141822014212.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-19T23:24:26	81050	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20141822014212.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-19T23:24:26	81	- - -
<a href="#">Q20142132014243.L3m MO SCISMD V4.0 SSS 1deg.bz2</a>	2015-06-18T10:04:56	81768	<a href="#">ddx</a> <a href="#">dds</a> <a href="#">das</a>
<a href="#">Q20142132014243.L3m MO SCISMD V4.0 SSS 1deg.bz2.md5</a>	2015-06-18T10:04:56	81	- - -

Sections: Aquarius > Processing Levels: 3 > Parameter: Salinity/Density > Temporal Resolution: Monthly  
 Aquarius Official Release Level 3 Sea Surface Salinity Standard Mapped Image 28-Day Running Mean Data V4.0  
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Home  
 ADEOS-2  
 GRACE  
 OSTM  
 TOPEX/Poseidon  
 Home  
 AQUARIUS  
 Mission  
 The Aquarius/SAC-D Mission  
 (CON) The Aquarius/SAC-D Mission  
 sea surface salinity (SSS) from space. Data from Aquarius will play a large role in understanding both climate change and the global water cycle.  
 On June 7, 2015 at 12:53:17 UTC the Aquarius/SAC-D observatory suffered a mission-ending hardware failure resulting in the permanent cessation of data flows. The entire Aquarius data record spans a full 3 year, 9 month period from 8/25/2011 to 6/7/2015. Version 4.0 of the Aquarius data is the Official NASA end-of-prime mission data for the Aquarius/SAC-D mission. While forward processing of data is possible, a release of a V5.0 end-of-mission dataset is expected in future.



# 5. Panoply Orientation

Related Tutorials:  
Download NetCDF<sup>3</sup>

The screenshot shows the Panoply software interface. At the top, there are buttons for 'Create Plot', 'Combine Plot', and 'Open Dataset'. Below these are tabs for 'Datasets', 'Catalogs', and 'Bookmarks'. A table lists the datasets:

Name	Long Name	Type
aquarius...	aquarius_aggreg...	Local File
l3m_...	sea surface salinity	Geo2D
lat	latitude	1D
lon	longitude	1D
time	time	1D

Below the table is a 'Show:' dropdown menu set to 'All variables'. To the right, a text area displays the NetCDF metadata for the file 'aquarius\_aggregate\_AQUARIUS\_L3\_SSS\_SMI\_MONTHLY\_V4.nc':

```
File type: NetCDF-3/CDM

netcdf file:/C:/.../PanoplyWin-4.3.2/Par
dimensions:
  time = 47;
  lat = 180;
  lon = 360;
variables:
  float l3m_data(time=47, lat=180, lon=360);
    :Scaling = "linear";
    :Scaling_Equation = "(Slope*l3m_data) + Intercept = Parameter value";
    :Slope = 1.0f; // float
    :Intercept = 0.0f; // float
    :_FillValue = -32767.0f; // float
    :scale_factor = 1.0f; // float
    :add_offset = 0.0f; // float
    :valid_min = 0.0f; // float
    :standard_name = "sea_surface_salinity";
    :units = "psu";
    :coordinates = "time lat lon lat lon";

  int time(time=47);
    :standard_name = "time";
    :axis = "T";
    :units = "days since 2011-01-01";
    :_CoordinateAxisType = "Time";
```

The screenshot shows the NASA Goddard Institute for Space Studies website. The header includes the NASA logo and the text 'National Aeronautics and Space Administration Goddard Institute for Space Studies'. A navigation menu on the left lists the following items: GISS Home, News & Features, Projects & Groups, Datasets & Images, Publications, Software, Education, Events, and About GISS. The main content area displays 'Panoply netCDF' and 'panoply IPAN-uh-...'.





# 6. Visualizing Data Using Panoply: Longitude-Latitude Plots

## Related Tutorials:

Install Panoply<sup>5</sup>

Download NetCDF<sup>3</sup>

Combined Plots<sup>9</sup>

Export Plot<sup>10</sup>

Panoply: Sources

File Edit View History Bookmarks Plot View

Create Plot 2 Combine Plot Open Dataset

Datasets Catalogs Bookmarks

Name	Long Name	Type
aquarius_aggr...	aquarius_aggregate_...	Local File
l3m_data	sea surface salinity	Geo2D
lat	latitude	1D
lon	longitude	1D
time	time	1D

Create Plot

More than one type of plot can be created from 'l3m\_data'. What type of plot do you want to create?

- Create georeferenced plot
- Create 2D plot using longitude and latitude
- Create line plot using longitude and latitude

Plot Array 1

sea surface salinity

sea surface salinity (psu)

35.0 35.8 36.5 37.3 38.0 38.8

Data Min = 22.0, Max = 38.0, Mean = 34.0

Array(s) Scale Map Overlay Contours Vectors Labels

Scale Range: Min.: 35, Max.: 38.7562 Center on 0 Fit to Data Units: psu

Always fit to data  Scale is logarithmic Scaling Factor: 10<sup>0</sup>

Color Table: panoply.act  Reverse colors Divisions, Major: 5, Minor: 2

Bar Width: 60%, Outlier Shape: Triangle, Fill Color:

Scale Label:  Default  Other: SCALE CAPTION Tick Label Format: %.1f, Size: 11

Caption Location: Above colorbar



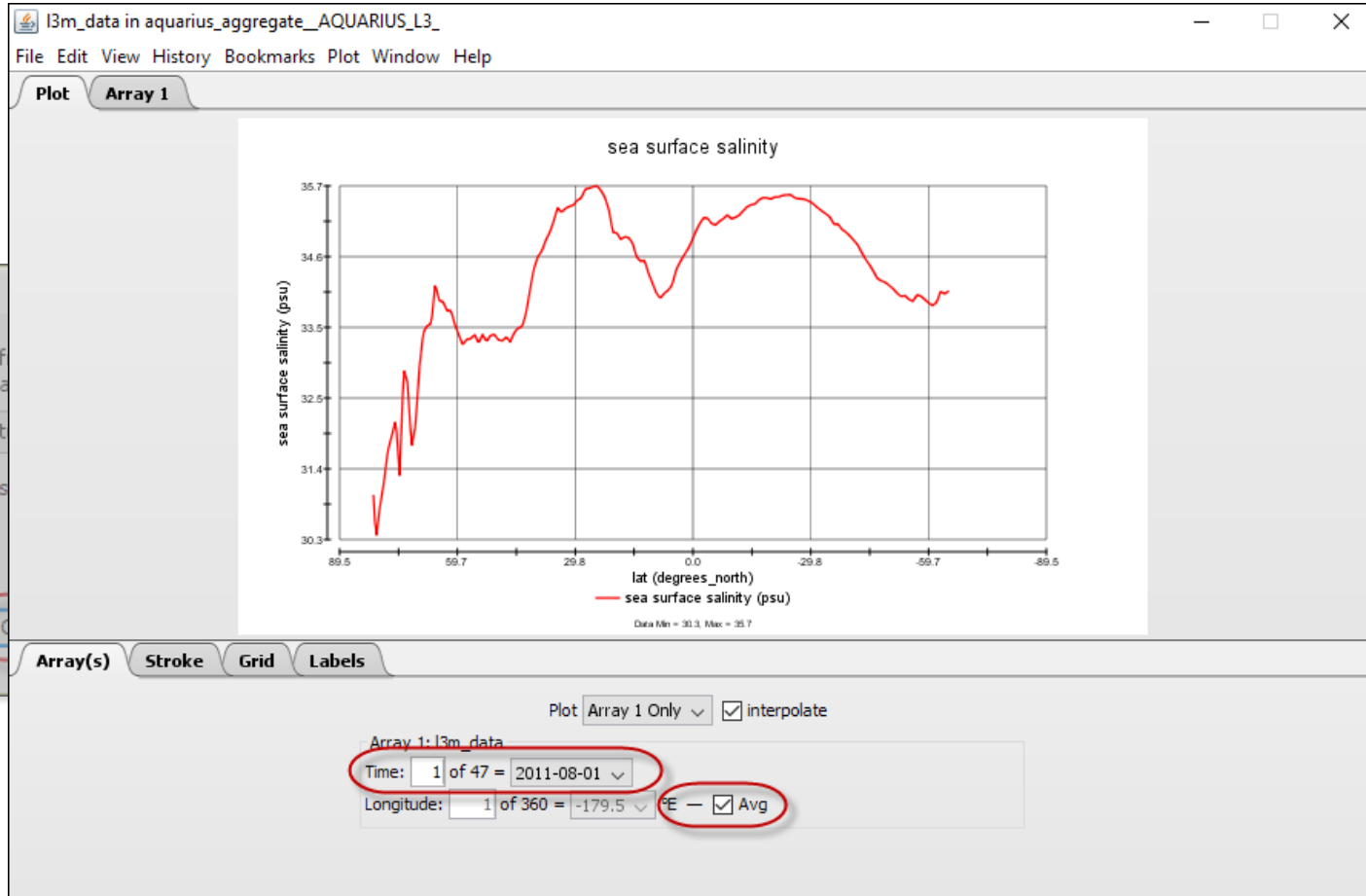
# 7. Visualizing Data Using Panoply: Line Plots

[Related Tutorials:](#)  
[Install Panoply<sup>5</sup>](#)  
[Download NetCDF<sup>3</sup>](#)  
[Export Plot<sup>10</sup>](#)

## Create Plot

More than one type of plot can be created from 'l3m\_data'. What type would you like to create?

- Create georeferenced plot using Longitude-Latitude
- Create 2D plot using lat for X axis
- Create line plot along lat for X axis



# 8. Visualizing Data Using Panoply: Hovmöller Plots

## Related Tutorials:

Install Panoply<sup>5</sup>

Download NetCDF<sup>3</sup>

Customize Your Plot<sup>6</sup>

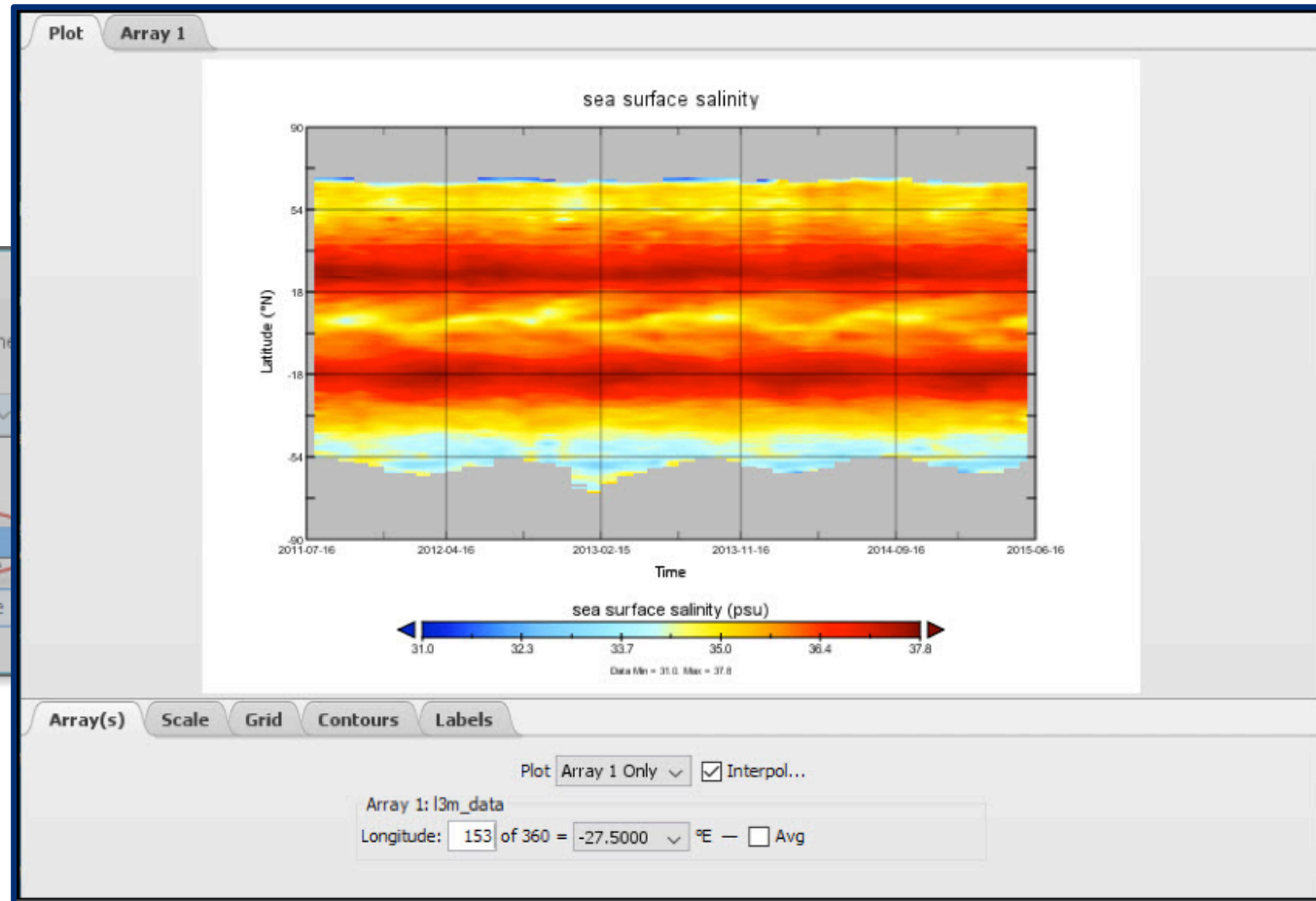
Export Plot<sup>10</sup>

### Create Plot

More than one type of plot can be created from the 'l3m\_data'. What type would you like to create?

- Create georeferenced Longitude-Latitude
- Create 2D plot using Latitude-Time
- Create horizontal Longitude-Latitude
- Create Time-Latitude

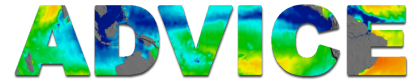
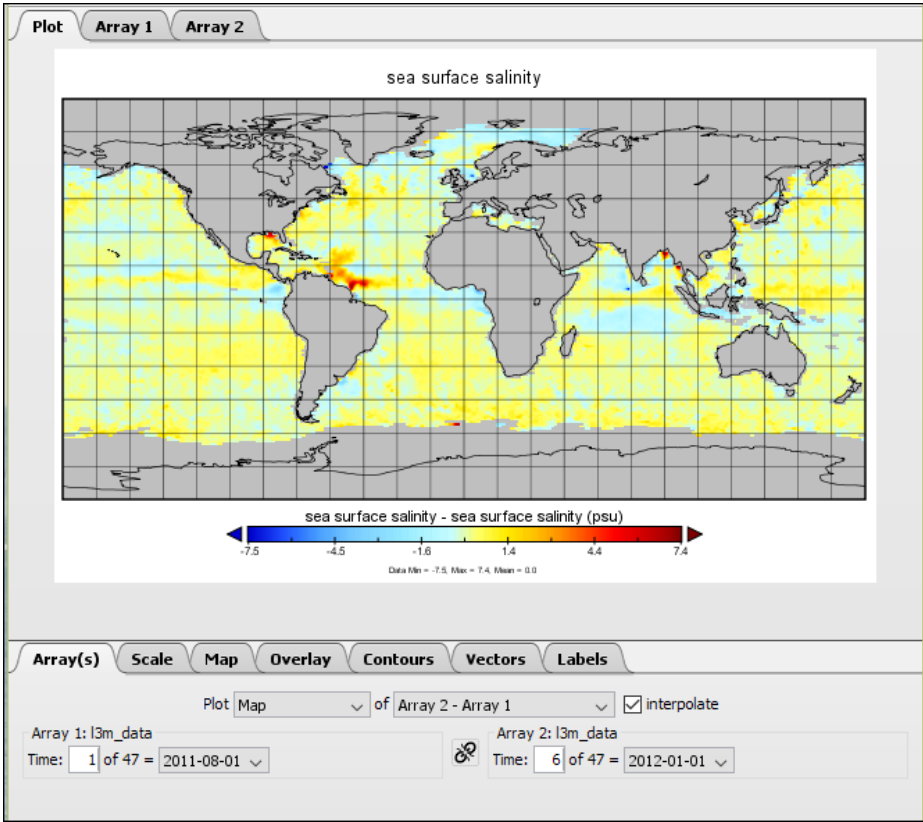
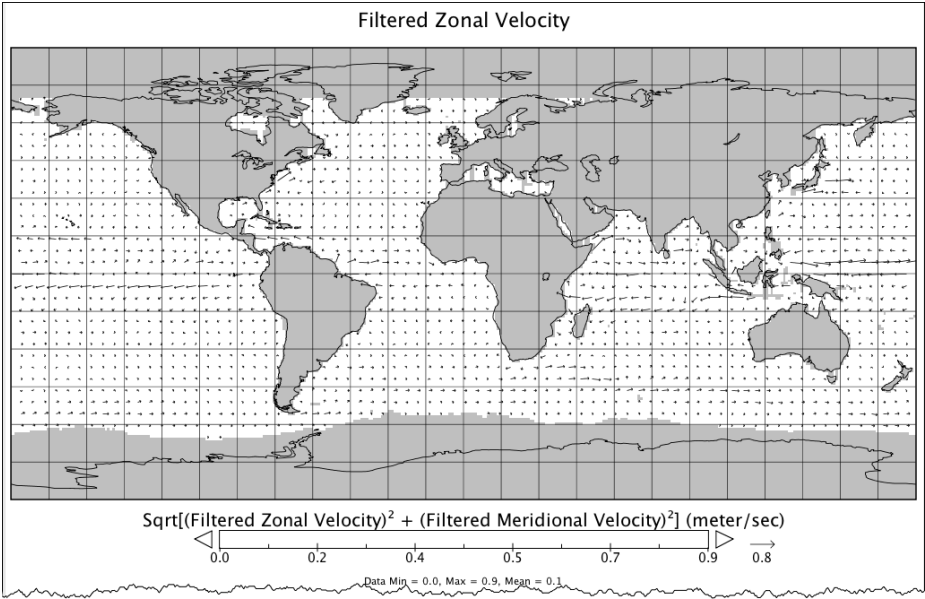
Create



# 9. Comparing Data Using Combination Plots in Panoply

Related Tutorials:  
 Install Panoply<sup>5</sup>  
 Download NetCDF<sup>3</sup>  
 Customize Your Plot<sup>6</sup>  
 Export Plot<sup>10</sup>

- Array 1 Only
- Array 2 Only
- Array 1 - Array 2
- Array 2 - Array 1
- Array 1 + Array 2
- Array 1 × Array 2
- Array 1 / Array 2
- Array 2 / Array 1
- (Array 1 - Array 2) / Array 2
- (Array 2 - Array 1) / Array 1
- Average
- Merge
- Vector Magnitude**



# 10. Using Panoply to Create Images, Animations & GoogleEarth-ready Files

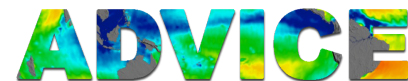
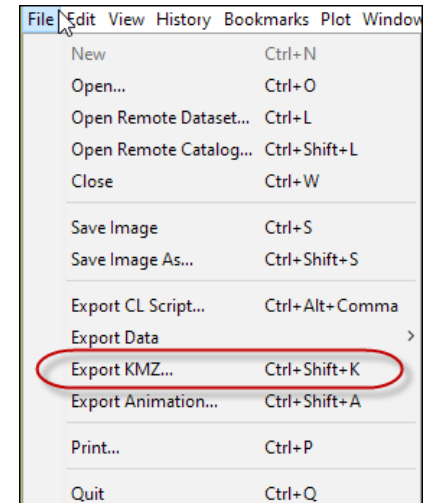
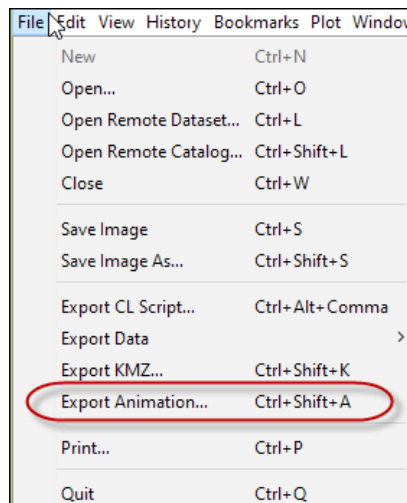
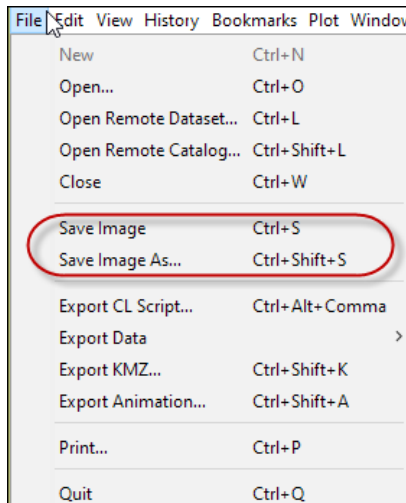
## Related Tutorials:

Install Panoply<sup>5</sup>

Download NetCDF<sup>3</sup>

Create a Plot<sup>6,7,8,9</sup>

GoogleEarth<sup>11</sup>



# 11. How to Make a Movie of Your Plot in Google Earth & Google Earth Pro

## Related Tutorials:

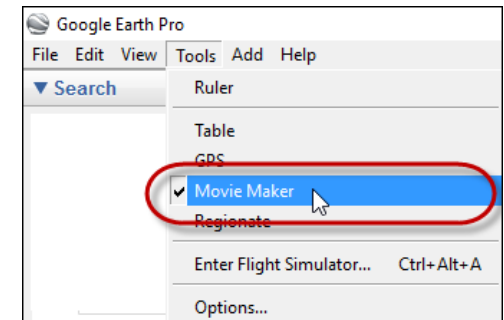
Install Panoply<sup>5</sup>

Download NetCDF<sup>3</sup>

Create a Plot<sup>6,7,8,9</sup>

Export to KMZ<sup>10</sup>

Making a Movie to Be Shared Outside of Google Earth Pro



Making a Movie to Be Viewed Inside Google Earth/Google Earth Pro

