

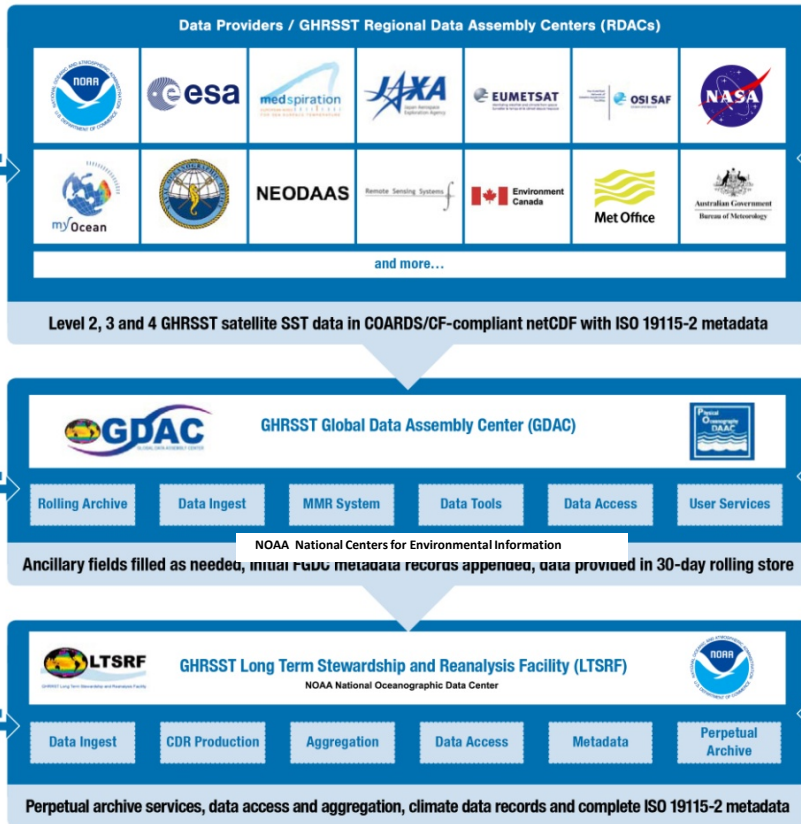
A brief introduction to...
GHRSSST Data Access and
Visualisation

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Regional/Global Task Sharing (R/GTS)

Interoperable user access via OPeNDAP, TDS WCS, FTP...

User requirements, services and feedback at all levels...



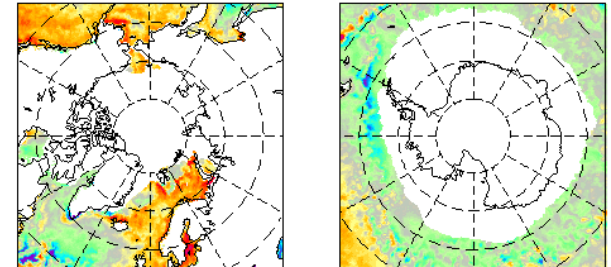
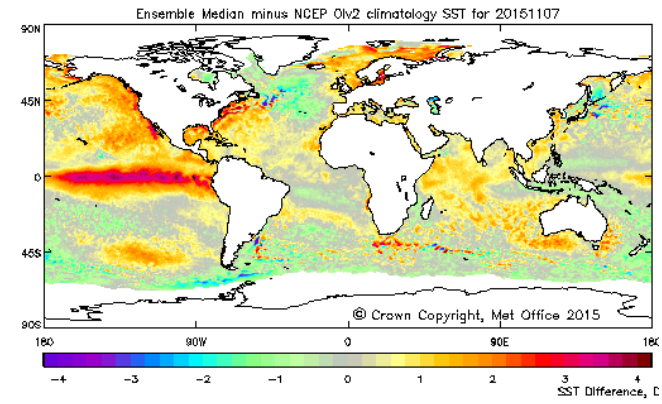
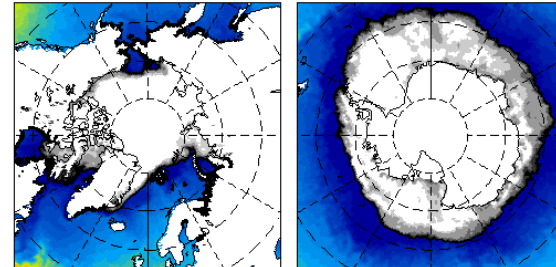
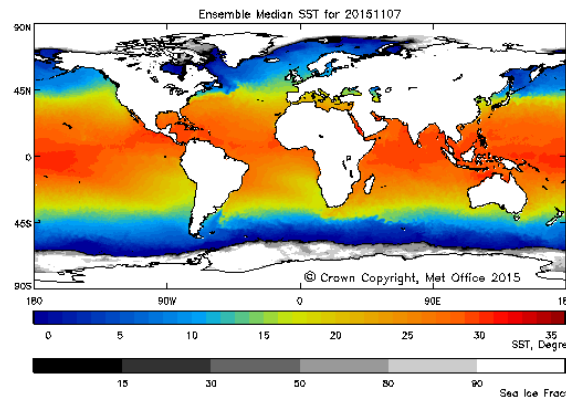
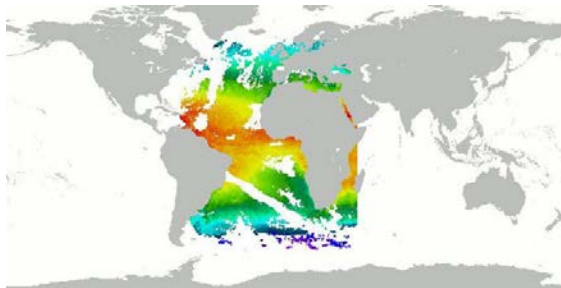
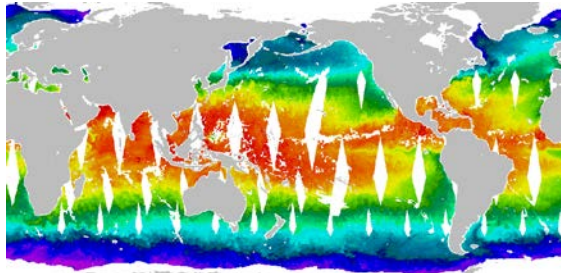
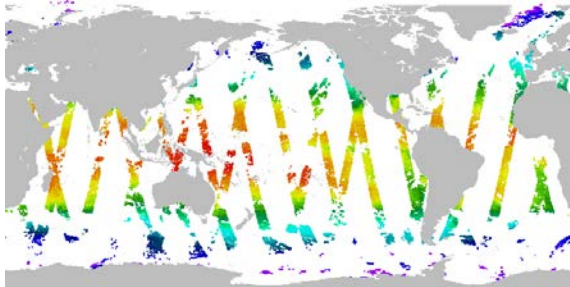
- GHRSSST products generated by RDACs
 - Some RDACs are self-serve
- GHRSSST offers to serve data on-behalf of RDACs
 - Optional step but recommended
 - Additional metadata for discovery services required
- Real time
 - Global Data Assembly Centre (GDAC)
 - Primary system hosted by NASA JPL
 - See <http://podaac.jpl.nasa.gov/>
 - Secondary system hosted by Ifremer
 - See <http://cersat.ifremer.fr/data/collections/ghrsst> (requires simple registration)
 - Not all datasets are mirrored
- Delayed mode
 - Long-term Stewardship and Reanalysis Facility (LTSRF)
 - Hosted by NOAA NODC (now NCEI)
 - See <http://data.nodc.noaa.gov/ghrsst/>
- Data can be accessed using many methods
 - ftp, http, DAP, WMS, WCS, LAS, Geoportal, Granules, CWI
- Any issues
 - Please contact the GHRSSST Project Office (gpc@ghrsst.org)

GDS2.0

- GHRSSST Data Processing Specification (GDS) 2.0
- All data files are in NetCDF file format
- All data files contain COARDS/CF compliant file level metadata
- All data files have a corresponding DIF metadata record, and once in the LTSRF, FGDC metadata as well

- All data are free and openly available to everyone
- Some RDACs require simple registration

Example L2P and L4 data



RDACs

- Regional Data Assembly Centres
- **GHRST Data Producers**
 - Provide L2P, L3 or L4 data
- Self serve or pass to GDACs
 - If self-serve then metadata should at least be passed to GDAC/LTSRF

GDACs and LTSRF

- Global Data Assembly Centres
- **GHRSSST Data Distributors**
 - Mainly real-time (up to 30 days)
- Long-term Stewardship and Reanalysis Facility
- **GHRSSST Data Archive**
 - And much, much more...
- Both have many ways to access GHRSSST data
 - ftp, http, DAP, WMS, WCS, LAS, Geoportal, Granules, CWI

LTSRF Progression

	2007	2008	2009	2010	2011	2012	2013	2014	2015*
Products		22	26	27	40	59	60	62	77
Accessions		39,048	49,957	59,982	67,906	92,282	105,046	112,182	123,325
Files		679,000	993,580	1,352,901	1,662,004	2,459,724	3,290,806	3,971,657	4,894,891
Volumes (TB)		13	20	28	34	57	69	81	92
Services	ftp http	ftp http	ftp http DAP	ftp http DAP WMS WCS	ftp http DAP WMS WCS LAS	ftp http DAP WMS WCS LAS Geoportal	ftp http DAP WMS WCS LAS Geoportal Granules CWIC	ftp http DAP WMS WCS LAS Geoportal Granules CWIC	ftp http DAP WMS WCS LAS Geoportal Granules CWIC

Some considerations in selecting a GHRSSST product...

- Spatially complete?
 - Analysis or native swath data
- Duration?
 - Time series or single image
- Spatial resolution?
 - High-resolution near coast or basin scale
- Level of uncertainty?
 - Best quality only
- Depth?
 - Skin or other defined depth
- Synergy?
 - Co-located with other data
- Availability?
 - Timeliness
- Volume?
 - Local or remote processing

GDAC Access

The screenshot shows the Podaac website interface. At the top, there is a navigation bar with "EARTHDATA" and "Data Discovery | PO.DAAC". The main header features the NASA logo and "Jet Propulsion Laboratory California Institute of Technology". Below this is the "podaac" logo and "Physical Oceanography Distributed Active Archive Center". A search bar and "Follow Us" links are also present.

The main content area is titled "Dataset Discovery" and shows "All Products > Collections: GHRSSST". It indicates "Found 94 matching dataset(s)". A "Select Filter" sidebar on the left allows filtering by Processing Levels, Swath Spatial Resolution, Grid Spatial Resolution, Temporal Resolution, and Parameter. The main results area displays a list of datasets, each with a thumbnail map and a brief description. The first result is "GHRSSST Level 2P Global Skin Sea Surface Temperature from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the NASA Aqua satellite (JPL-L2P-MODIS_A)".

Select Filter

- Processing Levels**
 - Any processing level
 - Level-2 (Swath) (46)
 - Level-3 (Grid) (18)
 - Level-4 (Blended) (30)
- Swath Spatial Resolution**
 - Any swath spatial resolution
 - 1 km (13)
 - 2 km (7)
 - 4 km (9)
 - 5 km (2)
 - 9 km (10)
 - 11 km (1)
 - 25 km (4)
- Grid Spatial Resolution**
 - Any grid spatial resolution
 - 0.01 degree(s) (10)
 - 0.02 degree(s) (13)
 - 0.03 degree(s) (2)
 - 0.04 degree(s) (3)
 - 0.05 degree(s) (10)
 - 0.08 degree(s) (3)
 - 0.09 degree(s) (1)
 - 0.1 degree(s) (2)
- Temporal Resolution**
 - Any temporal resolution
 - 1 Day (1)
 - 1 Hour (3)
 - 12 Hours (10)
 - 12 Hours (nominally) (1)
 - 15 Minutes (1)
 - 15 minutes (1)
 - 3 Hours (1)
 - 30 Minutes (3)
- Parameter**
 - Any parameter

Dataset Discovery

Found 94 matching dataset(s).

Advanced search

View mode: [List] [Grid]

Sort By: Popularity (All Time)

Prev 1 2 3 4 5 6 7 8 9 10 Next

1

GHRSSST Level 2P Global Skin Sea Surface Temperature from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the NASA Aqua satellite (JPL-L2P-MODIS_A)

Ocean Temperature

Platform/Sensor: AQUA/MODIS

Processing Level: 2P

Along/Across Track Resolution: 1 km x 1 km

Start/End Date: 2006-Jun-30 to Present

Description: The Moderate-resolution Imaging Spectroradiometer (MODIS) is a scientific instrument (radiometer) launched by NASA in 2002 on board the Aqua satellite platform (a second series is on ... more

2

GHRSSST Level 2P Global Skin Sea Surface Temperature from the Moderate Resolution Imaging Spectroradiometer (MODIS) on the NASA Terra satellite (JPL-L2P-MODIS_T)

Ocean Temperature

Platform/Sensor: TERRA/MODIS

Processing Level: 2P

Along/Across Track Resolution: 1 km x 1 km

Start/End Date: 2006-Oct-1 to Present

Description: The Moderate-resolution Imaging Spectroradiometer (MODIS) is a scientific instrument (radiometer) launched by NASA in 1999 on board the Terra satellite platform (a second series is ... more

3

GHRSSST Level 4 MUR Global Foundation Sea Surface Temperature Analysis (JPL-

<http://podaac.jpl.nasa.gov/>

LTSRF Access

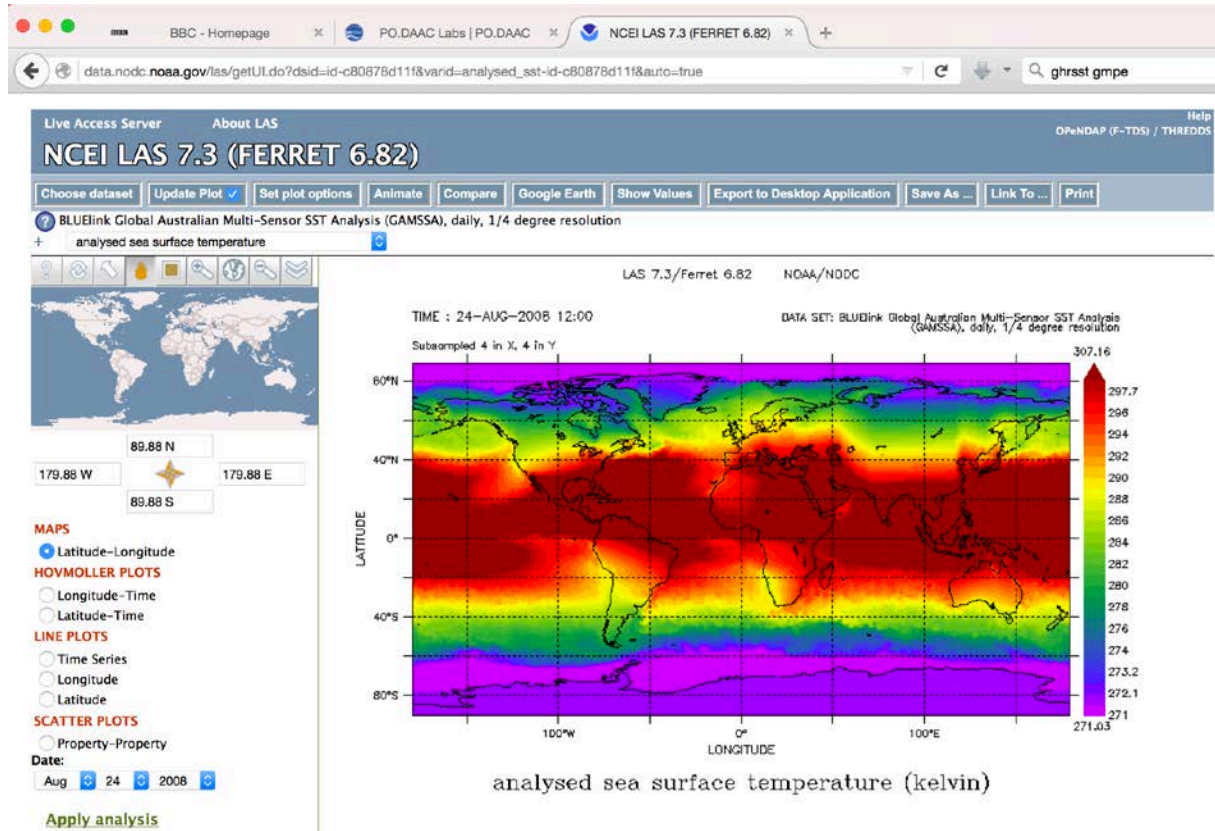
The screenshot shows the NOAA National Centers for Environmental Information website. The main heading is "LTSRF" (GHRSSST Long Term Stewardship and Reanalysis Facility). Below this, there is a section titled "Data Access is Here!" with a list of links for HTTP, FTP, OPeNDAP, and THREDDS access, as well as information about the NODC Geoportal and Live Access Server.

Below the text is a table titled "GHRSSST Products in the LTSRF". The table has columns for RDAC, Product, Product Level, Start Date, End Date, GDS Version, Grid / Pixel Resolution, Metadata, Access, and Disk Volume · Number of Days · Number of Files.

RDAC	Product	Product Level	Start Date	End Date	GDS Version	Grid / Pixel Resolution	Metadata	Access	Disk Volume · Number of Days · Number of Files
ABOM	GAMSSA_28km GLOB	L4	2008-08-24	2015-10-02	1.5	28 km	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	2.5GB · 2589 days · 2589 files
	RAMSSA_09km AUS	L4	2008-04-01	2015-10-02	1.5	9 km	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	4.3GB · 2716 days · 2720 files
CMC	CMC0.2deg GLOB	L4	2013-06-27	2015-09-20	2.0	0.2°	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	1.0GB · 461 days · 461 files
DMI	DMI_OI GLOB	L4	2013-12-11	2015-09-15	2.0	0.05°	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	21.5GB · 143 days · 143 files
	DMI_OI NSEABALTIC	L4	2007-06-04	2015-10-03	1.5	3 km	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	1.5GB · 3009 days · 3009 files
EUR	AMSRE	L2P	2004-12-19	2007-02-26	1.5	25 km	Details · Granule Search · Live Access Server	FTP · HTTP · OPeNDAP · THREDDS	3.0GB · 744 days · 8995 files
	ATS_NR_2P	L2P	2004-12-30	2009-09-29	1.5	1 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	315.4GB · 1643 days · 22303 files
	AVHRR16_G	L2P	2004-12-30	2006-08-14	1.5	8.8 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	0.6GB · 549 days · 7549 files
	AVHRR16_L	L2P	2004-12-30	2005-10-26	1.5	2.2 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	0.1GB · 241 days · 1021 files
	AVHRR17_G	L2P	2004-12-30	2007-02-26	1.5	8.8 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	0.8GB · 708 days · 9756 files
	AVHRR17_L	L2P	2004-12-30	2007-02-26	1.5	2.2 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	0.5GB · 687 days · 3126 files
	AVHRR_METOP_A	L2P	2009-10-01	2013-07-04	1.5	1.1 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	3221.9GB · 1326 days · 622720 files
	AVHRR_METOP_A	L3P	2009-09-01	2013-07-03	1.5	0.05°	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	34.6GB · 1396 days · 2741 files
AVHRR_NOAA_19	L3P	2009-12-10	2013-07-03	1.5	2 km	Details · Granule Search	FTP · HTTP · OPeNDAP · THREDDS	24.0GB · 1301 days · 2584 files	

<http://www.nodc.noaa.gov/sog/ghrsst/accesdata.html>

Live Access Server

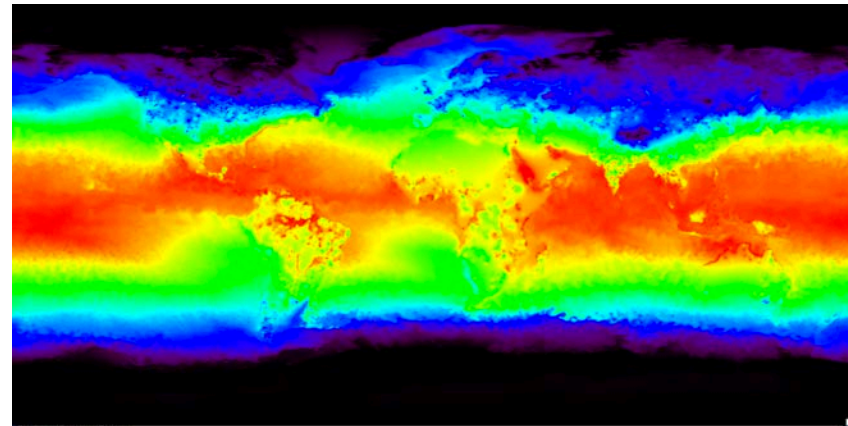


OPeNDAP

- Easy access to GDS2.0 format through OPeNDAP
 - Internally compressed NetCDF 4.0 format
- Can use IDL, MATLAB, etc., for direct access

```
url = 'http://podaac-  
opendap.jpl.nasa.gov/opendap/allData/ghrsst/data/GDS  
2/L4/GLOB/CMC/CMC0.2deg/v2/' $  
+ '2015/' $  
+ '311/' $  
+ '20151107120000-CMC-L4_GHRSSST-SSTfnd-  
CMC0.2deg-GLOB-v02.0-fv02.0.nc'
```

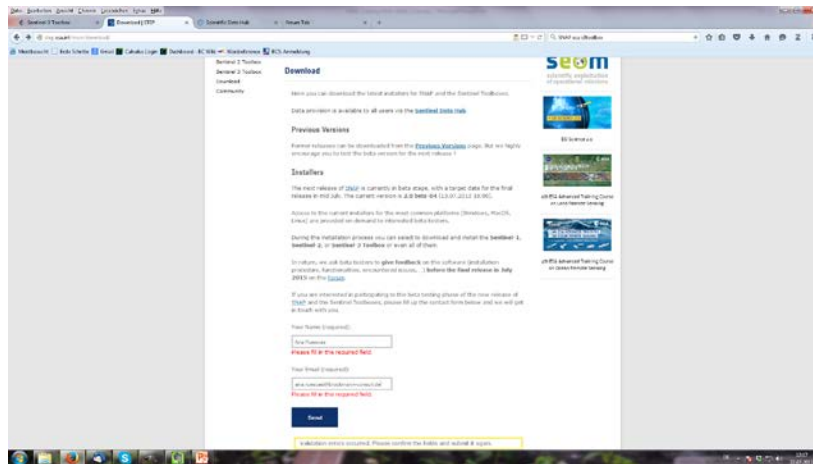
```
file_id = NCDF_OPEN(url, /nowrite)  
NCDF_VARGET, file_id, 'analysed_sst', sst  
NCDF_CLOSE, file_id  
DEVICE, decomposed=0  
LOADCT, 39, /silent  
TV, BYTSCL(sst)
```



No flags applied

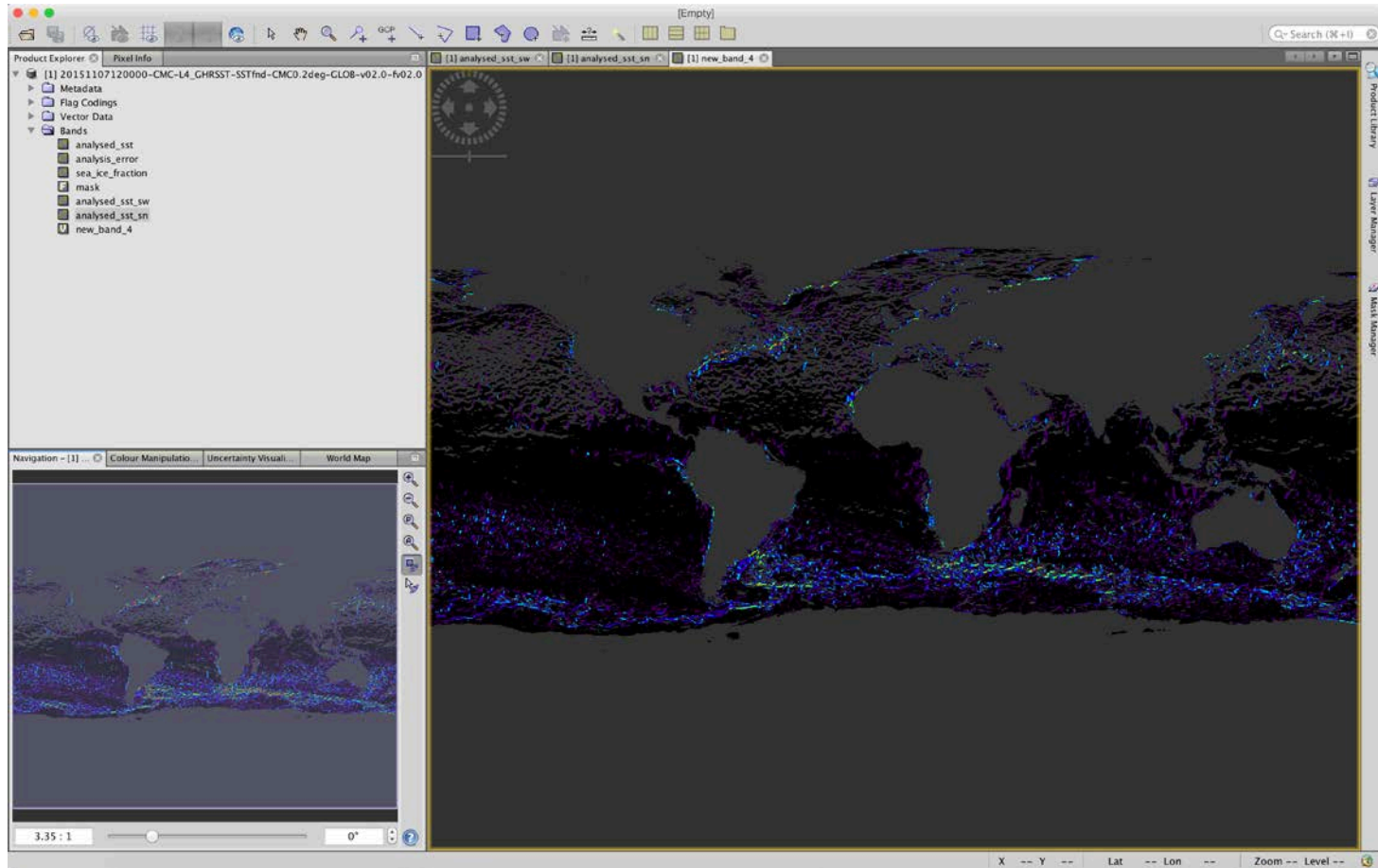
SNAP – Sentinel Application Platform

<http://step.esa.int/main/download/>

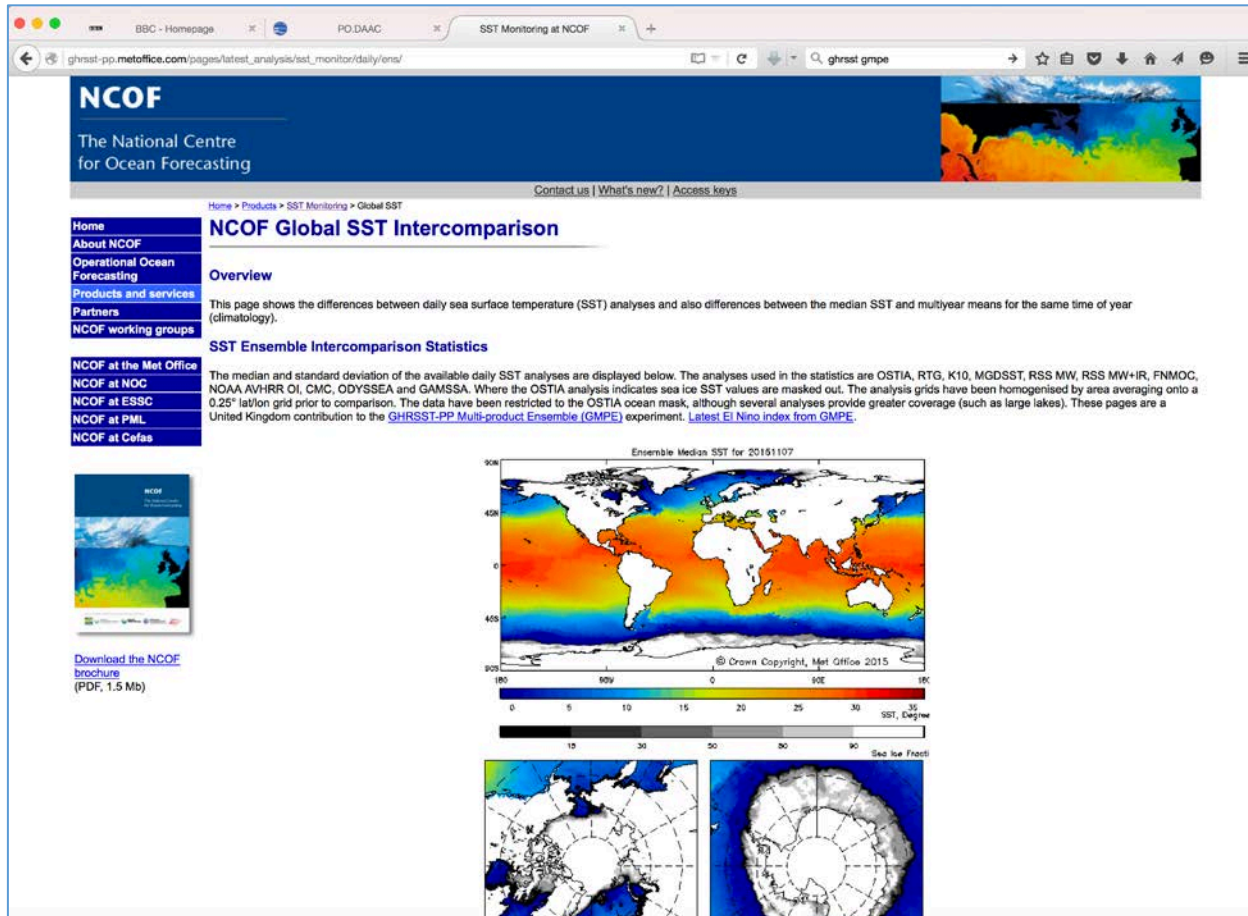


- SNAP is an open source toolbox for visualisation, analysis and processing of the Sentinels 1, 2 and 3 EO data. All supports many third-party missions and generic formats (e.g. NetCDF).

Example: SST gradients



GMPE

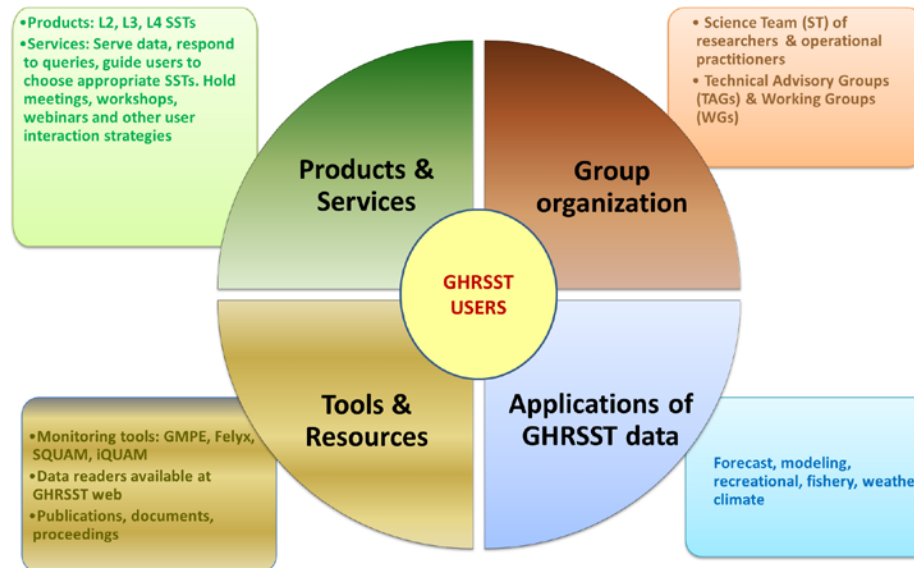


http://ghrsst-pp.metoffice.com/pages/latest_analysis/sst_monitor/daily/ens/

Finding the SST you need

Interested in GHRSSST data:

- Real-time data (collection - GHRSSST): <http://podaac.jpl.nasa.gov>
- Long-term data: <http://www.nodc.noaa.gov/SatelliteData/ghrsst/>
- Which data to use? Please check “Quick Start” : www.ghrsst.org/quick-start
- Tools/resources/codes: <https://www.ghrsst.org/products-and-services/tools/>



Interested in GHRSSST activities:

- Visit the GHRSSST website at <https://www.ghrsst.org>
- For your interest in a particular technical advisory group (TAG) or working group (WG), please check the description for that working group

Other products/tools

- Globcurrent (ocean currents)
 - <http://www.globcurrent.org/>
- OceanDataLab (online visualisation)
 - <http://www.oceandatalab.com/syntool-web/>
- NANSAT (Python toolbox)
 - <https://github.com/nanscenter/nansat>
- NAIAD (visualisation and extraction)
 - <http://naiad.ifremer.fr>
- Nephelae (data mining and processing)
 - <http://cersat.ifremer.fr/oceanography-from-space/our-domains-of-research/mass-data-processing-and-mining>

Uncertainty of measurement

- SST is 300 K
 - SST error is +0.5 K
 - SST uncertainty is 0.5 K

