



Introduction to CoastWatch and the CoastWatch Satellite Training

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Andrea Vander Woude, Sunny Hospital and Daisy Shi

Training Coordinator:
Melanie Abecassis
NOAA CoastWatch
UMD CISESS

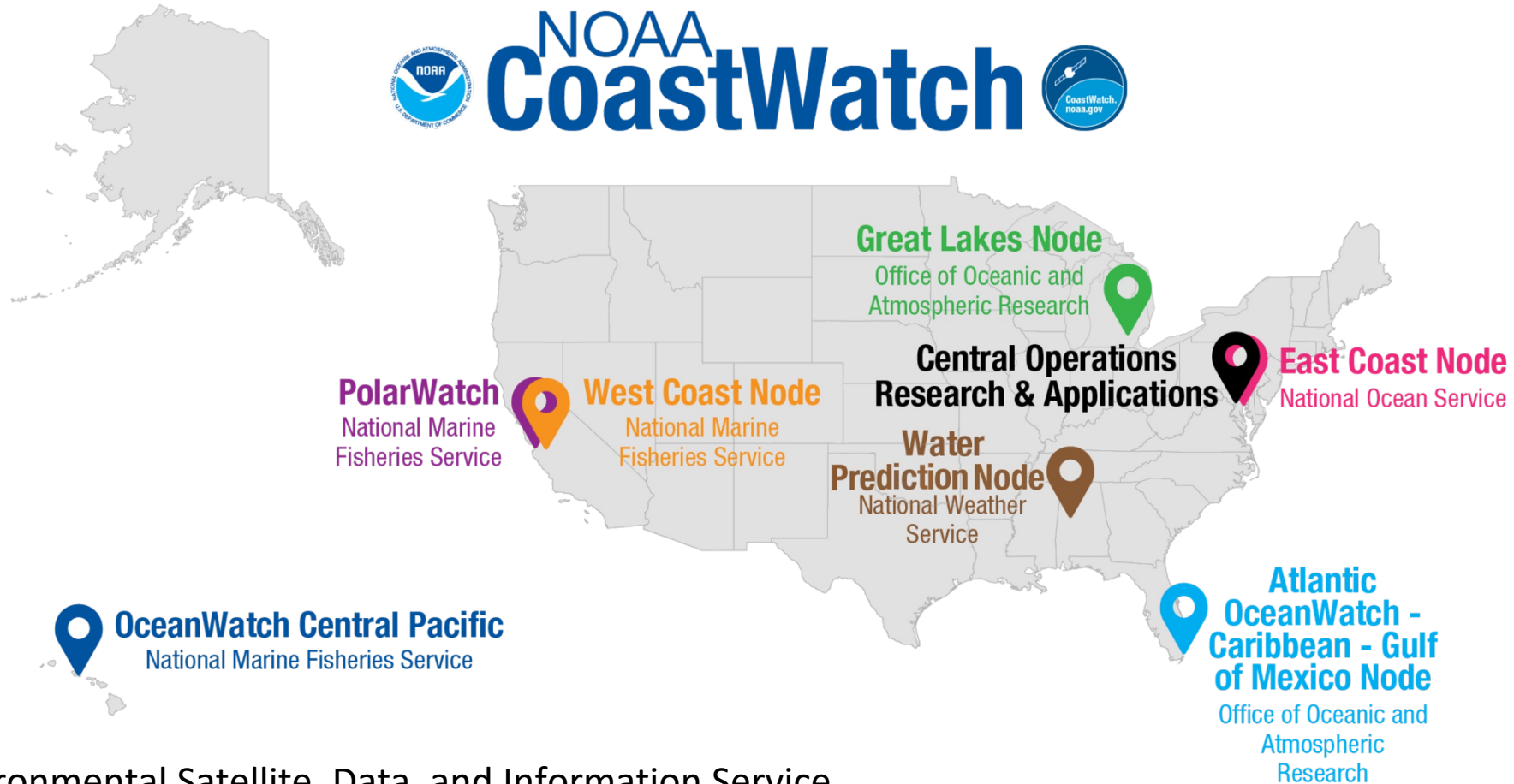
CoastWatch Course - Micronesia 2024

coastwatch.info@noaa.gov



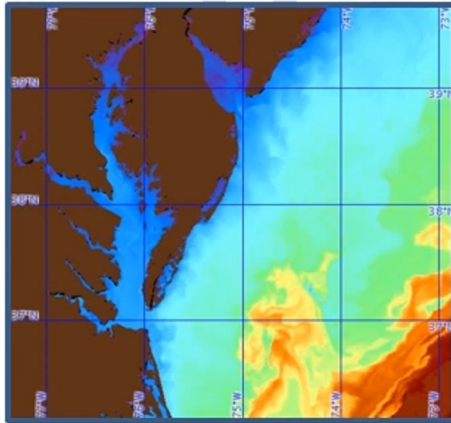
NOAA CoastWatch is a national program funded by NOAA/NESDIS¹

MISSION: PROVIDE ACCESS TO AND PROMOTE THE USE OF SATELLITE DATA PRODUCTS
for oceanic, freshwater, & polar applications

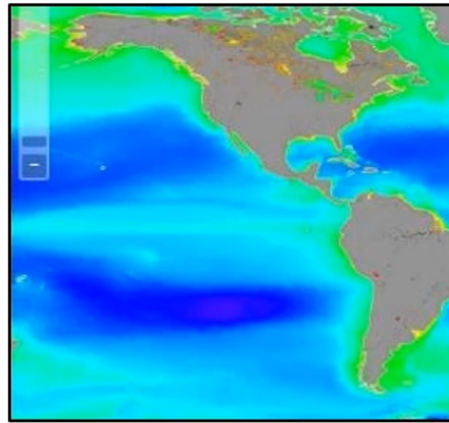


¹National Environmental Satellite, Data, and Information Service

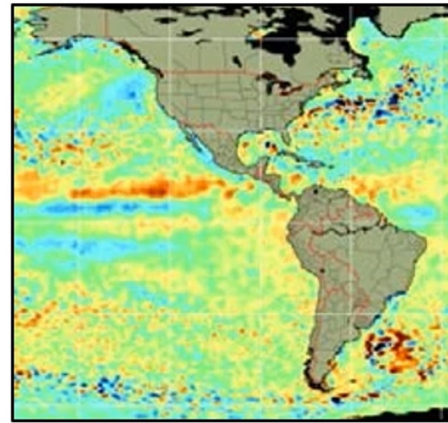
CoastWatch distributes ocean satellite data



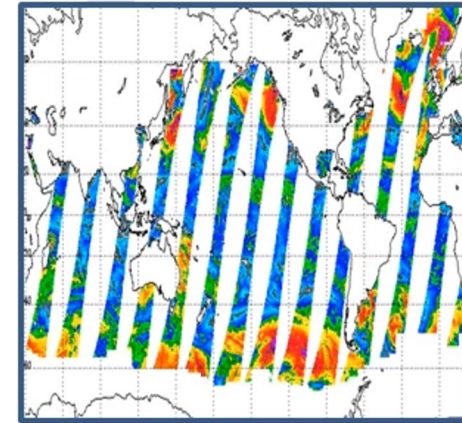
Temperature



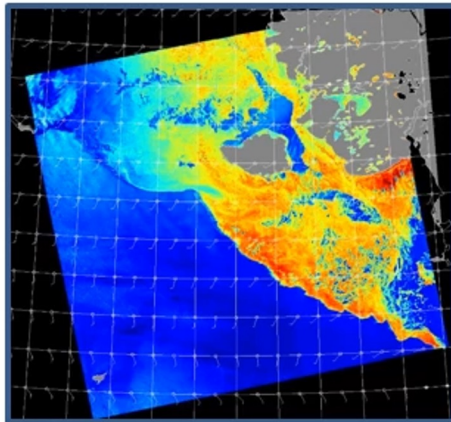
Ocean Color



Altimetry



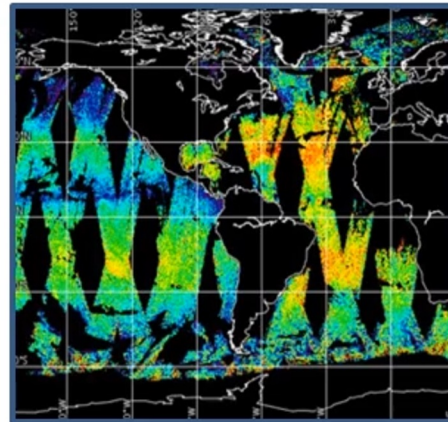
Ocean Vector Winds



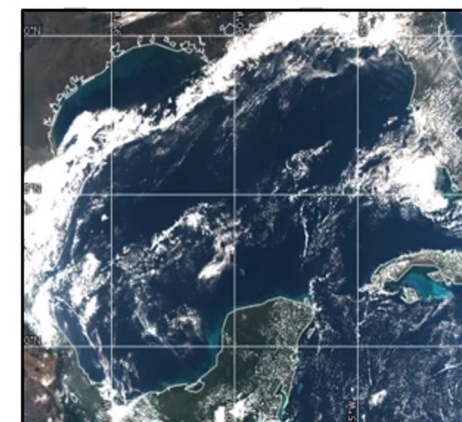
Synthetic
Aperture
Radar



Sea Ice



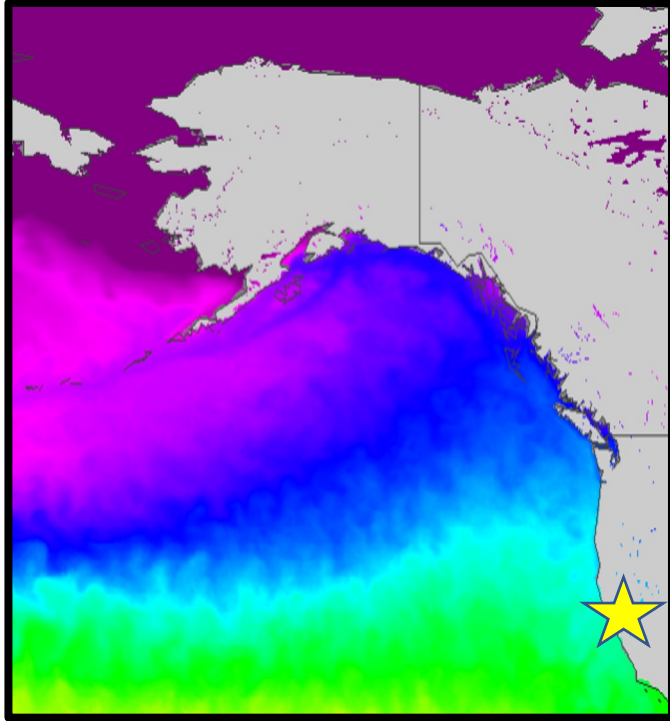
Salinity



Imagery

West Coast Node (WCN) – NOAA Fisheries

SERVICE AREA - US WEST COAST FROM CALIFORNIA TO ALASKA



Personnel at NMFS/SWFSC

Dale Robinson – Coordinator

Cara Wilson – Manager

User Community

Users from Alaska to California

Extensive data holdings

Eastern Pacific and global coverage

One stop shopping with easy data access

1000's of datasets from NOAA, NASA and other sources

<https://coastwatch.pfeg.noaa.gov>

PolarWatch (PW) – NOAA Fisheries

Personnel

Cara Wilson – Manager

Dale Robinson – Deputy Manager

Sunny Bak Hospital – Coordinator

Location

Housed at SWFSC, CA

Focused on high latitude regions

Node Highlights

Providing easier access to polar satellite data

Previewing data online with polar maps

Serving sea ice datasets

Serving polar projected datasets

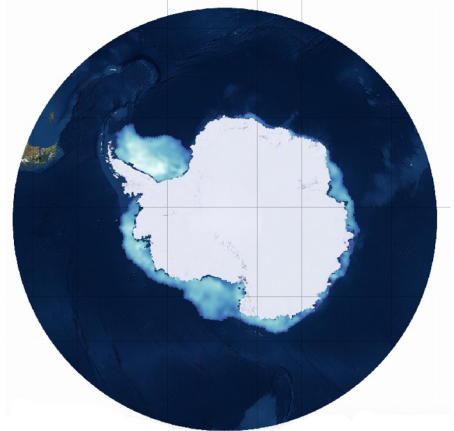
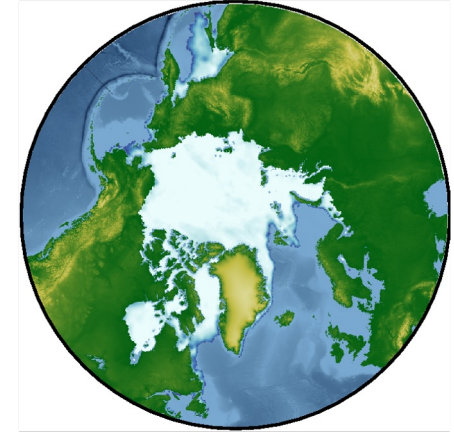
Collaborators

National Ice Center

National Snow and Ice Data Center

STAR Science Teams (Sea Ice, SAR, LSA)

<https://polarwatch.noaa.gov/>



OceanWatch Central Pacific (OWCP) – NOAA Fisheries

Personnel

Ryan Rykaczewski – Manager

Daisy Shi – Operations Manager

Location

Housed at PIFSC, HI

Focused on the Pacific Islands Region

Node Highlights

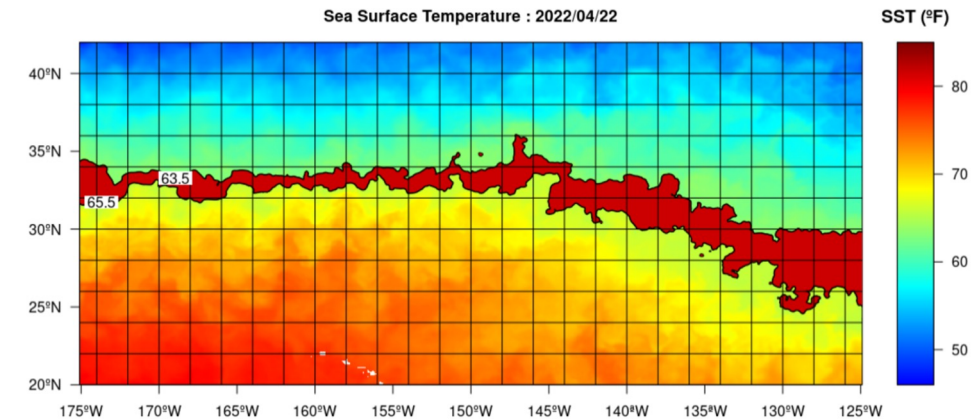
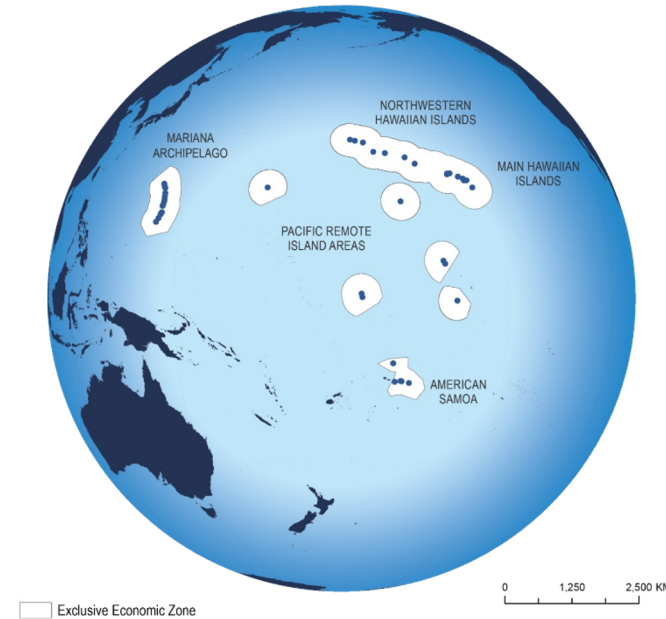
Focused on user needs in the tropics and the subtropical gyre from island-scale to basin-scale.

Providing easier access to satellite data across the dateline.

TurtleWatch

Oceanic and Climate indicators

Capacity Building



<https://oceanwatch.pifsc.noaa.gov/>



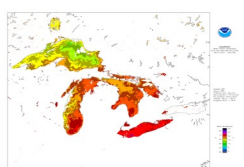
Great Lakes Node – NOAA Research (OAR)

Personnel

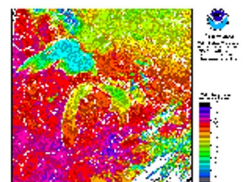
Andrea Vander Woude – Manager
Songzhi Liu – Operations Manager



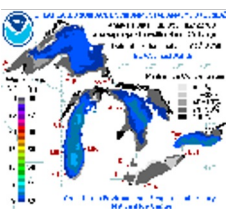
GOES SST



VIIRS SST



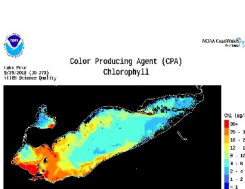
AVHRR SST



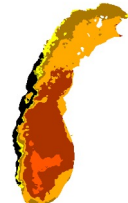
GLSEA



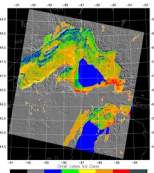
<https://coastwatch.glerl.noaa.gov/>



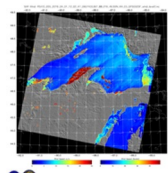
CPA



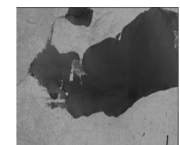
Upwellings



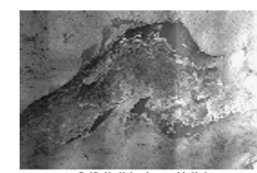
ICECON



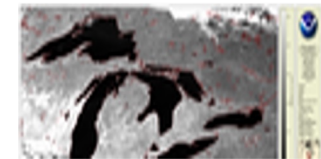
Winds



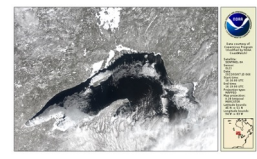
SENTINEL 1A/B



RADARSAT



GOES Visible



OLCI True Color

Node Highlights

Established in 1990

Housed at NOAA Great Lakes Environmental Research Laboratory (GLERL), Ann Arbor, MI

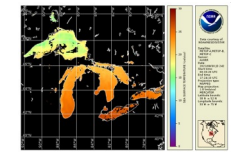
The service area is the Great Lakes region

User Community

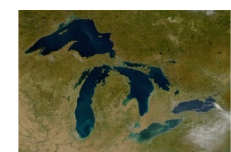
GLERL, NCEP, NWS, US Coast Guard, Local Government agencies, Universities, and Public Users

Satellite Data Products

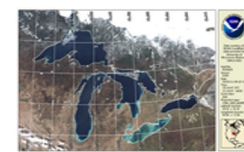
Hundreds of datasets including water surface temperature, color producing agents, ice concentration and ice type classification



ACSPO SST



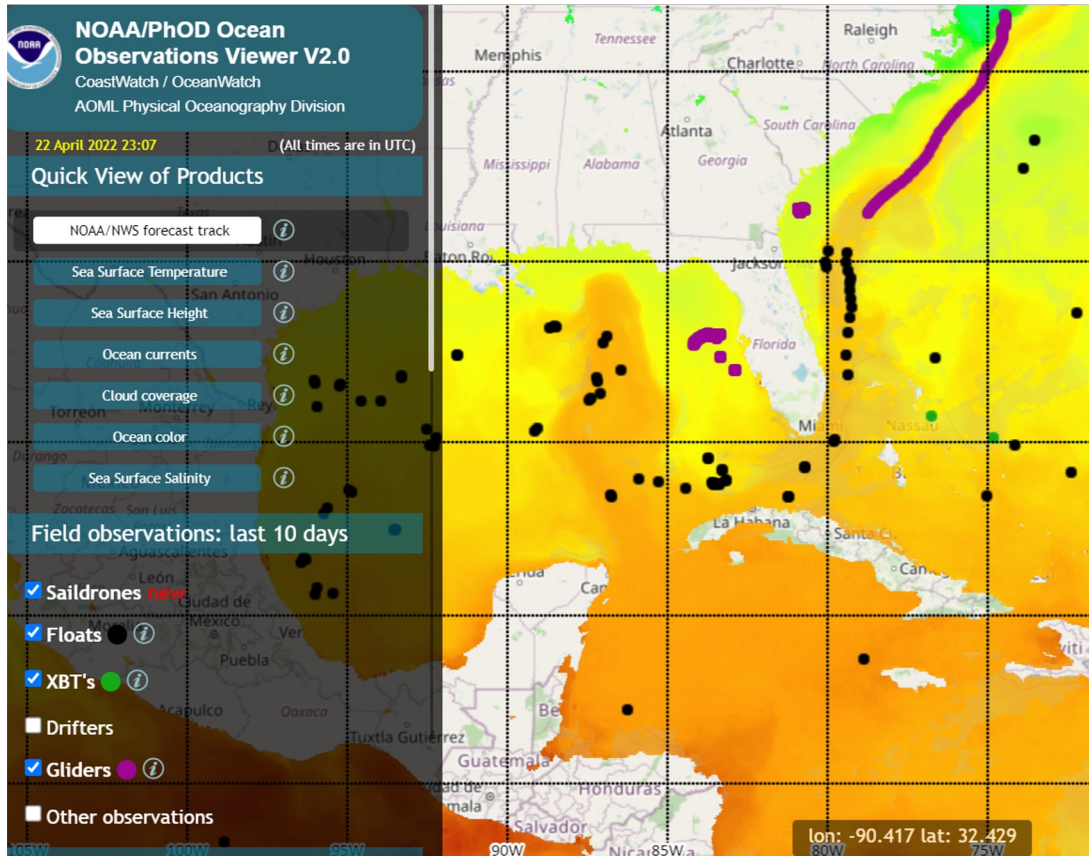
MODIS True Color



VIIRS True Color



Gulf of Mexico Node – NOAA Research (OAR)



Personnel

Joaquín Trinanes – Ops Manager

Gustavo Goñi – Manager

User Community

Gulf of Mexico & Caribbean

Focus

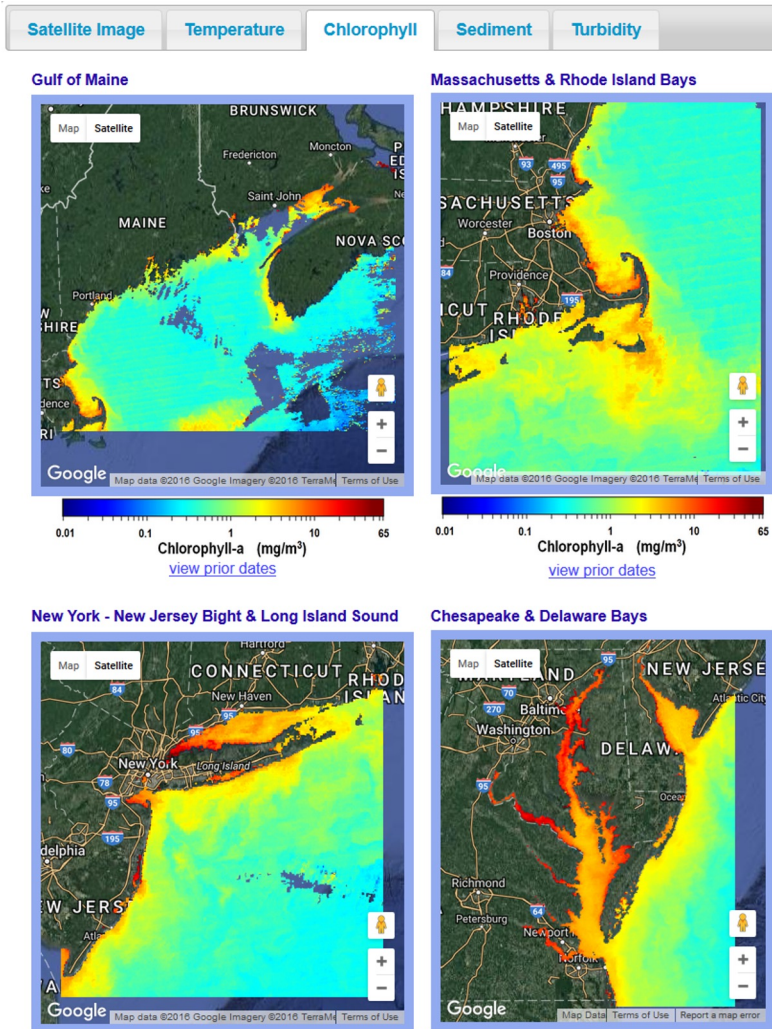
Hurricanes, Sargassum, Vibrio, Seascapes

<https://cwcaribbean.aoml.noaa.gov/>



East Coast Node (ECN) – NOAA Ocean Service (NOS)

SERVICE AREA - US EAST COAST FROM MAINE TO FLORIDA



Personnel at National Ocean Service, NOAA Chesapeake Bay Office, and Center for Satellite Applications & Research

Shelly Tomlinson – Manager

Ron Vogel – Coordinator

User Community

Environmental decision-makers, researchers, commercial data providers & the general public from Maine to Florida

Providing Support

Making data usable for water quality, fisheries, aquaculture, algal bloom tracking, climate change, and more

Building tailored applications by engaging directly with stakeholders

Data holdings in temperature, water clarity, chlorophyll

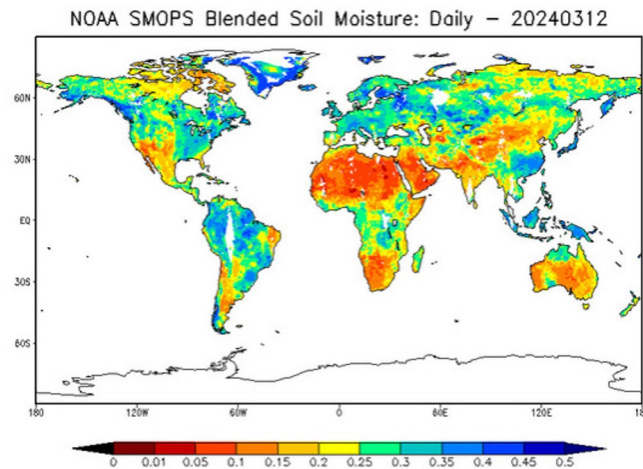
<https://eastcoast.coastwatch.noaa.gov>



Water Prediction Node – NOAA Office of Water Prediction



Inundated extents



Soil Moisture

Personnel

David Vallee – Manager

Dylan Lee – Operations Manager

User Community

National Water Center, NOAA River Forecast Centers, Researchers at Cooperative Institute for Research to Operations in Hydrology (CIROH)

Focus

Remotely sensed inundated extents, snow cover, soil moisture, vegetation indices, estimates of hydraulic geometry

Node Summary

Founded in 2023 as a thematic node dedicated to remote sensing data related to inland and coastal hydrology

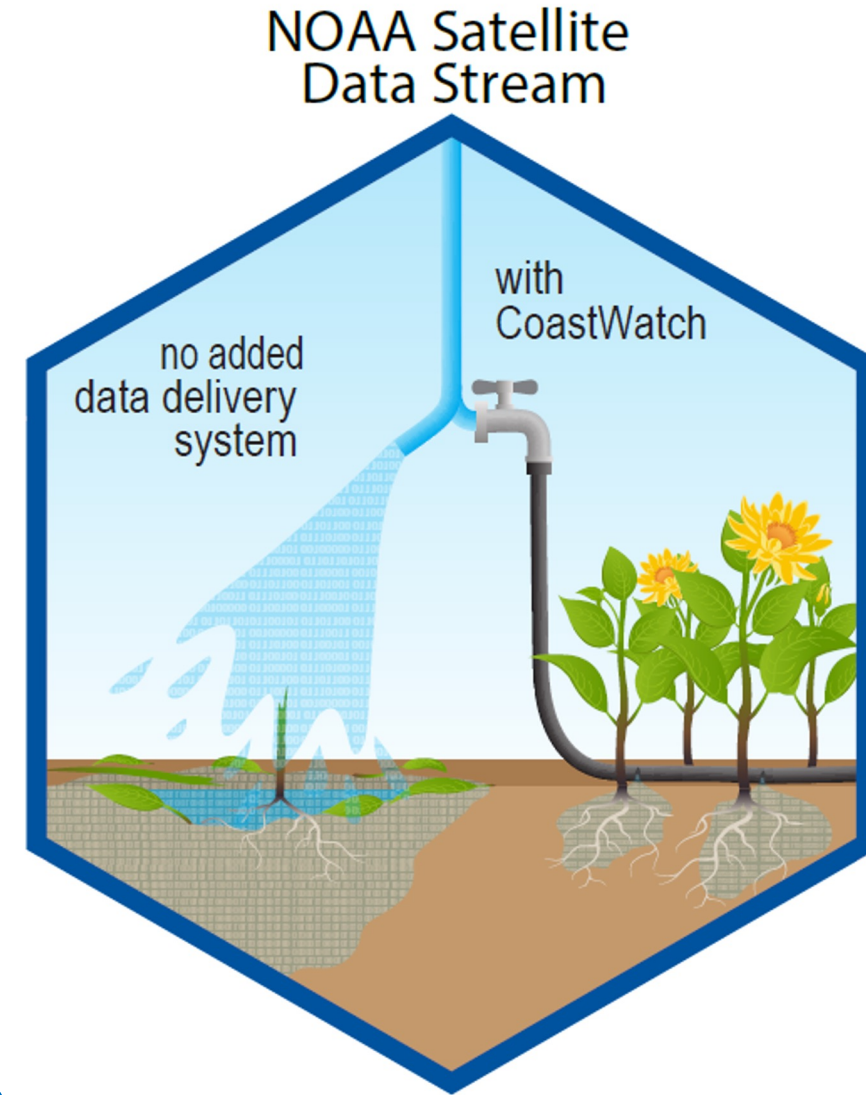
<https://waternode.ciroh.org/>

CoastWatch offers several levels of service to help users with satellite data

INCREASING
ASSISTANCE TO USER

- Provide access to datasets with data servers
- Develop tools and tutorials to help users interact with the server and use the data
- Provide training and hands-on assistance
- Find or create products and tools to address users needs
- Work directly with users on projects

COASTWATCH IS A VALUE ADDED PROVIDER



NOAA CoastWatch Satellite Course Philosophy

- The objective of the course is to show people how to access satellite data and use it in the environment they are used to working in – a somewhat challenging task!
- We focus on the software used the most widely by participants – primarily R, ArcGIS, and python, and to a lesser extent Matlab. However it is not necessary to have any experience with any of these software in order to take the course.
- Not a “GIS course”, or “R course” or “Python” course but it includes all those elements.
- The course focuses on datasets available on CoastWatch ERDDAPs

Course Schedule

Day 1: Satellite 101 (2 pts), tools & strategies, ERDDAP, Panoply

Day 2: Ocean Color, SST, SSH/Winds/Altimetry/Salinity, Software modules

Day 3: Water Quality, Sea Ice (optional), Project work

Day 4: HABs, SAR, Submit your slide!

Day 5: Student presentations - 1 slide, 1 minute!

Getting help during the course

- Post questions on Slack

This is the most efficient easy for us to share information. If one participant has the question, channels are many others so as well and by posting it on slack the answer will be available to everyone

- Ask during the daily session at 9 AM ChST

- Schedule a one-on-one appointment with any of the instructors. Their schedules are available on the Instructors page.

We encourage everyone to schedule a one-on-one appointment so that we have a chance to talk with you about your projects, datasets etc.

Course Project

The course project reflects what you want to get out of the course. Some generic examples include:

- making maps of satellite data
- making timeseries of satellite data
- comparing satellite data to other in-situ datasets

Cloud computing resources (JupyterHub)

- We have cloud computing resources equipped with pre-installed QGIS, RStudio and Python, ready for use.
<https://training.coastwatchhub.org/>
- As the resource is limited, please coordinate with your instructors regarding availability or contact Sunny (sun.bak-hospital@noaa.gov) for more information
- This is our first time using JupyterHub so there might be some issues

Instructions: <https://coastwatch-training.github.io/coastwatchhub/>

Project Slide

Your project slide should include:

- Your name
- Where you work
- What you are trying to do
- A figure you were able to make as a result of this course
- What datasets and software you used
- Any challenges you faced, or datasets you wished you had (optional)

<https://umd.instructure.com/courses/1364405>



Portal

Welcome to the NOAA CoastWatch Learning

This learning portal is a one-stop shop for all CoastWatch learning resources. Everything is self-paced and publicly available for free.

CoastWatch regularly organizes satellite training classes or workshops featuring lectures, tutorials, & tool demonstrations.

For questions or more information about CoastWatch and the satellite training classes, please visit the [NOAA CoastWatch website](#) or email coastwatch.info@noaa.gov.



Training Classes

Courses familiarize users with different types of ocean satellite data, various tools, and teach participants how to use satellite data in their own projects using their choice of software.



Lectures

All lectures are available as audio-recorded PowerPoint files, videos, or transcripts.



Tutorials

Step-by-step instructions, exercises, User Guides, and videos for ArcGIS, the CoastWatch Data Portal, CoastWatch Utilities, ERDDAP, Matlab, Panoply, Python, and R.



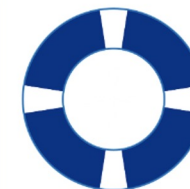
Example Applications

This page is under construction.



User Forums

The NOAA CoastWatch Forum provides information relevant to CoastWatch products and software and vary in technical details.



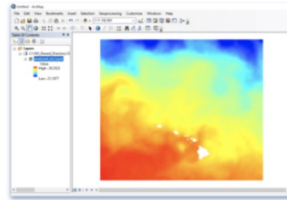
Help

This page is under construction. Information on who to contact, navigating this Learning Portal, Forums, troubleshooting rerddapXtracto, and FAQs.

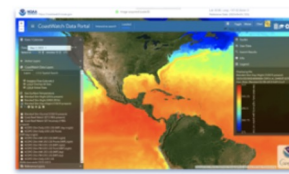
CoastWatch Learning Portal

Home Training Classes Lectures Tutorials Example Applications User Forums Help CoastWatch

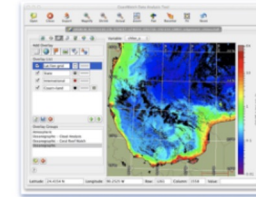
Step-by-step instructions, exercises, User Guides, and videos.



ArcGIS



CoastWatch
Data Portal



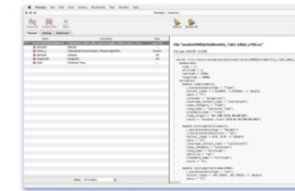
CoastWatch
Utilities



ERDDAP



Matlab



Panoply



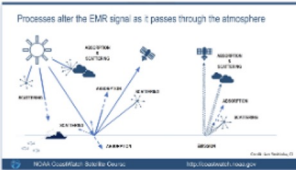
Python



R

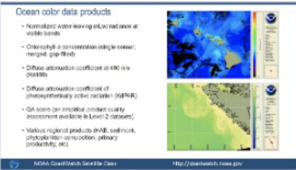


All lectures are available as audio-recorded PowerPoint files, videos or transcripts.



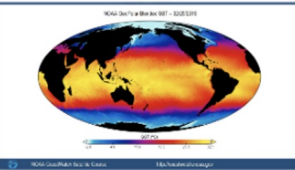
Processes after the EMR signal as it passes through the atmosphere

Satellite 101



Ocean color data products

Ocean Color



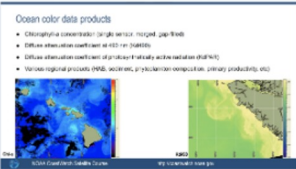
NOAA SeaWiFS SST - 02/03/05

Sea Surface Temperature



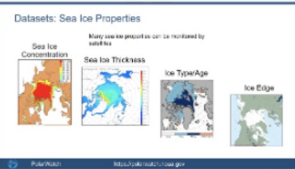
Ocean features can be tracked with wind data

Sea Surface Height, Winds, Salinity



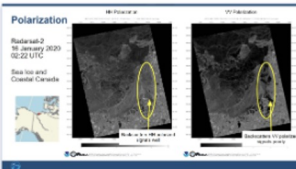
Ocean color data products

Water Quality



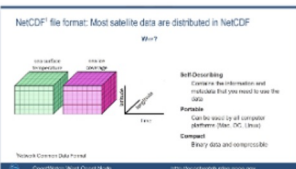
Datasets: Sea Ice Properties

Sea Ice



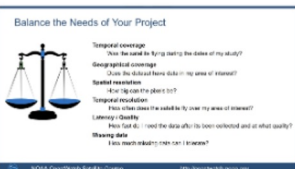
Polarization

Synthetic Aperture Radar (SAR)



NetCDF file format: Most satellite data are distributed in NetCDF

Tools & Strategy



Balance the Needs of Your Project

Selecting a Dataset

Questions?

Coastwatch.info@noaa.gov

Subscribe to our newsletter for
announcements for satellite classes:

subscribe

coastwatch.noaa.gov

The screenshot shows the NOAA CoastWatch website interface. At the top, there's a navigation bar with links: Home, Find Data, Data Tools, Education, News, Nodes, Partners, and About Us. A search bar is also present. Below the navigation bar, a 'Welcome to NOAA CoastWatch' message is displayed. The main content area features a grid of icons for various services: Search Data Products, Data Portal Map Viewer, Learning Portal, Data Access Tools, User Stories, and NOAA Regional Nodes. A green arrow points from the word 'subscribe' in the text on the left to the 'Subscribe to Our Newsletter' button in the 'Recent News' section. The 'Recent News' section lists several updates, including a noticeable shift in select 4km global datasets, a new hurricane tool, and a planned termination of NOAA NRT MODIS SST products. The 'Training Courses' section at the bottom right lists upcoming workshops and satellite courses.

NOAA COASTWATCH

Home Find Data Data Tools Education News Nodes Partners About Us

CoastWatch NOAA

Search Website Submit

Welcome to NOAA CoastWatch

NOAA CoastWatch exists to help people access and use global and regional satellite data for ocean and coastal applications. Our satellite data products and services can support research, resource management, and decision-making on topics such as understanding, managing and protecting ocean and coastal resources and for assessing impacts of environmental change in ecosystems, weather, and climate.

Search Data Products

Data Portal Map Viewer

Learning Portal

Data Access Tools

User Stories

NOAA Regional Nodes

Recent News

2023-10-17	Noticeable shift in select 4km global datasets
2023-10-13	New Hurricane Tool in Development
2023-10-06	Save the Date: 2024 Annual Meeting
2023-09-12	Planned termination of NOAA NRT MODIS SST products
2023-09-12	Upcoming NOAA SST Filename change

Please [Subscribe to Our Newsletter](#)

Training Courses

Operational Satellite Oceanography Workshop	Nov 27 @ 1500-2100 UTC - Online
NOAA CoastWatch Satellite Course - Alaska, September 2023	September 18, 2023 through September 20, 2023

Visit the [Training Courses](#) For more

Explore Data by Application

Climate & Weather	Ecosystem Monitoring	Fisheries & Aquaculture
Ocean & Coastal Dynamics	Transportation & Safety	Water Quality

