



NOAA CoastWatch/ OceanWatch Ocean Color Data Dissemination

Veronica P. Lance* and
Paul M. DiGiacomo
and the NOAA CoastWatch/OceanWatch Team

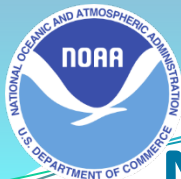
*Global Science & Technology, Inc.

2016 STAR/JPSS Annual Science Meeting
College Park, MD, 14-18 August 2017



STAR Center for Satellite
Application and Research

National Environmental Satellite, Data, and Information Service (NESDIS)



NOAA CoastWatch/OceanWatch Team

Paul DiGiacomo – Program Manager

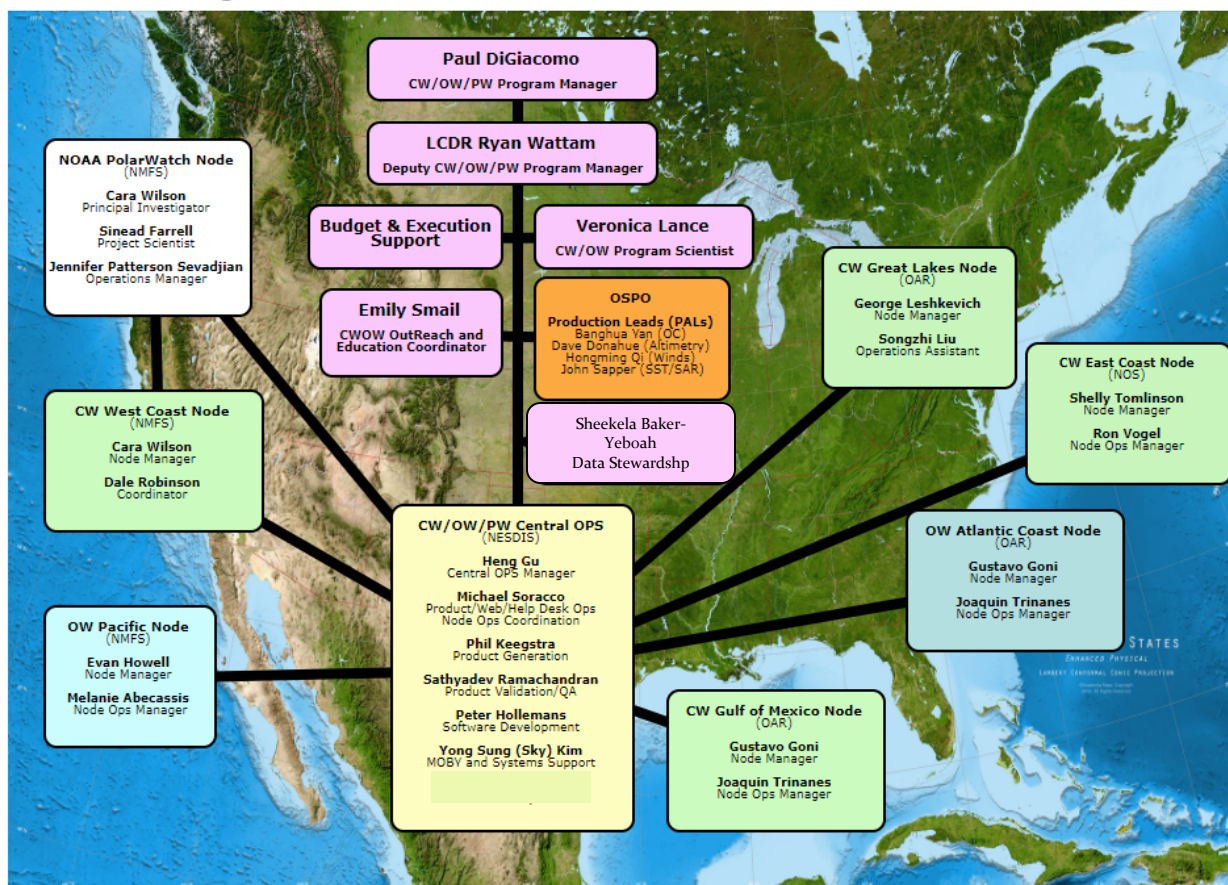
Full Time “CW Central” Technical Team	With Support From
Heng Gu	Veronica Lance
Phil Keegstra	Emily Smail
Sathya Ramachandran	Sheekela Baker-Yeboah
Michael Soracco	Ryan Wattam

And PolarWatch
and 5 Regional Nodes

NOAA

CoastWatch/OceanWatch/PolarWatch

CoastWatch Organization Chart



Role of NOAA CoastWatch/OceanWatch

NOAA CoastWatch/OceanWatch

NESDIS/STAR (Oceans/SOCD)

- Science research
- Algorithm/product development
- Cal/Val
- Quality assessment and monitoring
- Reanalysis, reprocessing
- Satellite application development & support

- Cross-NOAA program and data framework
- Interface between development, users of all levels and applications
- Measurement (vice) mission-based approach to multi-sensor satellite data
- Processing and customization of pre-and/or post-operational products; “value-added” for CoastWatch users
- NRT & science quality time-series data service
- Global and user regions of interest
- Quality monitoring
- Multiple pathways to data discovery
- Intermediate repository
- Help desk, project assistance, public outreach
- Best effort, 8/5 support

•USERS

NESDIS/NCEI

- Data stewardship
- Determine archive-worthiness; identify storage requirements
- Ensure robust metadata
- Data archive; long term storage
- Discovery of and access to archived data
- Support for users

NESDIS/OSPO

- Routine, robust, operational production and distribution, especially to NOAA users
- Dedicated support (8x5 or 24x7 depending upon specific product)

Suomi NPP VIIRS OC Data Products

- Near Real Time (Days 1-14)
 - Global
 - Regional
- Science Quality (Day 15 – 2 Jan 2012*)
 - Global
 - Regional



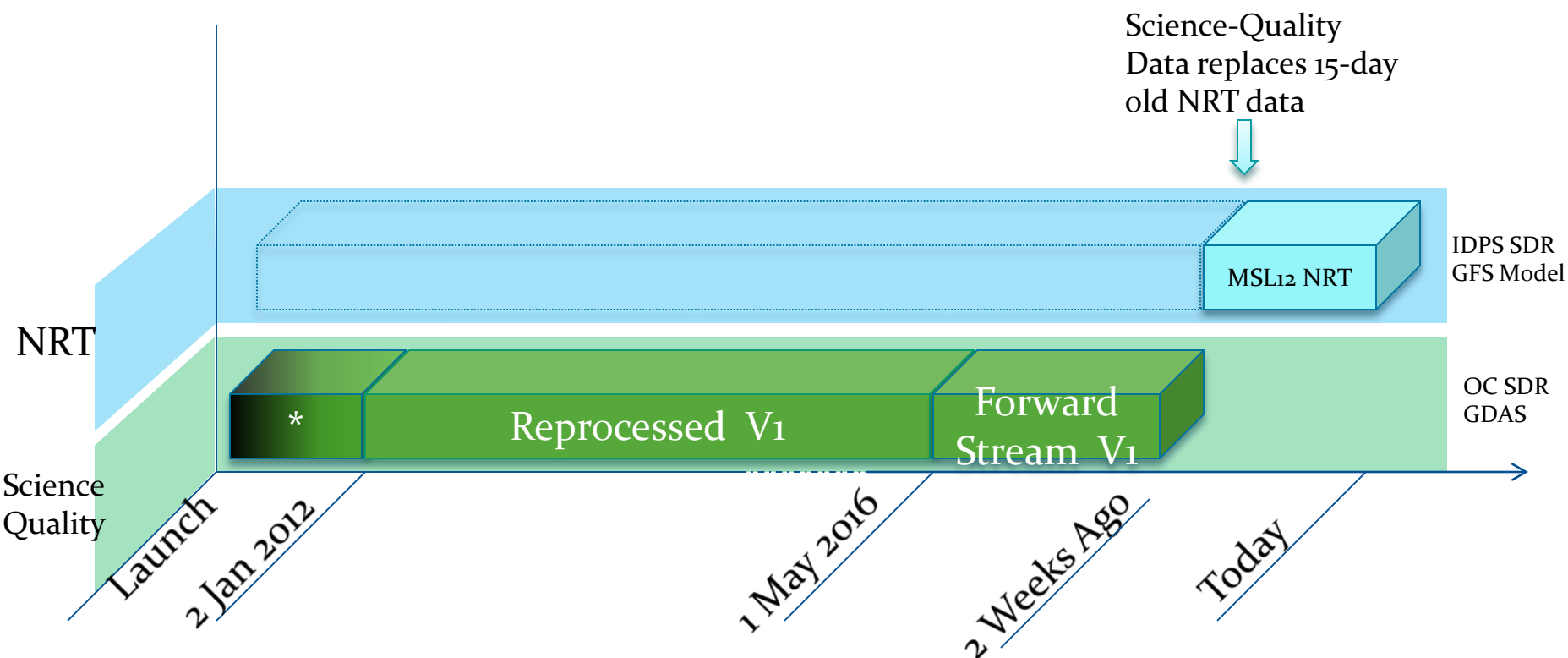
Also: Now Operational at OSPO

* Data from early mission (since launch Nov. 2011 to 2 Jan 2012) are available only upon special request and will be provided with a quality warning.

NRT & Science Quality Data

Attribute	Near-Real Time	Delayed-Mode/Science-Quality
Latency:	Best effort, as soon as possible (~12-24h)	Best effort, on a 2-week delay
Processing System:	MSL₁₂ (v1.01; will transition to v1.2x)	MSL₁₂ (v1.2x)
SDR:	IDPS Operational SDR	OC-improved SDR
Ancillary Data:	Global Forecast System (GFS) Model	Science quality (assimilated; GDAS) from NCEP
Spatial Coverage:	May be gaps due to various issues	Complete global coverage
Processed by:	OSPO (operational)	NOAA/STAR
Distributed by:	CoastWatch , OSPO	CoastWatch, NCEI
Archive Plans:	Yes, from OSPO to NCEI	Yes, from CoastWatch to NCEI
Full Mission Reprocessing:	No	Yes, every ~2-3 years or as needed

Example “Snapshot”



*Early mission data are not publically distributed due to quality issues.
They can be specially requested but will come with a quality warning.

L2 & L3 Global Products

- Standard:

- Chlorophyll-a
- $K_d(490)$
- $K_d(\text{PAR})$
- nL_w 5 M-Bands
 - 412
 - 445
 - 488
 - 555
 - 672
- $nL_w(638)$ I-Band
- QA Score

- L2_flags
- Latitude
- Longitude

- Experimental:

- IOPs
- PAR

*Future
inclusion
as released by MECB*

L2 & L3 Sector and Regional Products

- Standard:

- Chlorophyll-a
- $K_d(490)$
- $K_d(\text{PAR})$
- nL_w 5 M-Bands
 - 412
 - 445
 - 488
 - 555
 - 672
- nL_w (638) I-Band
- QA Score

- L2_flags
- Latitude
- Longitude
- Edgemask

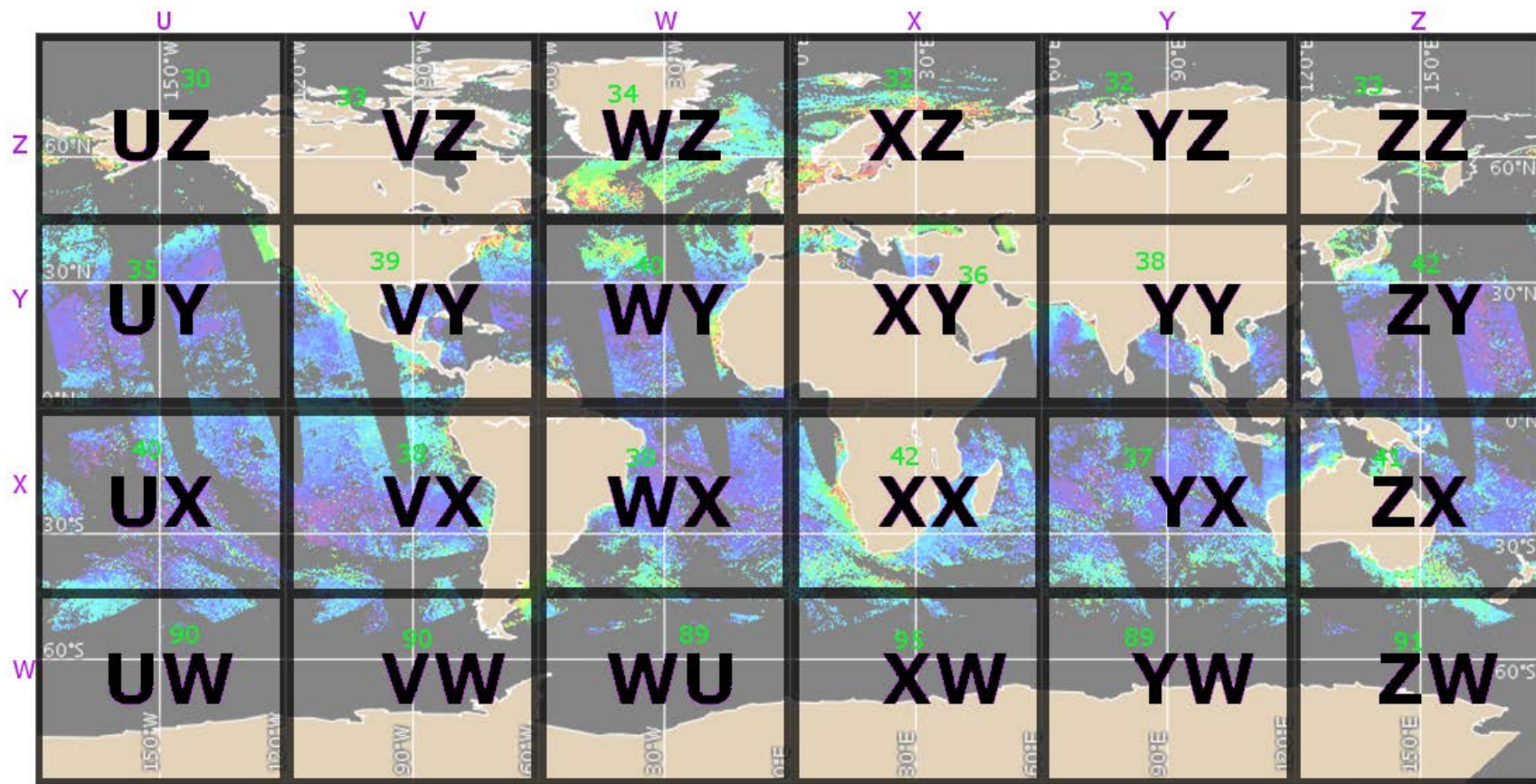
- Experimental:

- IOPs
- PAR

*Future
inclusion
as released by MECB*

- User Driven (“Customized” routine production; considered upon request):
 - HAB anomaly product
 - R_{rs}
 - Special projections
 - Etc.

L3 Global 750m Sectors



CW Distribution of NRT

Product Description	Processing Level	Nominal Spatial Resolution	Chl-a	nLws	KdPAR	Kd490	Rrs (672)	Chlorophyll Fronts	True Color
Daily granule global swath	L2	750 m	X	X	X	X	X		X
Daily merged mapped CW regions*	L3	750 m	X		X	X	X		X
Daily merged global single file	L3	4 km	X	X	X	X			
Daily merged global sectorized***	L3	750 m	X	X	X	X		X (3 sectors: UY, VY, WY)	
7-day merged global single file	L3	4 km	X	X	X	X			
7-day merged global sectorized***	L3	750 m	X	X	X	X			
True monthly merged global single file	L3	4 km	X	X	X	X			
True monthly merged global sectorized**	L3	750 m	X	X	X	X			
61 day merged for CW regions*	L3	750 m	X				X		
Anomaly for CW regions*	L3	750 m	X				X		
Daily granule Mediterranean	L1b, L2	750 m	X	X	X	X			
Daily merged mapped Mediterranean	L3	750 m	X		X	X			
Daily merged mapped Australia	L3	750 m	X		X	X			

CW Distribution of Science Quality

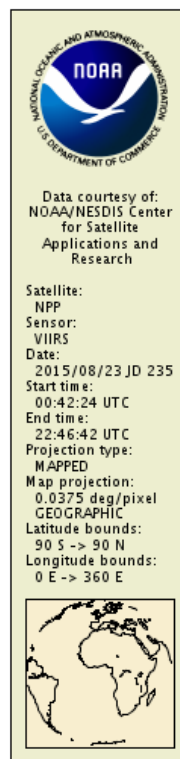
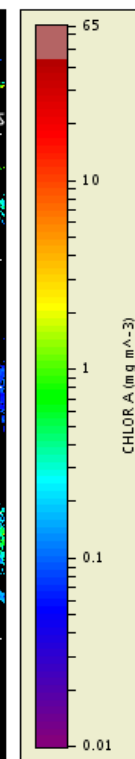
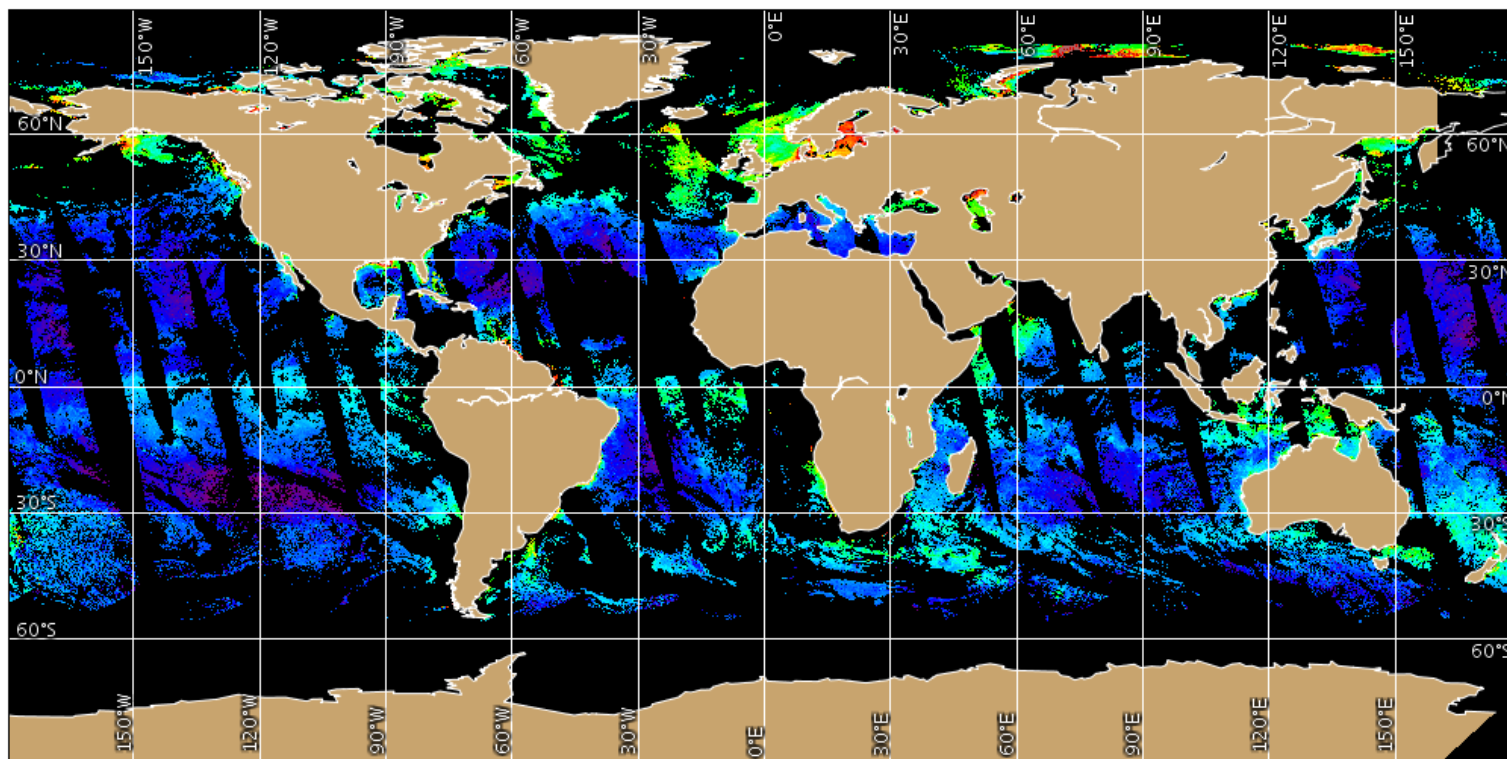
Product Description	Processing Level	Nominal Spatial Resolution	<u>Chl-<i>a</i></u>	<u><i>nLws</i></u>	<u><i>K_d</i>(PAR)</u>	<u><i>K_d</i>(490)</u>	QA Score
Daily granule global swath @750 m	L2	750 m	X	X	X	X	X
Daily merged global <u>sectorized</u> *	L3	750 m	in progress at CW	in progress at CW	in progress at CW	in progress at CW	in progress at CW
7-day merged global <u>sectorized</u> *	L3	750 m	in progress at CW	in progress at CW	in progress at CW	in progress at CW	in progress at CW
True monthly merged global <u>sectorized</u> *	L3	750 m	in progress at CW	in progress at CW	in progress at CW	in progress at CW	in progress at CW
Daily merged global single file	L3	4 km	X	X	X	X	X
7-day merged global single file	L3	4 km	X	X	X	X	X
Monthly merged global single file	L3	4 km	X	X	X	X	X

Data Formats

- Global and Sector:
 - NetCDF v4CF
 - GeoTIFF & PNG
- Tailored and CONUS Regional:
 - NetCDF v4 CF
 - GeoTIFF & PNG
 - HDF (v4 with CoastWatch metadata; to be phased out)

L3 NRT Global 4km

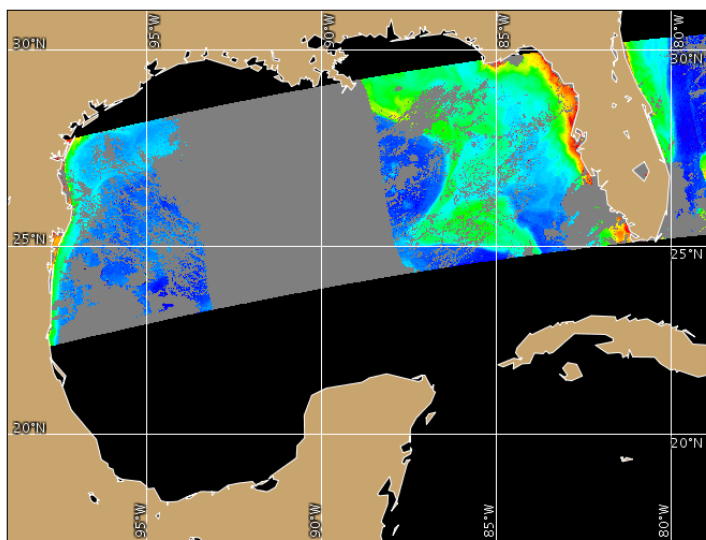
(mapped, daily, weekly monthly)



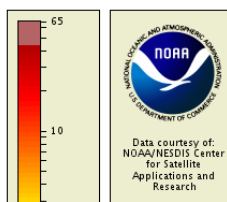
Pictured is daily NRT Chlorophyll-a [mg m^{-3}];

NRT Regional

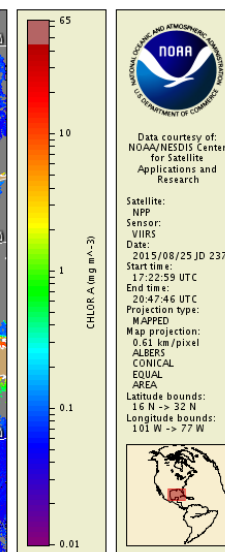
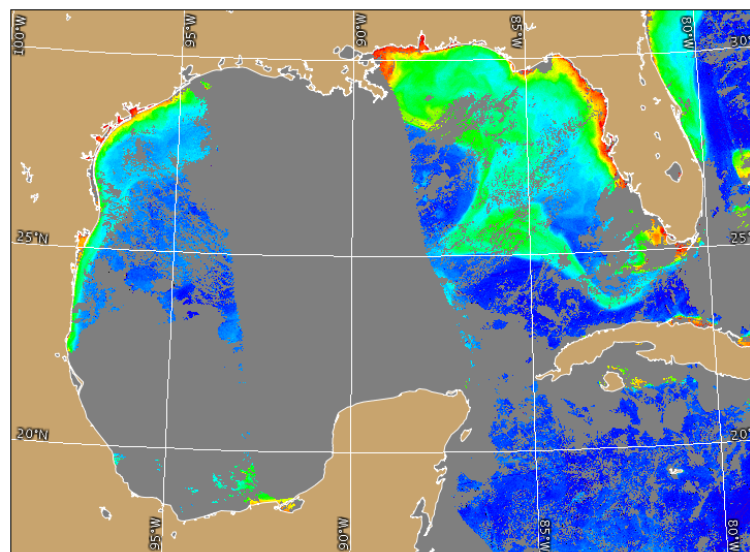
- “CONUS” 750m regions: Hawaii, West Coast, Great Lakes, Northeast, Southeast, Gulf of Mexico, Caribbean



Granule

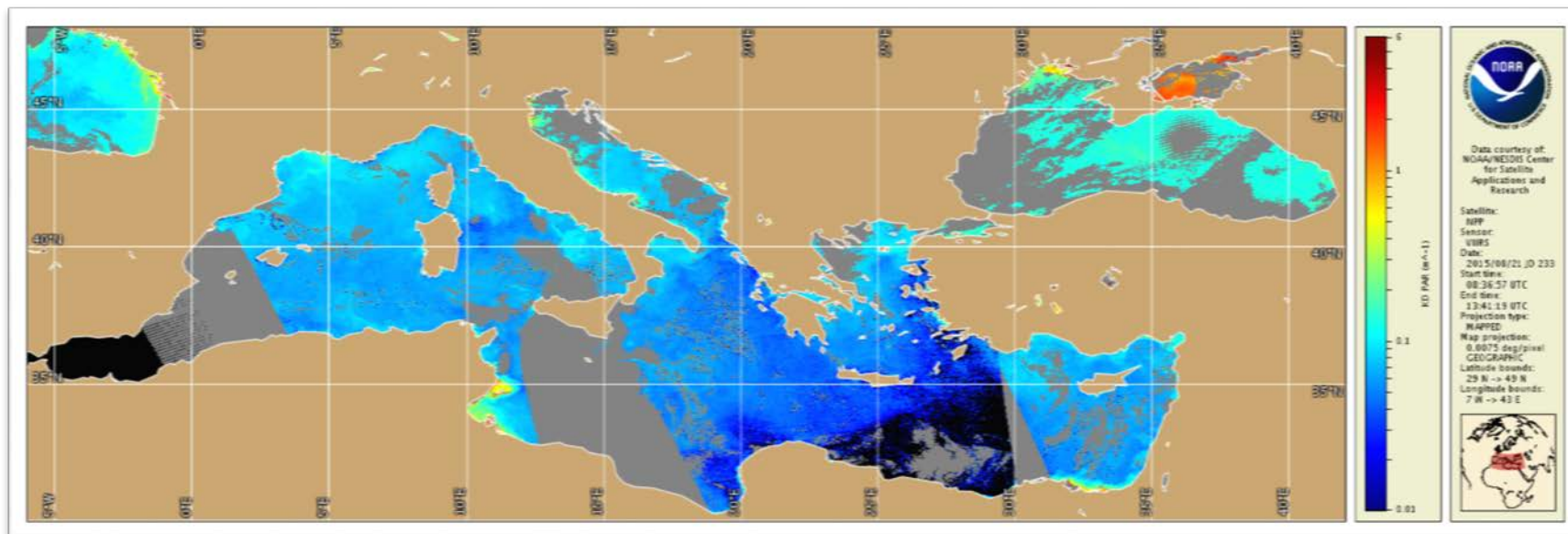


Daily Merge for Caribbean Region



International Partners (1)

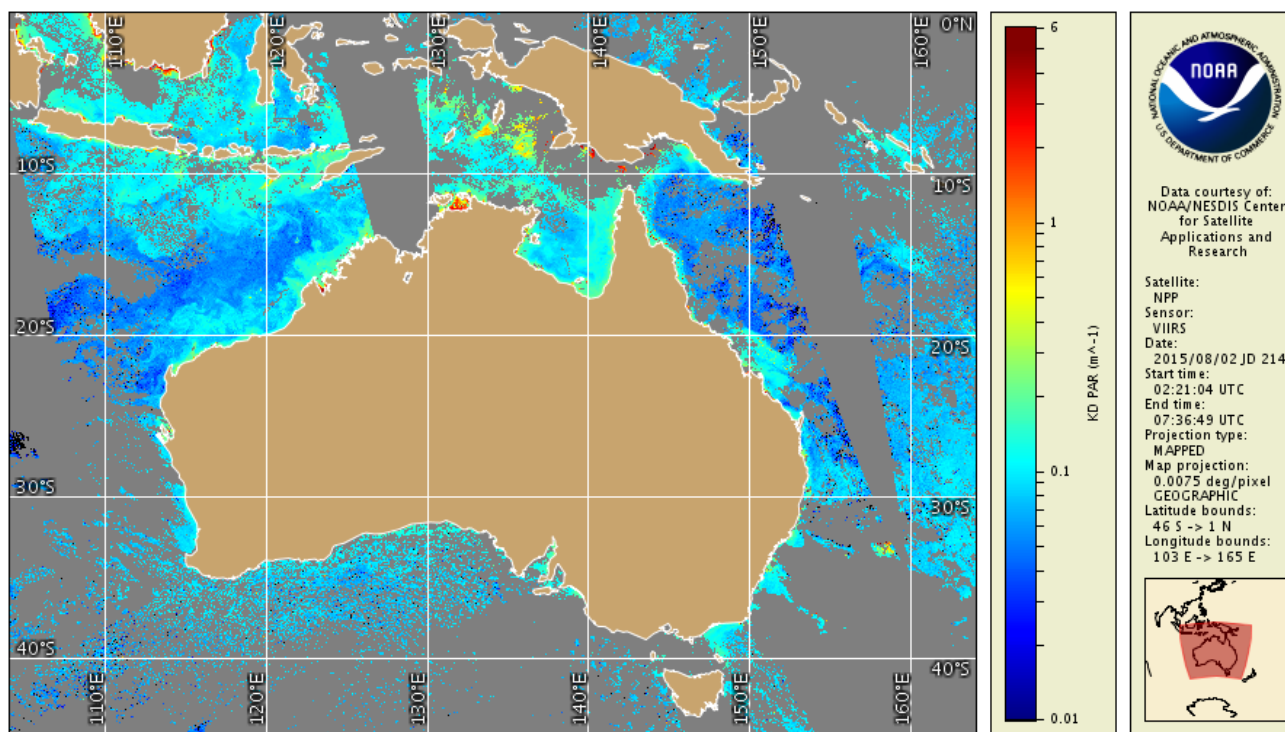
- EUMETSAT
 - Processing and staging of L2 750m Mediterranean datasets
 - EUMETcast (Copernicus Service) broadcasts VIIRS data to EU



Shown: L3 Daily merge, mapped, $k_d\text{PAR}$ [m^{-1}]

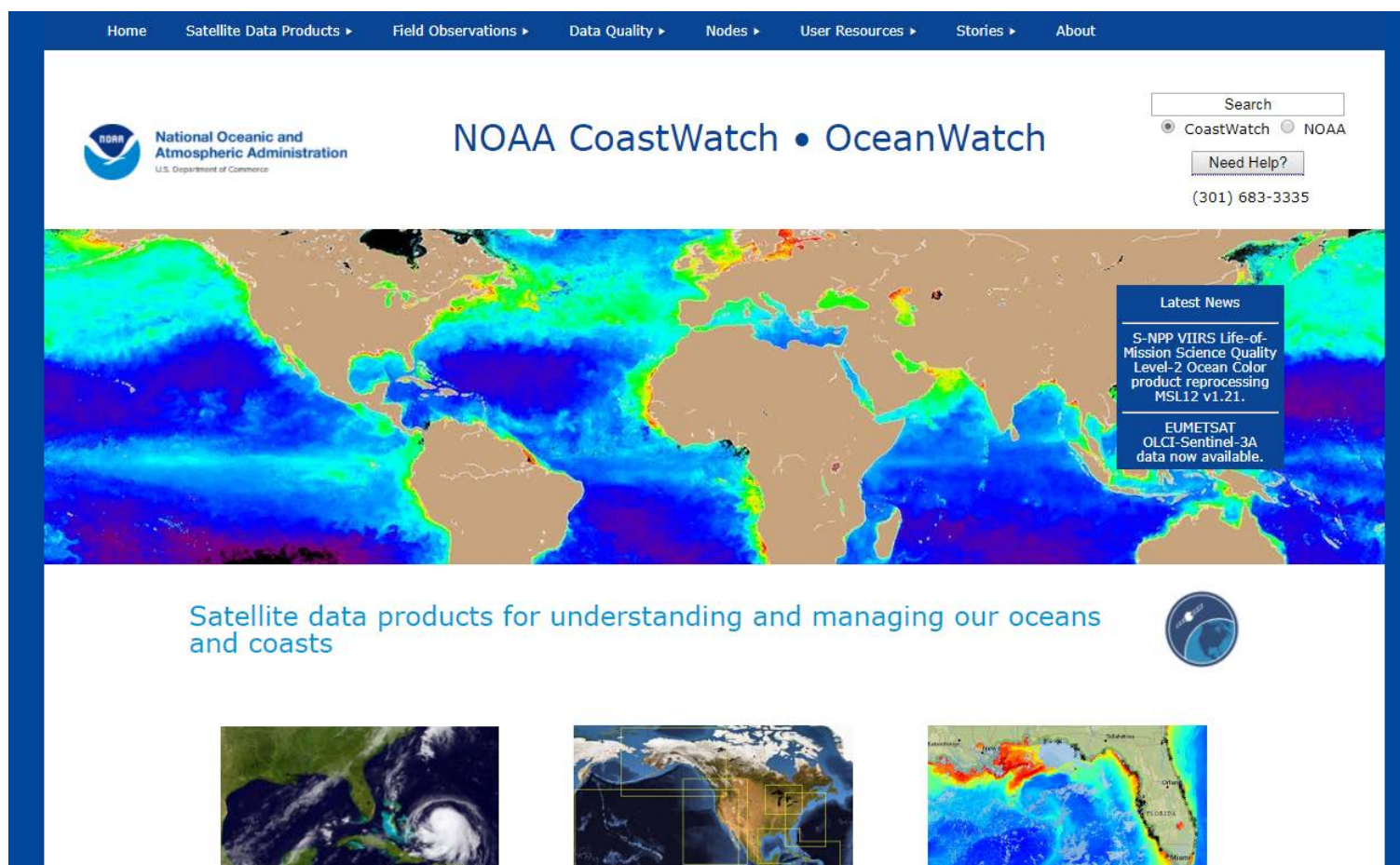
International Partners (2)

- CSIRO
- Processing and staging of L3 Australia 750m datasets



Daily Merge, mapped, k_d PAR [m^{-1}]

Website Revamp v.1.2 in Progress



OC Product Pages

Home Satellite Data Products ▶ Field Observations ▶ Data Quality ▶ Nodes ▶ User Resources ▶ Stories ▶ About



NOAA CoastWatch • OceanWatch

Ocean Color - Science Quality - VIIRS SNPP

Search
☒ CoastWatch ☐ NOAA

Need Help?

(301) 683-3335

Description

Information

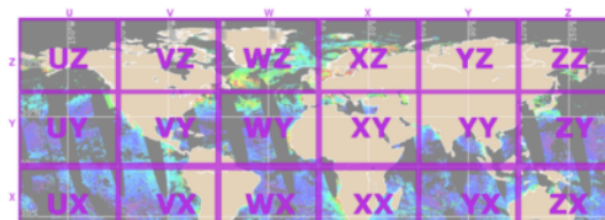
Data Access

Documentation

Updated: 22 February 2017

Data are available through the following servers:

Service	Resource Locator
HTTPS	https://coastwatch.noaa.gov/cw_html/cw_granule_selector.html
FTP	ftp://ftp.star.nesdis.noaa.gov/pub/socd1/mecb/coastwatch/viirs/science/L2/ ftp://ftp.star.nesdis.noaa.gov/pub/socd2/mecb/coastwatch/viirs/science/L3/global/chlora/daily/WW00/
THREDDS	https://www.star.nesdis.noaa.gov/thredds/socd/coastwatch/catalog_MECB_viirs_lom_global.html



NRT Search

Home Satellite Data Products Field Observations Data Quality Nodes User Resources Stories About



NOAA CoastWatch • OceanWatch Near Real Time Search

Search
CoastWatch NOAA
Need Help?
(301) 683-3335

Search Criteria

Region:
Select a Region

Product:
Select a Product

Sensor:
Select a Sensor

From: (MM/DD/YYYY)
08/14/2017

To: (MM/DD/YYYY)
08/15/2017

Search

The Near Real Time Search tool gives the user the ability of selecting OceanWatch data products based on their region of interest, the products associated with that region, the individual sensor used to obtain this data, and a time period of interest. Results are obtained either by category or by selecting criteria in the Search Criteria panel on the left.



True Color (RGB)



Sea Surface Temperature



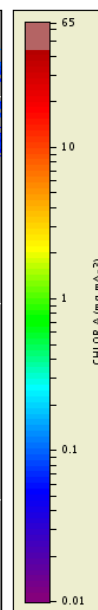
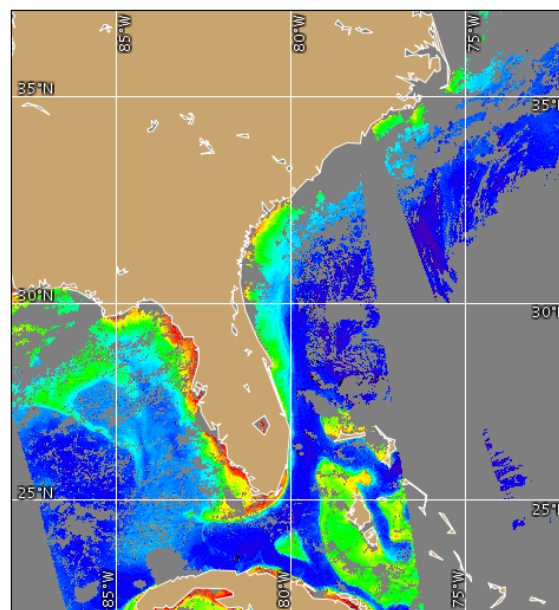
Chlorophyll-a



Salinity




Kd490



NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Data courtesy of:
NOAA/NESDIS Center
for Satellite
Applications and
Research

Satellite:
NPP
Sensor:
VIIRS
Date:
2017/08/14 JD 226
Start time:
17:17:48 UTC
End time:
19:04:27 UTC
Projection type:
MAPPED
Map projection:
0.83 km/pixel
MERCATOR
Latitude bounds:
21 N -> 38 N
Longitude bounds:
89 W -> 71 W



NOAA Satellites and Information
National Environmental Satellite, Data, and Information Service

Web site owner: Satellite Oceanography & Climatology Division

https://coastwatch.noaa.gov/cw_html/NearRealTimeSearch.html

L2 Granule Selector



National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

NOAA CoastWatch • OceanWatch

Level-1 / Level-2 Ocean Data

Search

☒ CoastWatch ☐ NOAA

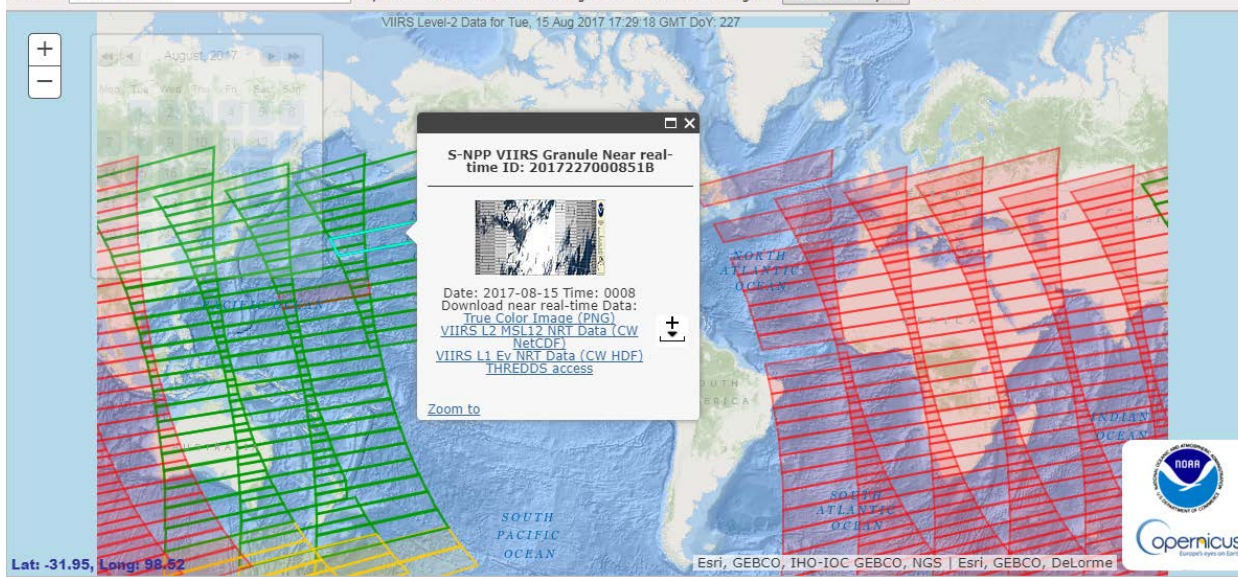
Need Help?

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The NOAA CoastWatch granule selector enables a user to select a Level-1 or Level-2 dataset by selecting a date and clicking on the granule that covers the user's area of interest. For VIIRS near real-time data is available for the last 15 days and science quality data is available from 2012 up to near real-time coverage. Clicking a granule will open an information window containing a link to the preview image and/or data file. If multiple files are desired (each file can be 18 to 550 MB), clicking on the download icon (↓) will add the selected granule to a list that can be downloaded and used to retrieve files using local software.

Sensor: Layers: ☐ MGRS Grid for S-2 regions ☐ CoastWatch Regions

VIIRS Level-2 Data for Tue, 15 Aug 2017 17:29:18 GMT DoY: 227



S-NPP VIIRS Granule Near real-time ID: 2017227000851B

Date: 2017-08-15 Time: 0008
Download near real-time Data:
True Color Image (PNG)
[VIIRS L2 MSL12 NRT Data \(CW NetCDF\)](#)
[VIIRS L1 Ev NRT Data \(CW HDF\)](#)
[THREDDS access](#)

Zoom to

Lat: -31.95, Long: 98.82

Esri, GEBCO, IHO-IOC GEBCO, NGS | Esri, GEBCO, DeLorme

NOAA
Copernicus
European Space Agency

Item	Data
1	VRSVCWB2017227.000851.nc
2	VRSVCWB2017227.000851.nc
3	VRSVCWB2017227.000851.nc

* Removes all items

https://coastwatch.noaa.gov/cwn/cw_granule_selector.html

L2 Spatial Search Tool



NOAA CoastWatch • OceanWatch
Level-2 VIIRS Ocean Color Science Quality

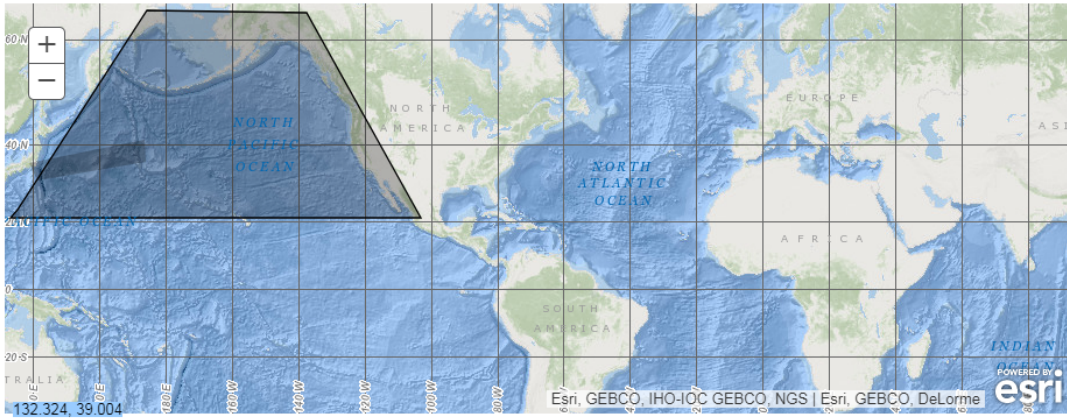
Search
☒ CoastWatch ☐ NOAA

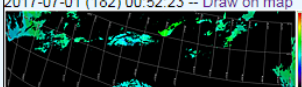
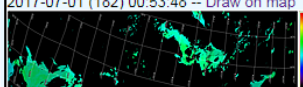
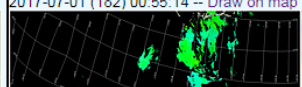

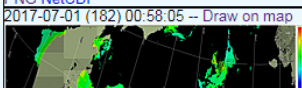
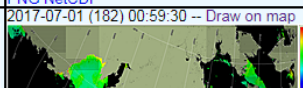
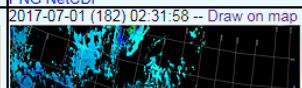
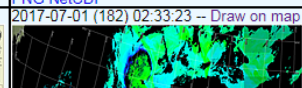
Need Help?
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Draw:

Jul 1, 2017 - Jul 31, 2017

Note: Science quality ocean color data from VIIRS is delayed by 15 days. The L2 datasets contain 5 nLW bands, chlorophyll-a, KdPAR, and Kd490. Use the FTP List button to generate a list of URLs for batch downloads. Data exists from 02JAN2012 to 31MAY2017.



2017-07-01 (182) 00:52:23 -- Draw on map	2017-07-01 (182) 00:53:48 -- Draw on map	2017-07-01 (182) 00:55:14 -- Draw on map	2017-07-01 (182) 00:56:39 -- Draw on map
			
PNG NetCDF	PNG NetCDF	PNG NetCDF	PNG NetCDF
2017-07-01 (182) 00:58:05 -- Draw on map	2017-07-01 (182) 00:59:30 -- Draw on map	2017-07-01 (182) 02:31:58 -- Draw on map	2017-07-01 (182) 02:33:23 -- Draw on map
			
PNG NetCDF	PNG NetCDF	PNG NetCDF	PNG NetCDF

FTP List

Region: L2
Sensor: VIIRS_sci
Product: color
Output: html

https://coastwatch.noaa.gov/cw_html/cw_polygon_search.html#searchbox



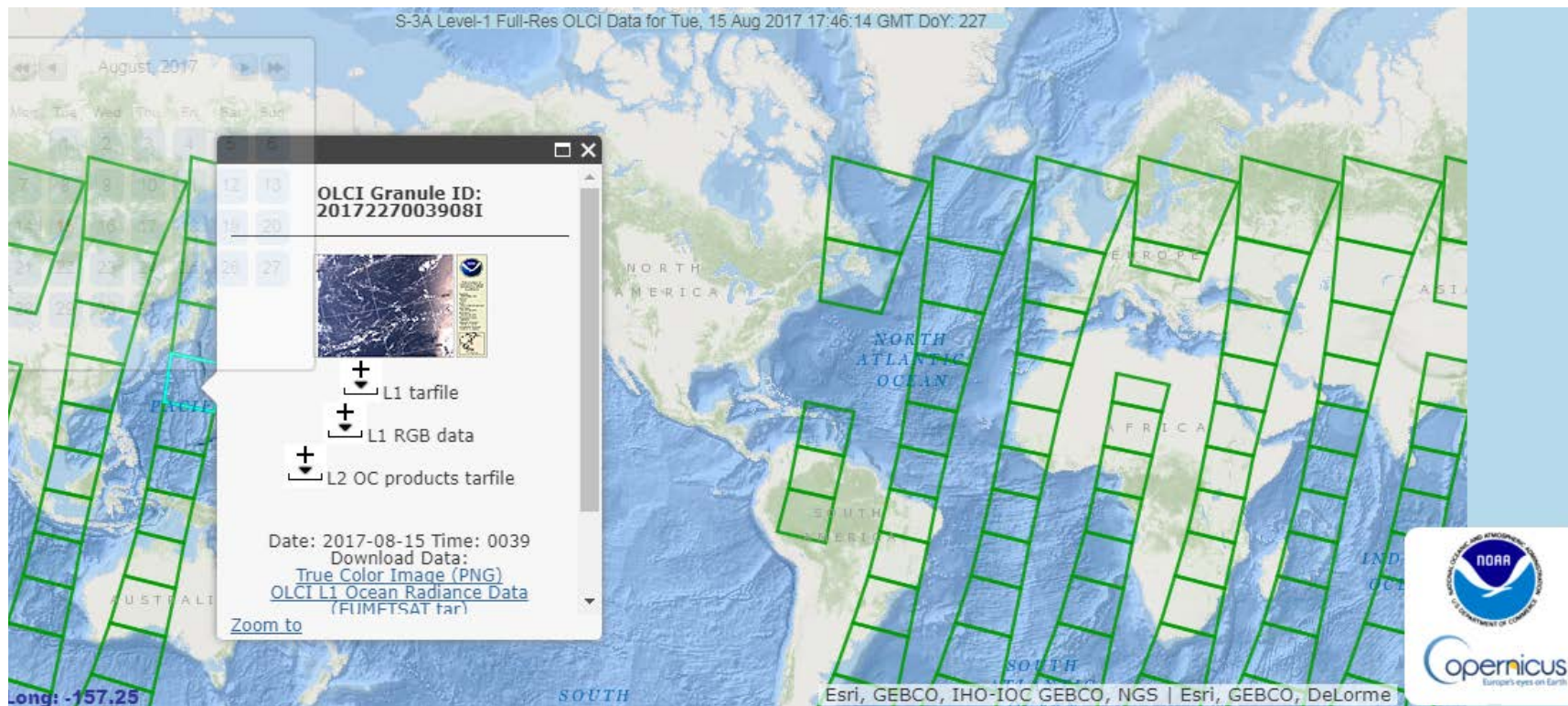
Data Stewardship and Long-Term Archive by NCEI

- NOAA CoastWatch/OceanWatch is delivering MSL12 full mission science quality data (L2 and L3) for data stewardship and long-term archiving by NCEI.
- Data will be stored at CLASS but easily accessible via CoastWatch and through NCEI spinning disk
- Spinning disk access page in progress, ***waiting on me to edit the content description.***

Sentinel-3A OLCI

- A Cooperative Arrangement between the United States and the European Commission and technical arrangements between NOAA and EUMETSAT (and NOAA and ESA for S1 and S2) are all complete.
- NOAA is primary outlet in US for Sentinel 3 marine data.
- EUMETSAT data transfer via terrestrial multicast to NOAA/STAR is now routine. L1 and L2 marine data products are now available through CW.
- NOAA CoastWatch/OceanWatch provides near real-time access to global OLCI (L1b and L2 full and reduced resolution)
- SLSTR data products from EUMETSAT and SRAL data are coming into STAR and will be redistributed through CoastWatch.
- OLCI data complements existing JPSS sensors:
 - 300m spatial resolution
 - Spectral bands meeting NOAA NOS HAB requirements
 - Morning vs. afternoon orbits
 - Relieves single point-of-failure for HAB forecasting

Sentinel-3A OLCI



Summary (1)

Both NRT and Science Quality VIIRS-SNPP Ocean Color data are available through NOAA CoastWatch/OceanWatch.

Science Quality

L2 global, granules:

FTP:

<ftp://ftp.star.nesdis.noaa.gov/pub/socd1/mecb/coastwatch/viirs/science/L2/>

THREDDS:

<https://www.star.nesdis.noaa.gov/thredds/catalog/swathNPPVIIRSSCIENCEL2WW00/catalog.html>

Or, you can interactively select and download data (or get your file list for automated commands) using the Granule Selector Tool here:

https://coastwatch.noaa.gov/cwn/cw_granule_selector.html

L3 global 4 km mapped:

FTP:

<ftp://ftp.star.nesdis.noaa.gov/pub/socd1/mecb/coastwatch/viirs/science/L3/global/>

Summary (2)

Both NRT and Science Quality VIIRS-SNPP Ocean Color data are available through NOAA CoastWatch/OceanWatch.

Near Real Time

THREDDS OC NRT main page:

https://www.star.nesdis.noaa.gov/thredds/socd/coastwatch/catalog_coastwatch_viirs_global.html

Includes: L2 global granules (swath); L3 global 4km mapped, daily, weekly, monthly merged

Or, you can interactively select and download data (or get your file list for automated commands) using the Granule Selector Tool here:

https://coastwatch.noaa.gov/cwn/cw_granule_selector.html

Thank You

Web Site: CoastWatch.NOAA.gov

Help Desk:
Coastwatch.info@NOAA.gov

Me: VeronicaLance@NOAA.gov