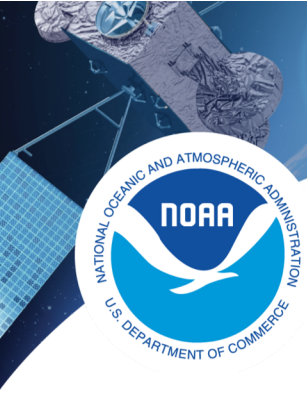




ERDDAP: Providing Easy Access to Remote Sensing Data and other Environmental Data

Cara Wilson^{1,3}, Dale Robinson^{2,3} and Robert A. Simons¹

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²UC Santa Cruz

³NOAA CoastWatch West Coast Node

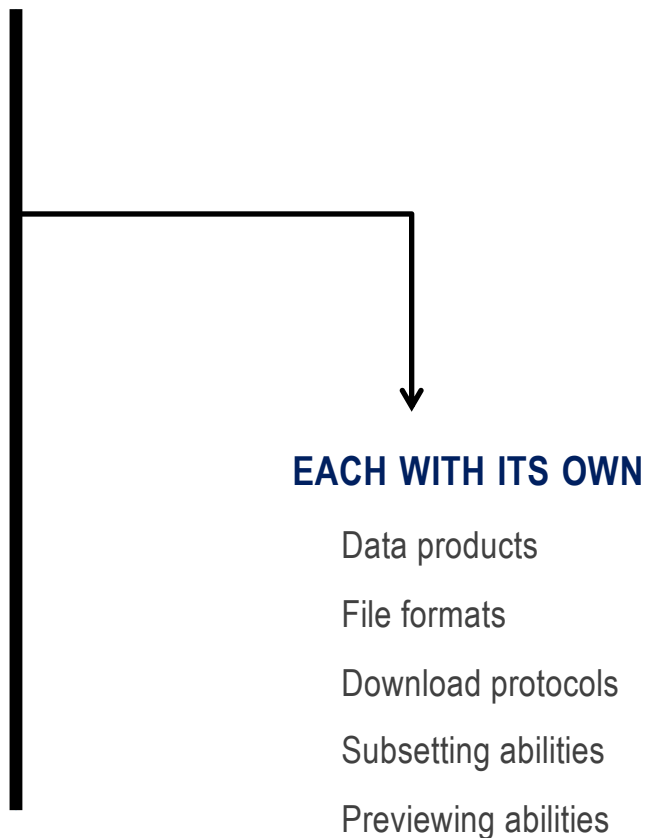
AMS Meeting, January 2021



Accessing satellite data can be challenging

A SHORT LIST OF DATA SERVERS

NOAA CoastWatch Central Operations
NOAA Center for Satellite Applications and Res.
NOAA Office of Satellite and Products
NOAA National Centers for Environmental Info.
NOAA Comprehensive Large Array-data
Stewardship System (CLASS)
NASA Jet Propulsion Laboratory PO.DAAC
NASA Ocean Biology (OB.DAAC)
NASA Goddard Space Flight Center
European Space Agency
EUMETSAT
Japan Aerospace Exploration Agency



ERDDAP¹ – designed to make data access easier

DATA AGGREGATION

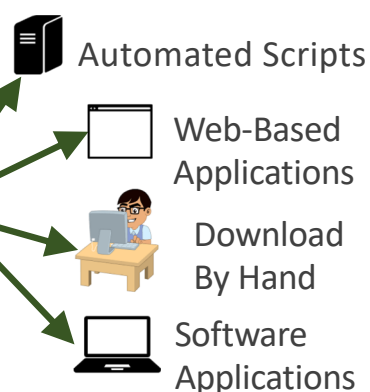
LOCAL STORAGE



REMOTE SERVERS



DATA DISTRIBUTION



ERDDAP provides a simple, consistent way to:

- Subset datasets temporally and spatially
- Distribute both gridded and non-gridded (tabular) data
- Download data in > 30 formats
- Data requests defined within URLs, allowing:
 - Access data within analysis tools (R, Matlab, python)
 - Machine-to-machine data exchange

Over 85 ERDDAPs exist worldwide

Over a dozen different ERDDAPs in NOAA

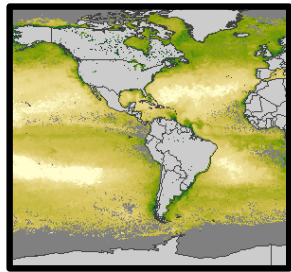
ERDDAP is one of the recommended data servers in NOAA's Data Access Procedural Directive

Search for data across multiple ERDDAPs at erddap.com

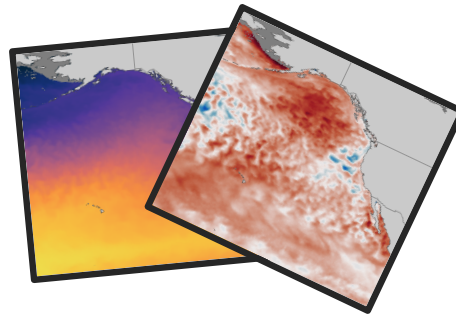
¹ERDDAP was developed at NOAA/NMFS/SWFSC/ERD by Bob Simons



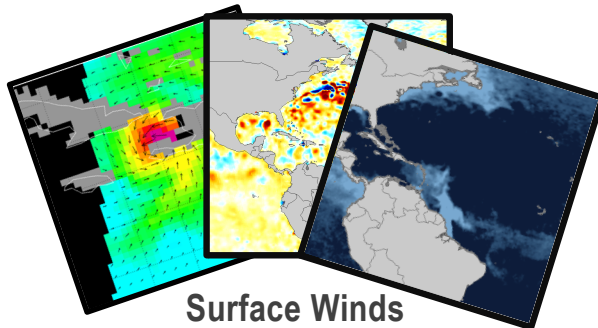
NOAA/ERD ERDDAP contains > 1000 satellite datasets



Chlorophyll
Primary Productivity



SST
SST Anomaly



Surface Winds
Sea Surface Salinity
Sea Surface Height and Anomaly

0.5 – 1 million data requests per day

- Daily, weekly, and monthly composites
- Blended products
- Interpolated products (gap free)
- All level 3 or 4 products (i.e. on a regular XY grid)

This ERDDAP is maintained jointly by the
[SWFSC Environmental Research Division](#) and the
[West Coast Node\(WCN\)](#) of NOAA's [CoastWatch](#) program



ERD ERDDAP data catalog has >400 non-satellite datasets

In Situ Measurements

- Animal Telemetry Network
- ARGO floats
- TAO/TRITON, RAMA, & PIRATA Buoys
- IOOS In Situ Sensors
- Glider Data
- Global Temperature and Salinity Profile Programme
- HF Radar Currents
- GLOBEC Northeast Pacific
- NOAA CO-OPS Sensors
- NDBC buoys

Field Sampling

- CalCOFI
- California Fish Landings
- Farallon Island Seabirds
- NWFSC Habitat Use
- SWFSC Rockfish

Underway Data

- NOAA Vessels
- UNOLS Vessels

Models, Climatologies

- OSCAR Sea Surface Velocity
- SODA Model

Models, Climatologies (cont.)

- NOAA Coastal Relief Model
- NOAA RTOFS Forecast Model
- NOAA RTOFS Nowcast Model
- NOAA World Ocean Atlas
- NOAA Seafloor Topography
- SWFSC Upwelling Index
- Navy NAVGEM Model
- Navy NOGAPS Model
- NCEP/NCAR Reanalysis
- USGS Topography
- NASA/NOAA CCMP Wind Atlas
- Navy HYCOM Model
- Navy FNMOC Forecast Model



The ERDDAP interface is functionally beautiful



ERDDAP

Easier access to scientific data

ERDDAP > List of All Datasets

1392 matching datasets, listed in alphabetical order. View page: 1 (current) 2 .

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	W M S	Source Data Files	Access-ible	Title	Summary	FGDC, ISO, Metadata	Back-ground Info	RSS	E mail	Institution	Dataset ID
	set	data	graph			public	* The List of All Active Datasets in this ERDDAP *		M	background			NOAA NMFS SWFSC E...	allDatasets
data			graph			public	AMSRE Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 2002-2010, Monthly		F I M	background			Remote Sensing Sy...	jplAmsreSstMon
data			graph	M		public	AMSRE Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 2002-2010, Monthly, Lon+/-180		F I M	background			Remote Sensing Sy...	jplAmsreSstMon_LonPM180
		data	graph		files	public	AN EXPERIMENTAL DATASET: Underway Sea Surface Temperature and Salinity Aboard the Oleander, 2007-2010		F I M	background			NOAA OAR AOML	nodcPJJU
	set	data	graph			public	Animal Telemetry Network (ATN)		F I M	background			Animal Telemetry ...	gtoppAT
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, 3-Month		F I M	background			NASA/GSFC OBPG	jplAquariusSSS3MonthV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, 7-Day		F I M	background			NASA/GSFC OBPG	jplAquariusSSS7DayV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, Daily		F I M	background			NASA/GSFC OBPG	jplAquariusSSSDailyV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, Monthly		F I M	background			NASA/GSFC OBPG	jplAquariusSSSMonthlyV5
data			graph		files	public	Audio data from a local source.		M	background			???	testGridWav
	set	data	graph		files	public	Audio data from a local source.		M	background			???	testTableWav
data			graph	M		public	AVHRR Pathfinder Version 5.3 L3-Collated (L3C) SST, Global, 0.0417°, 1981-present, Daytime (1 Day Composite)		F I M	background			NCEI	nceiPH53std1day
data			graph	M		public	AVHRR Pathfinder Version 5.3 L3-Collated (L3C) SST, Global, 0.0417°, 1981-present, Nighttime (1 Day Composite)		F I M	background			NCEI	nceiPH53stn1day
data			graph			public	AVISO Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 1992-2010, Monthly		F I M	background			Centre National d...	jplAvisoSshMon
data			graph	M		public	AVISO Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 1992-2010, Monthly, Lon+/-180		F I M	background			Centre National d...	jplAvisoSshMon_LonPM180
data			graph	M	files	public	C-HARM 1-Day Advanced Forecast: Pseudo-Nitzschia, cellular domoic acid, and particulate domoic acid probability, California and Southern Oregon coast		F I M	background			UCSC, UCSD	charmForecast1day
data			graph	M	files	public	C-HARM 2-Day Advanced Forecast: Pseudo-Nitzschia, cellular domoic acid, and particulate domoic acid probability, California and Southern Oregon coast		F I M	background			UCSC, UCSD	charmForecast2day
data			graph	M	files	public	C-HARM 3-Day Advanced Forecast: Pseudo-Nitzschia, cellular domoic acid, and particulate domoic acid probability, California and Southern Oregon coast		F I M	background			UCSC, UCSD	charmForecast3day
data			graph	M	files	public	C-HARM Nowcast: Pseudo-Nitzschia, cellular domoic acid, and particulate domoic acid probability, California and Southern Oregon coast		F I M	background			UCSC, UCSD	charmForecast0day
	set	data	graph			public	CalCOFI Continuous Underway Fish-Egg Sampler		F I M	background			NOAA SWFSC	erdCalCOFIcufes
	set	data	graph			public	CalCOFI Cruises		M	background			NOAA SWFSC	erdCalCOFICruises



Online interface to create custom graphs

Graph Type:

- Maps (surface)
- Time-series (lines)
- Hovmöller (surface)
- Vectors (vectors)

Color:

- Choose variable in dataset

Scale:

- Choose linear or log

Color Bar:

- Choose from > 40 color palettes

File Type:

- Choose from > 40 file formats
(data and graphics)

The screenshot shows the ERDDAP web interface for NOAA Coral Reef Watch data. The header includes the NOAA logo and the text "ERDDAP Easier access to scientific data". The main heading is "ERDDAP > griddap > Make A Graph". Below this, the dataset title is "NOAA Coral Reef Watch Operational Daily Near-Real-Time Global 5-km Satellite Coral Bleaching Monitoring Products". The institution is listed as "National Oceanic and Atmospheric Administration (NOAA)" with dataset ID "NOAA_DHW". Information links include Summary, License, FGDC, ISO 19115, Metadata, Background, and Data Access Form.

The "Graph Type" is set to "surface". The X Axis is "longitude" and the Y Axis is "latitude". The Color is "CRW_SST". The Dimensions are set to "time (UTC)" with a "Start" of "2020-02-10T12:00:00Z" and a "Stop" of "2020-02-10T12:00:00Z". The latitude range is from 89.975 to -89.975 degrees north, and the longitude range is from -179.975 to 179.975 degrees east.

The "Graph Settings" section includes options for Color Bar, Continuity, Scale, Minimum, Maximum, N Sections, Draw land mask, Y Axis Minimum, Maximum, and Ascending. A "Redraw the Graph" button is present with a note: "(Please be patient. It may take a while to get the data.)".

Optional settings include "Then set the File Type" to ".htmlTable" and a link to "File Type information". A "Download the Data or an Image" button is also available. The URL for the data is provided: "https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW.htmlTable?CRW:". Documentation and Bypass this form links are also present.

On the right side, there is a map showing the global distribution of sea surface temperature (SST) with a color bar indicating temperature in Celsius. The color bar ranges from -2 to 34 degrees Celsius. The map shows a global view with latitude and longitude coordinates. Below the map, there is a text box with the following information: "sea surface temperature (Celsius)", "NOAA Coral Reef Watch Operational Daily Near-Real-Time Global 5-km Satellite Coral Bleaching Monitoring Products (2020-02-10T12:00:00Z)", and "Data courtesy of National Oceanic and Atmospheric Administration (NOAA)".



Online interface to download data

Cal
lor

File

.asc - View OPeNDAP-style ISO-8859-1 comma-separated
.csv - Download a ISO-8859-1 comma-separated
.csvp - Download a ISO-8859-1 .csv file with line
.csv0 - Download a ISO-8859-1 .csv file without c
.das - View the dataset's metadata via an ISO-885
.dds - View the dataset's structure via an ISO-885
.dods - OPeNDAP clients use this to download the
.esriAscii - Download an ISO-8859-1 ESRI ASCII fi
.fgdc - View the dataset's UTF-8 FGDC .xml metad
.graph - View a Make A Graph web page.
.help - View a web page with a description of grid
.html - View an OPeNDAP-style HTML Data Acces
.htmlTable - View a UTF-8 .html web page with the
.iso19115 - View the dataset's ISO 19115-2/19139
.itx - Download an ISO-8859-1 Igor Text File. Each
.json - View a table-like UTF-8 JSON file (missing
.jsonCSV1 - View a UTF-8 JSON Lines CSV file wi
.jsonCSV - View a UTF-8 JSON Lines CSV file wit
.jsonKVP - View a UTF-8 JSON Lines file with Key
.mat - Download a MATLAB binary file.
.nc - Download a NetCDF-3 binary file with COARI
.ncHeader - View the UTF-8 header (the metadata
.ncml - View the dataset's structure and metadata
.nccsv - Download a NetCDF-3-like 7-bit ASCII NC
.nccsvMetadata - View the dataset's metadata as
.ncoJson - Download a UTF-8 NCO lvl=2 JSON fil
.odvTxt - Download time,lat,lon,otherVariables as
.timeGaps - View a UTF-8 list of gaps in the time
.tsv - Download a ISO-8859-1 tab-separated text
.tsvp - Download a ISO-8859-1 .tsv file with line 1


ERDDAP
Easier access to scientific data

ERDDAP > griddap > Data Access Form

Dataset Title: **SST and SST Anomaly, NOAA Global Coral Bleaching Monitoring, 5km, V.3.1, Monthly, 1985-Present**

Institution: NOAA/NESDIS/STAR Coral Reef Watch program (Dataset ID: NOAA_DHW_monthly)
Information: [Summary](#) | [License](#) | [FGDC](#) | [ISO 19115](#) | [Metadata](#) | [Background](#) | [Files](#) | [Make a graph](#)

Dimensions	Start	Stride	Stop	Size	Spacing
☒ time (UTC)	1985-01-16T00:00:00Z	1	2020-11-16T00:00:00Z	431	30 days 10h 29m 35s (uneven)
☒ latitude (degrees_north)	60.025	1	60.025	3600	-0.05 (uneven)
☒ longitude (degrees_east)	-169.975	1	-169.975	7200	0.05 (uneven)

Grid Variables (which always also download all of the dimension variables)
☐ sea_surface_temperature (degree_C)
☐ mask (Pixel characteristics flag array, pixel_classification)
☒ sea_surface_temperature_anomaly (degree_C)

File type: [\(more info\)](#)

Just generate the URL:

[\(Documentation / Bypass this form\)](#)

Submit (Please be patient. It may take a while to get the data.)



Deconstructing an ERDDAP data request URL

coastwatch.pfeg.noaa.gov/erddap/griddap/
NOAA_DHW_monthly.largePng?sea_surface_temperature[(2019-09-21T12:00:00Z)]

Example of a URL data request

Base URL: <https://coastwatch.pfeg.noaa.gov/erddap/griddap/>

Dataset ID: NOAA_DHW_monthly

File Type: .largePng (.nc, .mat, .json, .geotif, .kml, .csv...)

Data Request Begins ?

Variable: sea_surface_temperature

Time range: [(2019-09-15T12:00:00Z):(2019-09-15T12:00:00Z)]

Latitude Range: [(70):(-10)]

Longitude Range: [(-180):(-100)]

[(70):(-10)][(-180):(-100)]

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature\[\(2019-09-15T12:00:00Z\)\]\[\(70\):\(-10\)\]\[\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature[(2019-09-15T12:00:00Z)][(70):(-10)][(-180):(-100)])



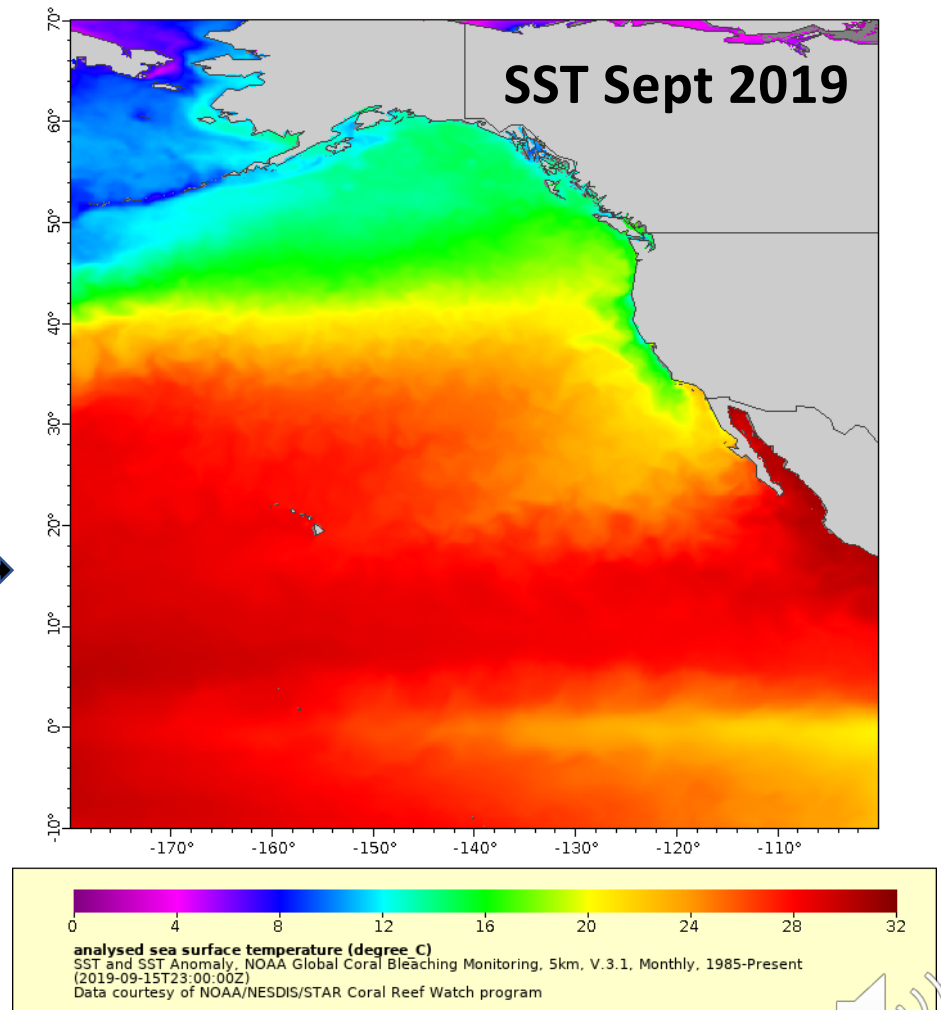
This URL:

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature\[\(2019-09-15\)\]\[\(70\):\(-10\)\]\[\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature[(2019-09-15)][(70):(-10)][(-180):(-100)])

Produces this figure →

Note:

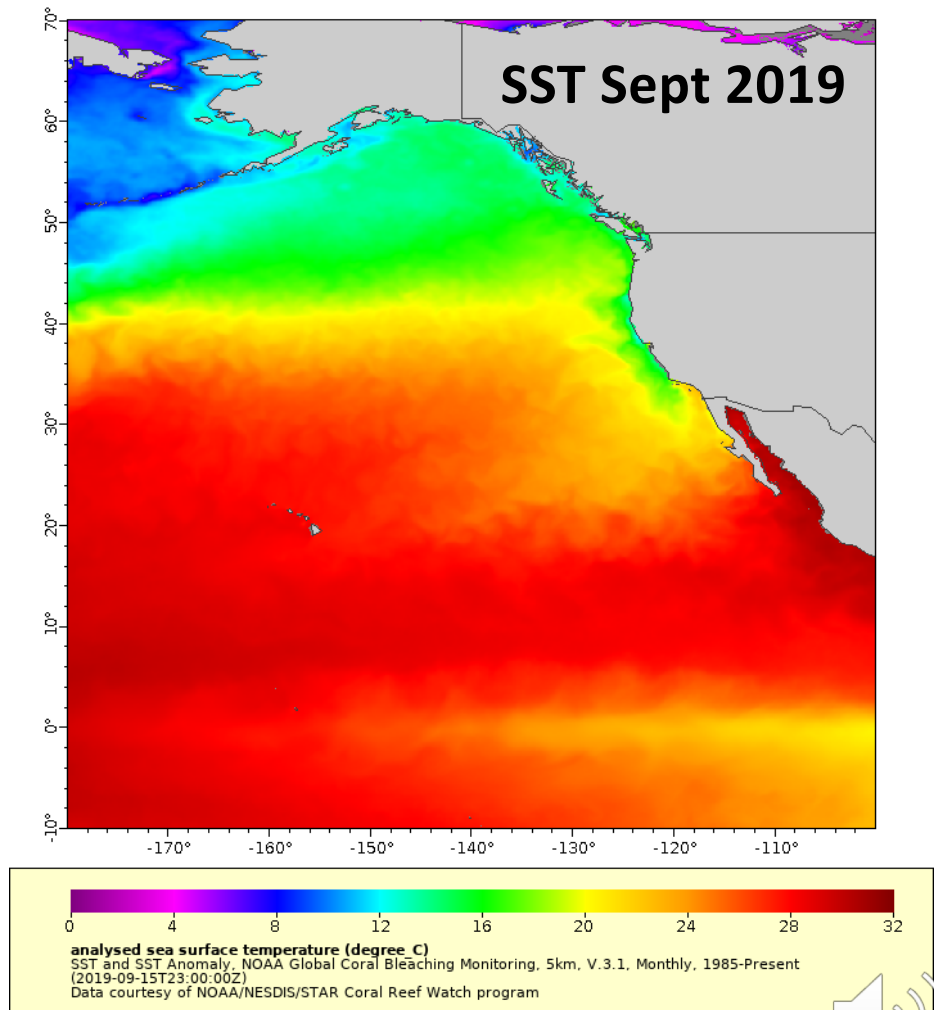
You can download the data in a netCDF file by changing **.largePng** to **.nc** in the URL



Change the variable:

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature\[2019-09-15\)\]\[\(70\):\(-10\)\]\[\(180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature[2019-09-15)][(70):(-10)][(180):(-100)])

- Change the variable displayed to see the SST anomaly
- For this dataset we will change it to sea_surface_temperature_anomaly

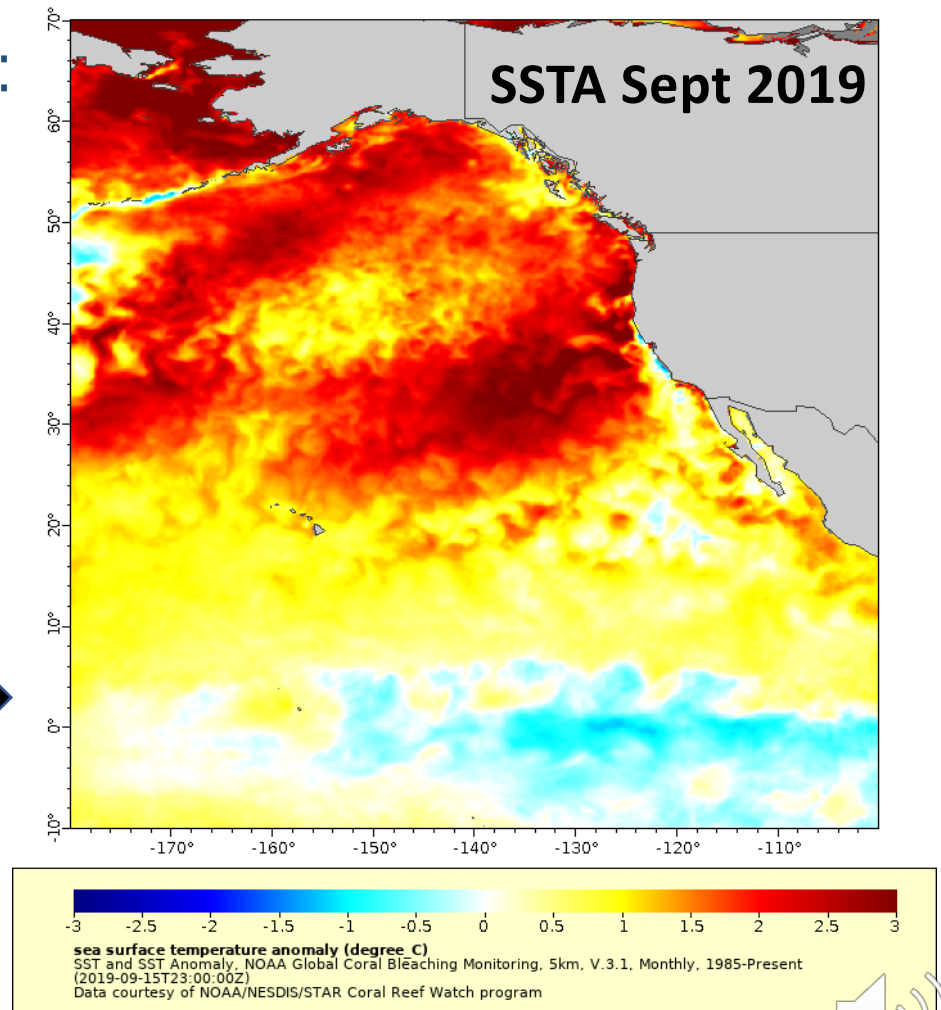


Visualize the Pacific marine heat wave:

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[\(2019-09-15\)\]\[\(70\):\(-10\)\]\[\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[(2019-09-15)][(70):(-10)][(-180):(-100)])

Produces this figure →

Note: Changing the variable name produces an anomaly because this dataset has a variable with the SST anomaly in it. Most datasets do not have an anomaly variable in them, so this modification will only work for this dataset.



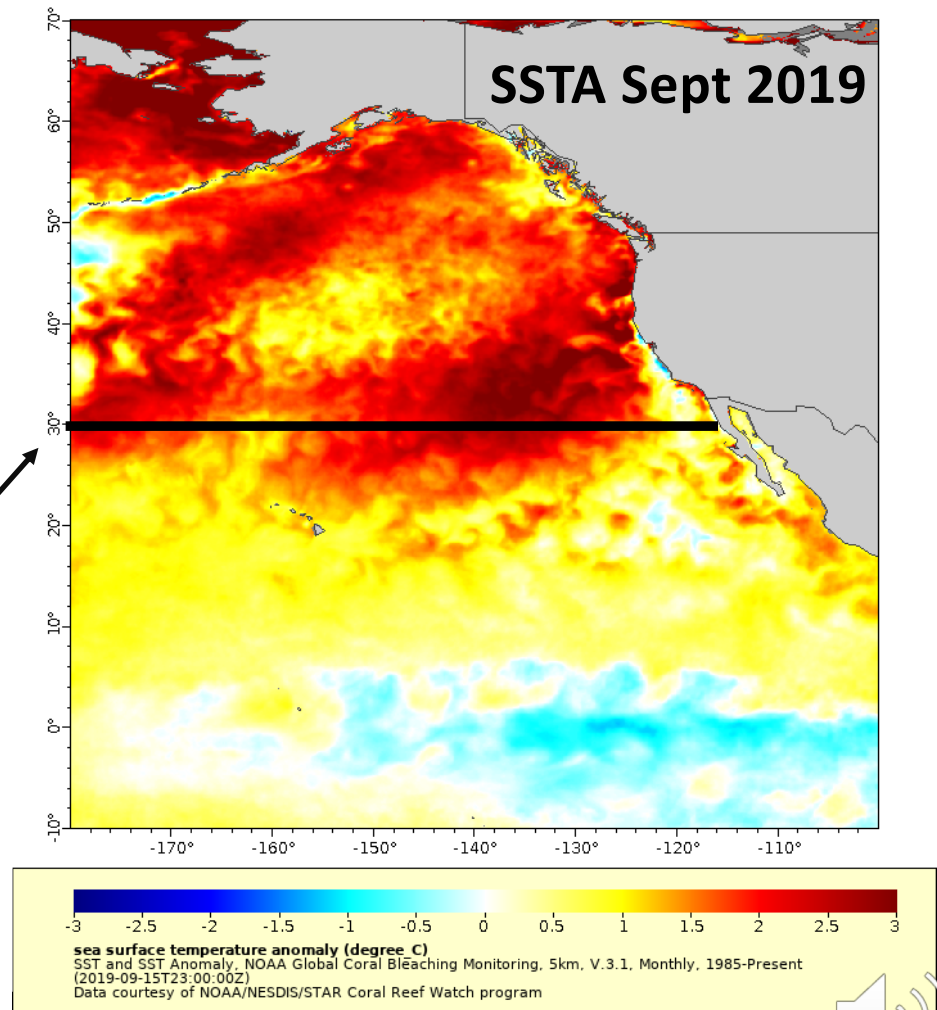
Create a 2D timeseries:

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[\(2019-09-15\)\]\[\(70\):\(-10\)\]\[\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[(2019-09-15)][(70):(-10)][(-180):(-100)])

Next we will examine the temporal evolution of the warm “blob” by making a Hovmöller diagram, a hybrid map with time on one axis, and latitude or longitude on the other. We will make a slice through 30°N.

We can do this by setting the y-axis to time on the “Make a Graph” page:

Graph Type: surface
X Axis: longitude
Y Axis: time
Color: sea_surface_temperature_anomaly

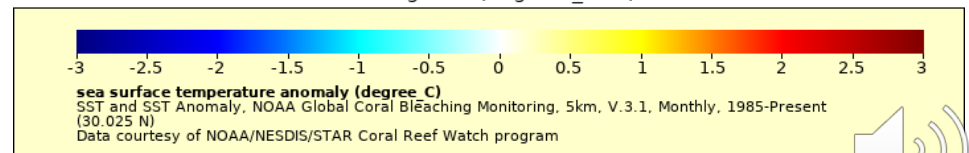
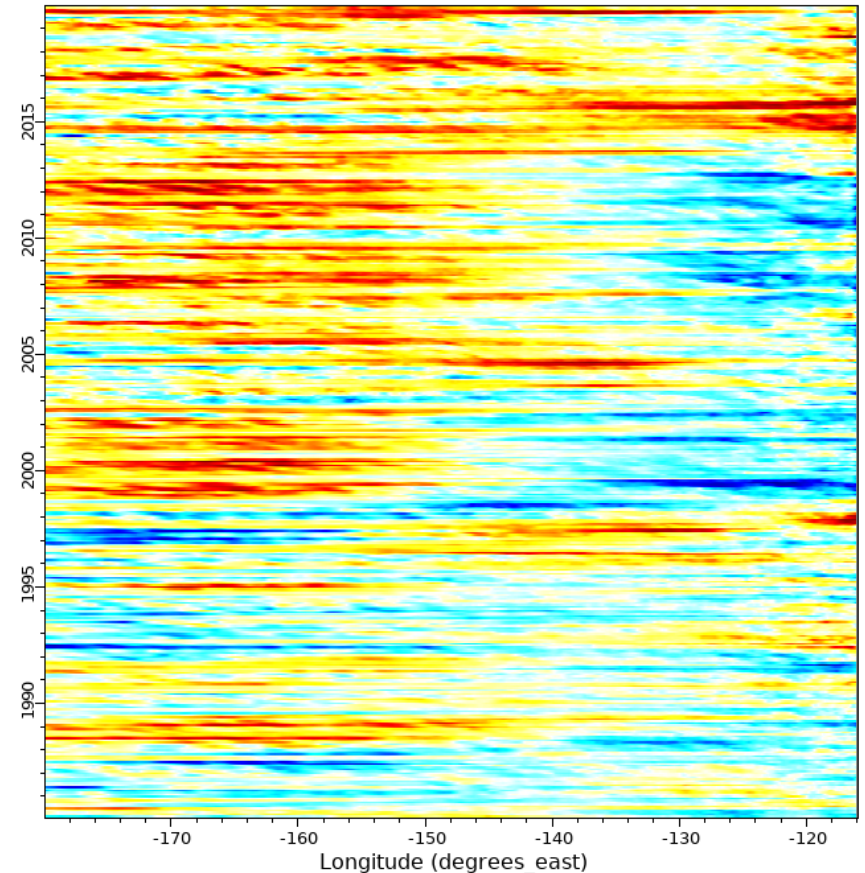


Generate a Hovmöller diagram

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[\(1985-01-15\):\(2019-12-16\)\]\[\(30\)\]\[\(-180\):\(-116\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[(1985-01-15):(2019-12-16)][(30)][(-180):(-116)])

Produces this figure →

While most of the last 20 years the N. Pacific (at 30°N) has experienced warmer than usual temperatures, only in the past few years has this phenomena spread to coast (east of 120°W).

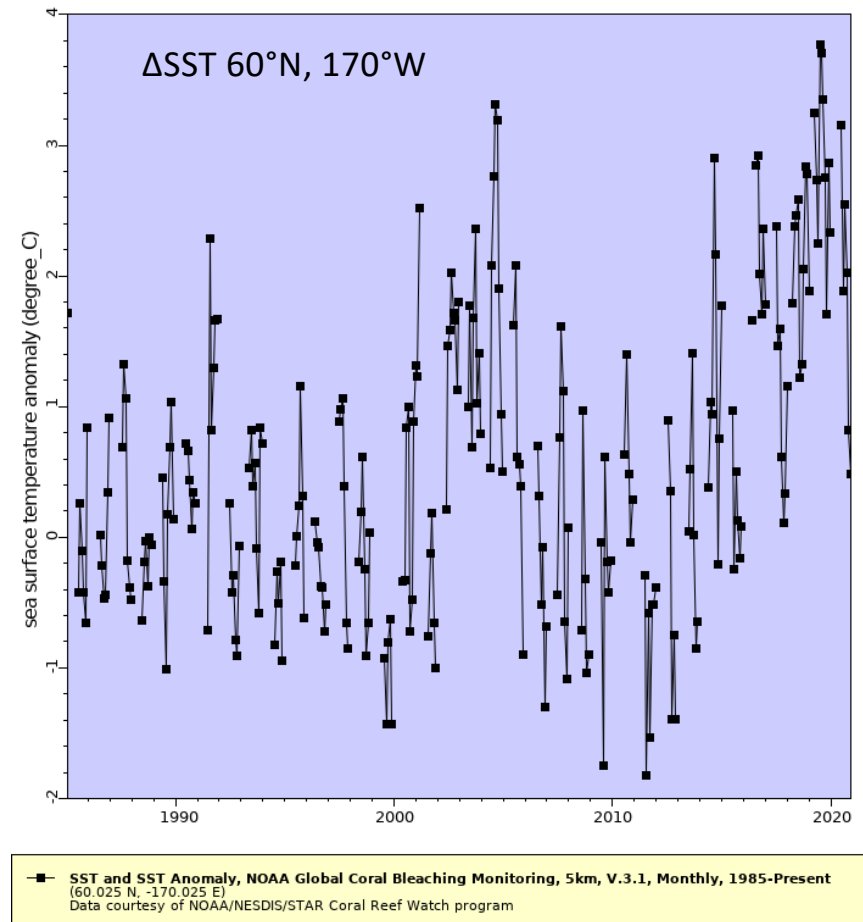


Generate a Timeseries

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[\(1985-01-16\):\(2020-11-16\)\]\[\(60\)\]\[\(-170\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[(1985-01-16):(2020-11-16)][(60)][(-170)])

Produces this figure →

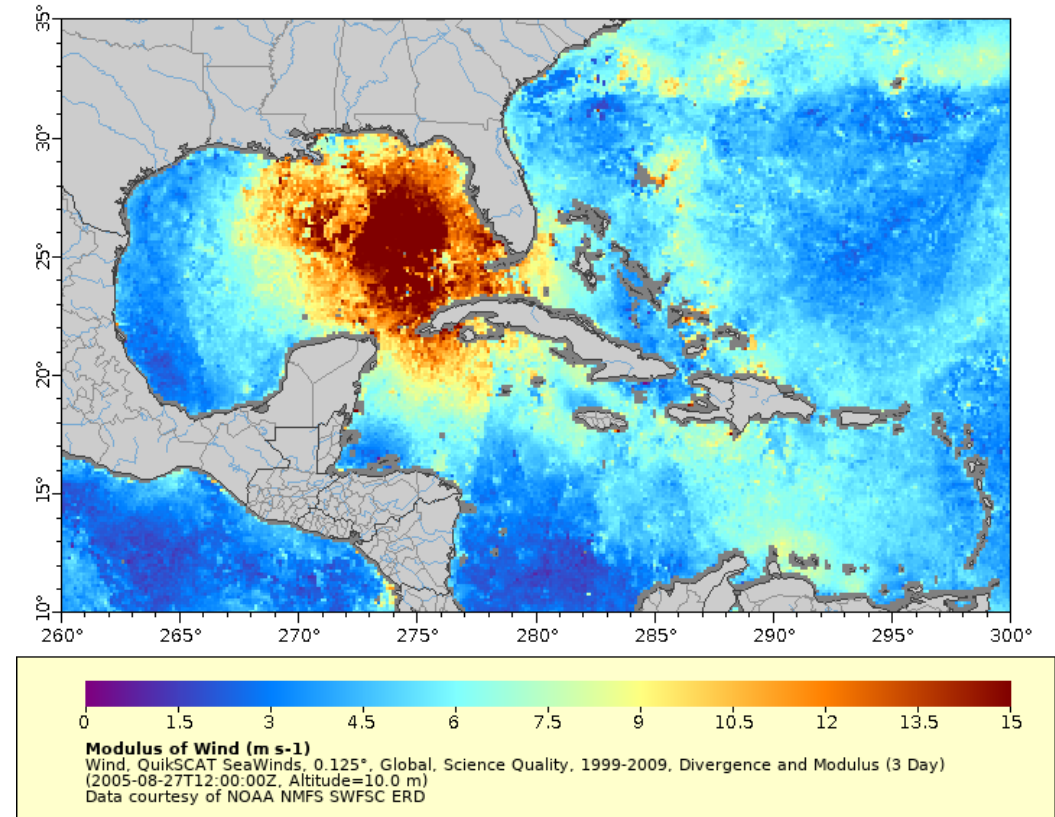
Select 'linesAndMarkers' under Graph Type on the Make a Graph page (.graph) to create a timeseries at any point in the dataset



Visualize wind speeds produced by Hurricane Katrina

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdQSdivmod3day.largePng?mod\[\(2005-08-27\)\]\[\(10\)\]\[\(10\):\(35\)\]\[\(260\):\(300\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdQSdivmod3day.largePng?mod[(2005-08-27)][(10)][(10):(35)][(260):(300)])

Produces this figure →



Visualize wind vectors produced by Hurricane Katrina



ERDDAP

Easier access to scientific data

ERDDAP > griddap > Make A Graph ?

Dataset Title: **Wind, QuikSCAT SeaWinds, 0.125°, Global, Science Quality, 1999-2009 (3 Day)** |

Institution: NOAA NMFS SWFSC ERD (Dataset ID: erdQSwind3day)

Information: Summary ? | License ? | [FGDC](#) | [ISO 19115](#) | [Metadata](#) | [Background](#) ? | [Data Access Form](#) | [Files](#)

Graph Type: vectors ?

X Axis: longitude ?

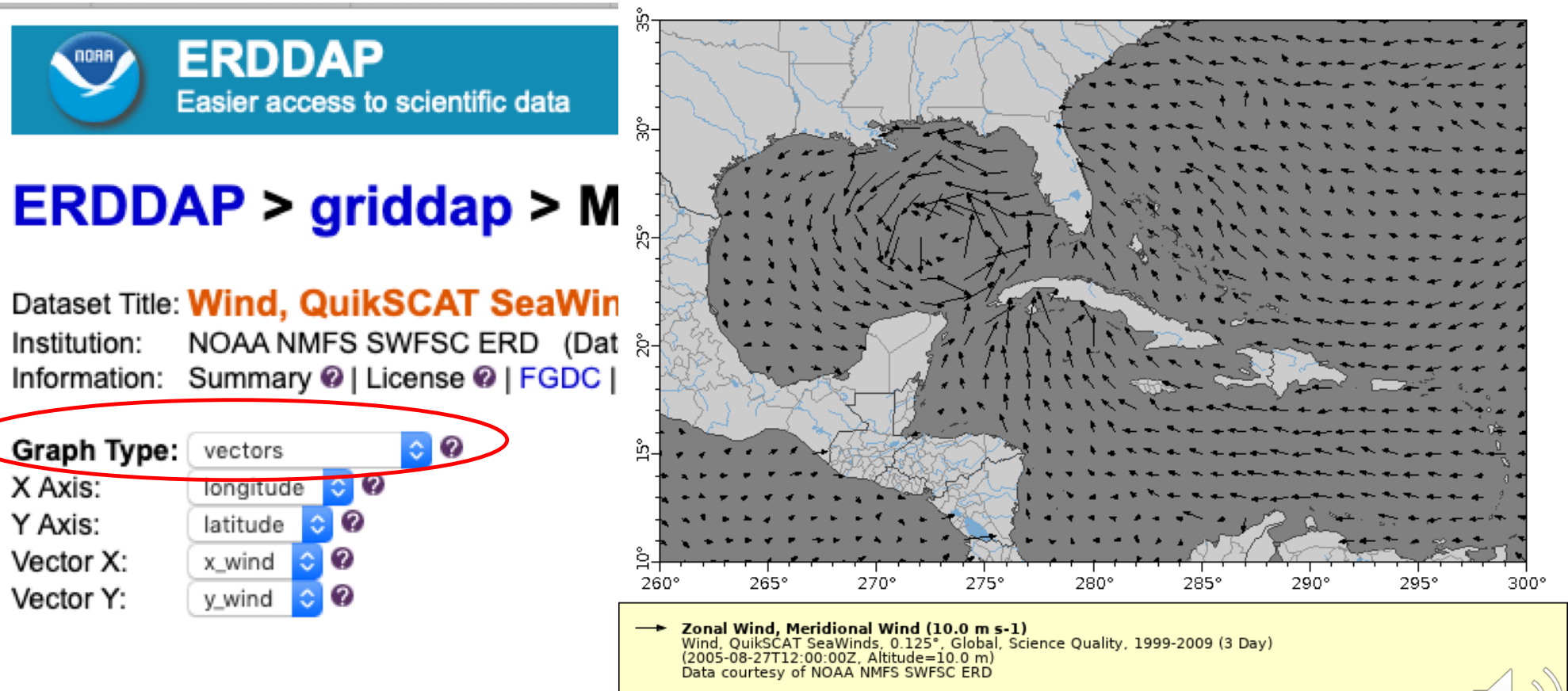
Y Axis: latitude ?

Vector X: x_wind ?

Vector Y: y_wind ?



Visualize wind vectors produced by Hurricane Katrina



Access tabular data like BGC-Argo Float data

Map of all BGC-Argo floats since 2017-01-01 in the Southern Ocean around South America. Float profiles are colored by date.

https://polarwatch.noaa.gov/erddap/taledap/SOCCOM_BGC_Argo.graph

Graph Type:

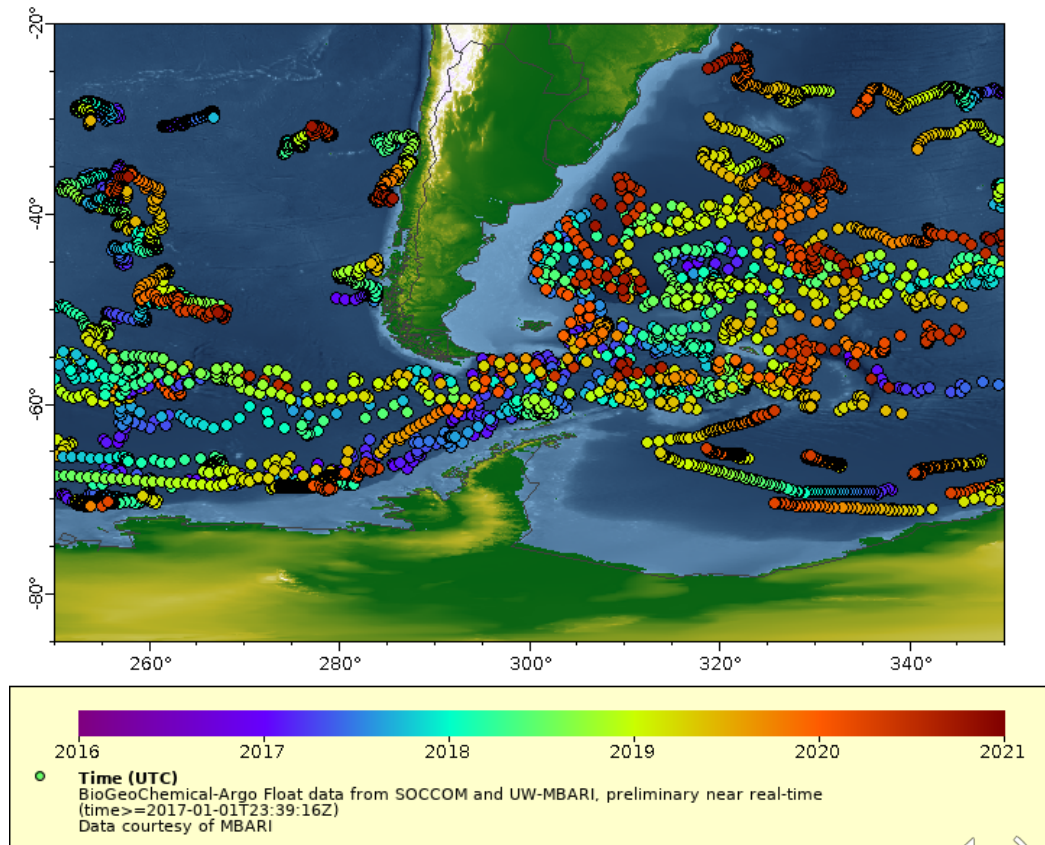
X Axis:

Y Axis:

Color:

Constraints

		Optional Constraint #1		Optional Constraint #2
time	<input <="" td="" type="text" value=">="/> <td> 2017-01-01T23:39:16Z </td> <td><input <="" td="" type="text" value="<="/><td> </td></td>	2017-01-01T23:39:16Z	<input <="" td="" type="text" value="<="/> <td> </td>	
latitude	<input <="" td="" type="text" value=">="/> <td> -85 </td> <td><input <="" td="" type="text" value="<"/><td> -20 </td></td>	-85	<input <="" td="" type="text" value="<"/> <td> -20 </td>	-20
longitude	<input <="" td="" type="text" value=">="/> <td> 250 </td> <td><input <="" td="" type="text" value="<="/><td> 350 </td></td>	250	<input <="" td="" type="text" value="<="/> <td> 350 </td>	350
	<input <="" td="" type="text" value=">="/> <td> </td> <td><input <="" td="" type="text" value="<="/><td> </td></td>		<input <="" td="" type="text" value="<="/> <td> </td>	
	<input <="" td="" type="text" value=">="/> <td> </td> <td><input <="" td="" type="text" value="<="/><td> </td></td>		<input <="" td="" type="text" value="<="/> <td> </td>	

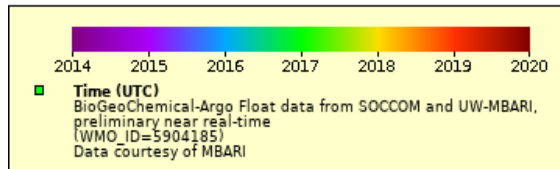
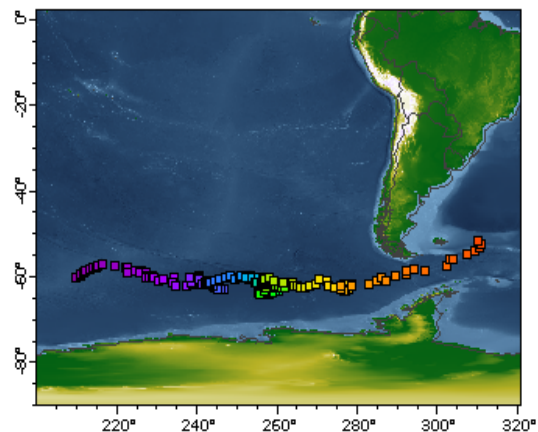


Visualizations of tabular data

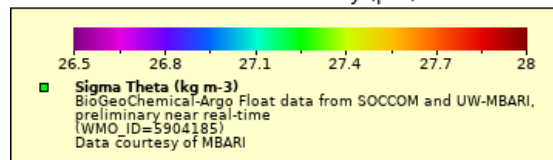
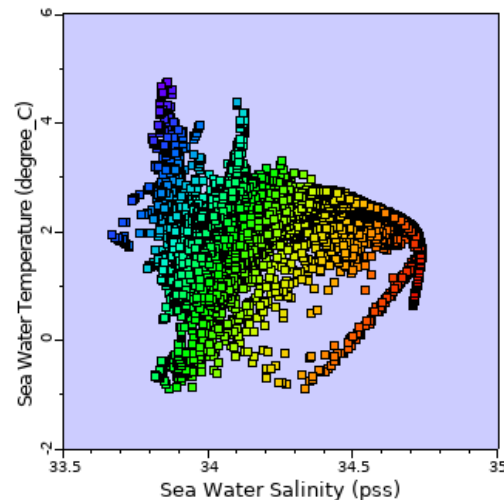
https://polarwatch.noaa.gov/erddap/taledap/SOCCOM_BGC_Argo.graph

Float WMO_ID = 5904185

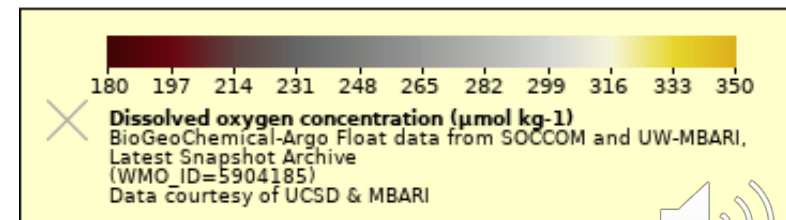
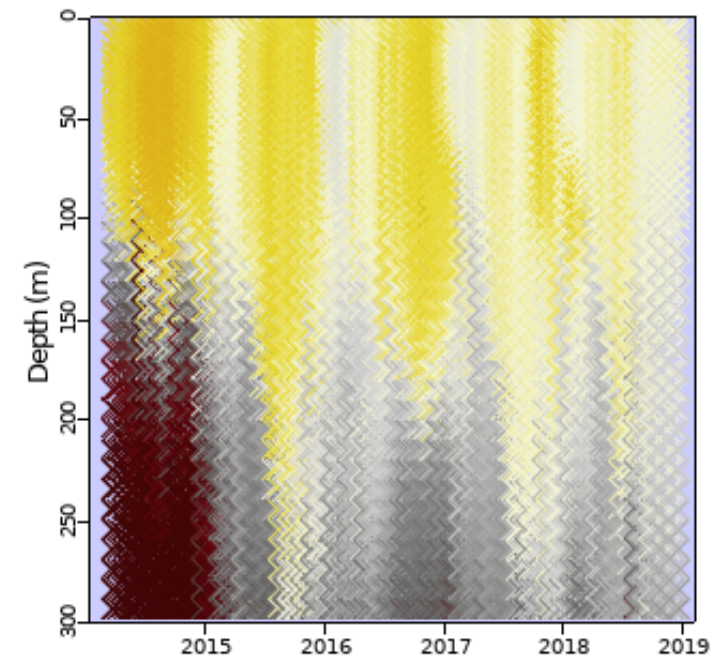
Map of float trajectory



Temperature-Salinity Diagram



Oxygen Section for 0-350 m depth



Downloading Data

`coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature[(2019-09-21T12:00:00Z)]`

Example of a URL data request

Base URL: `https://coastwatch.pfeg.noaa.gov/erddap/griddap/`

Dataset ID: `NOAA_DHW_monthly`

File Type: `.largePng (.nc, .mat, .json, .geotif, .kml, .csv...)`

Data Request Begins `?`

Variable: `sea_surface_temperature`

Time range: `[(2019-09-15T12:00:00Z):(2019-09-15T12:00:00Z)]`

Latitude Range: `[(70):(-10)]`

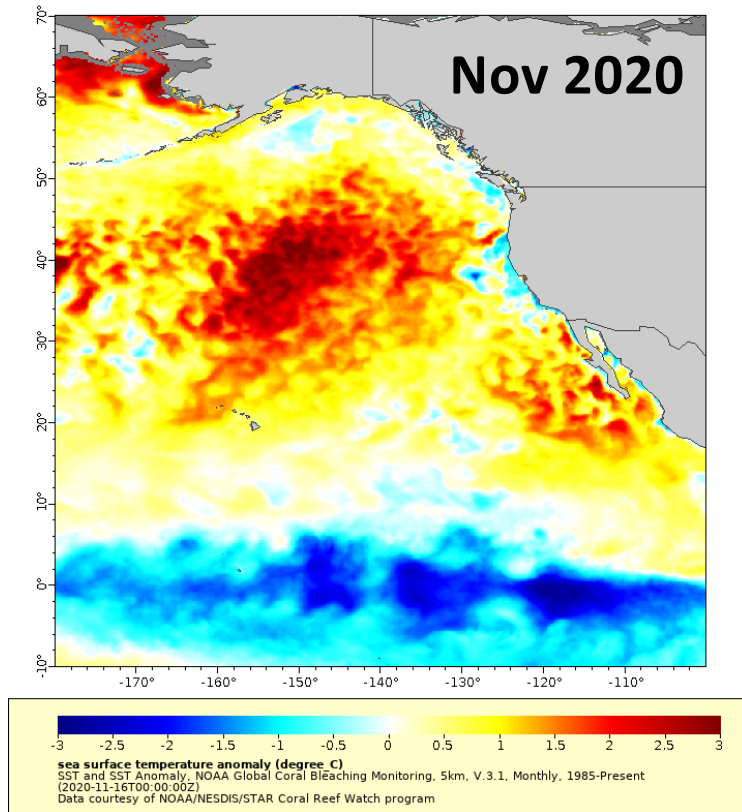
Longitude Range: `[(-180):(-100)]`

`[(70):(-10)][(-180):(-100)]`

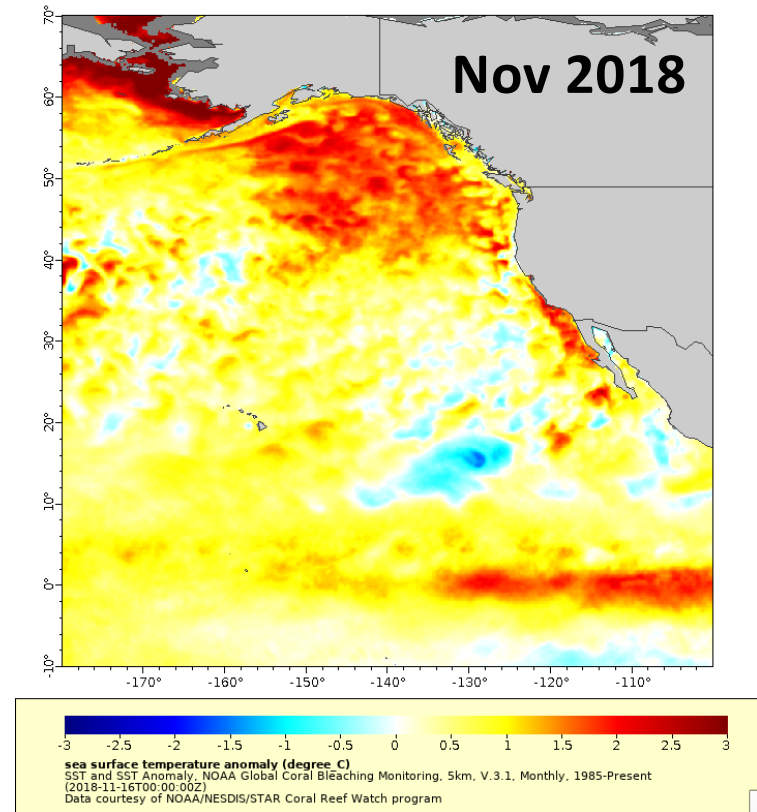


“Last” Data

[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[last\]\[:\(70\):\(-10\)\]\[:\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[last][:(70):(-10)][:(-180):(-100)])



[https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly\[last-24\]\[:\(70\):\(-10\)\]\[:\(-180\):\(-100\)\]](https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.largePng?sea_surface_temperature_anomaly[last-24][:(70):(-10)][:(-180):(-100)])



Data Access Form

https://coastwatch.pfeg.noaa.gov/erddap/griddap/NOAA_DHW_monthly.html?sea_surface_temperature_anomaly

 **ERDDAP**
Easier access to scientific data

ERDDAP > griddap > Data Access Form

Dataset Title: **SST and SST Anomaly, NOAA Global Coral Bleaching Monitoring, 5km, V.3.1, Monthly, 1985-Present** [✉](#) [RSS](#)

Institution: NOAA/NESDIS/STAR Coral Reef Watch program (Dataset ID: NOAA_DHW_monthly)

Information: [Summary](#) | [License](#) | [FGDC](#) | [ISO 19115](#) | [Metadata](#) | [Background](#) | [Files](#) | [Make a graph](#)

Dimensions	Start	Stride	Stop	Size	Spacing
☒ time (UTC)	2018-11-16T00:00:00Z	1	2018-11-16T00:00:00Z	431	30 days 10h 29m 35s (uneven)
☒ latitude (degrees_north)	70.025	1	-10.025	3600	-0.05 (uneven)
☒ longitude (degrees_east)	-179.975	1	-100.025	7200	0.05 (uneven)

Grid Variables (which always also download all of the dimension variables)

- ☐ sea_surface_temperature (degree_C)
- ☐ mask (Pixel characteristics flag array, pixel_classification)
- ☒ sea_surface_temperature_anomaly (degree_C)

File type: [\(more info\)](#)

HTML Table - View a URL - .html web page with the data in a table. Times are ISO 8601 strings.

Just generate the URL:

[\(Documentation / Bypass this form\)](#)

Submit (Please be patient. It may take a while to get the data.)



CoastWatch West Coast Node

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

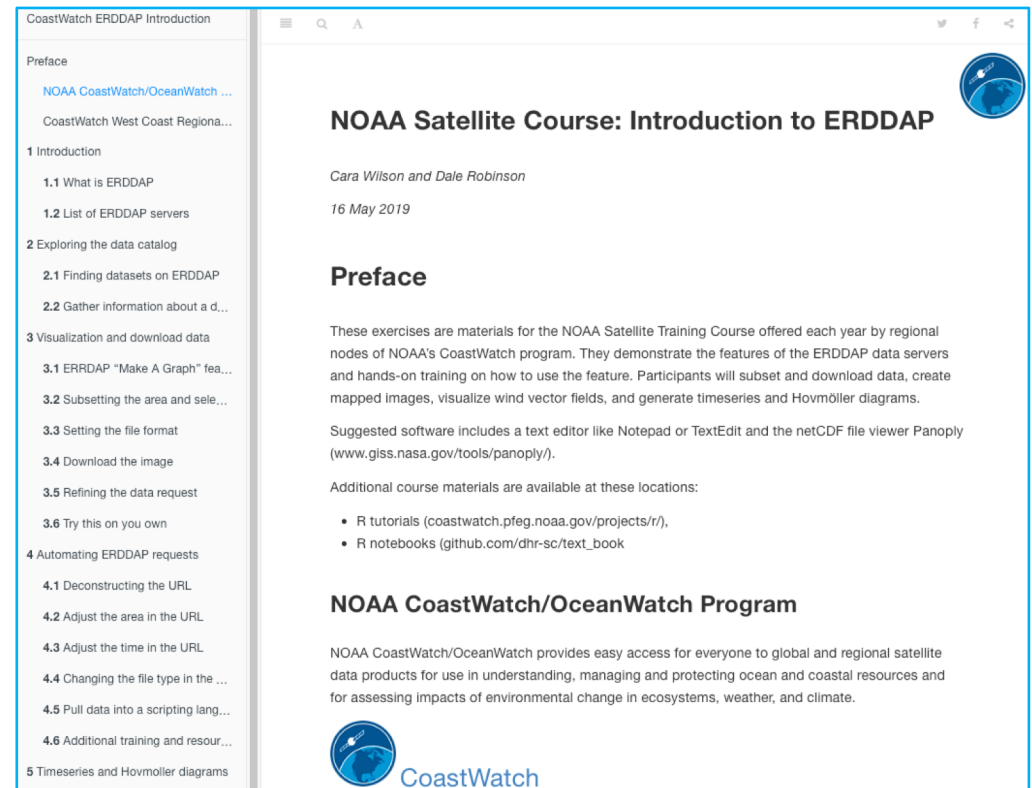
23



Online “Introduction to ERDDAP” provided by NOAA CoastWatch

Online ERDDAP tutorial

- Developed by CoastWatch West Coast Node for the NOAA satellite course
coastwatch.noaa.gov/cw/user-resources/satellite-data-training-courses.html
- Walks users through using ERDDAP
- Demonstrates visualizing both gridded and tabular datasets
- Shows how to subset and download datasets in a variety of different formats



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



Online tutorial for using R with ERDDAP provided by NOAA CoastWatch

Online ERDDAP tutorial

- Developed by CoastWatch West Coast Node for the NOAA satellite course
coastwatch.noaa.gov/cw/user-resources/satellite-data-training-courses.html
- Demonstrates techniques to extract data from the ERDDAP data servers using the rerddapxtracto library written in R

R Exercises for the NOAA Satellite Course

Cara Wilson, Jennifer Sevadjian, and Dale Robinson

8 March 2020

Preface

These exercises are materials for the NOAA Satellite Training Course offered each year by regional nodes of NOAA's CoastWatch program. They demonstrate techniques to extract data from the ERDDAP data servers using the rerddapxtracto library written in R.

NOAA CoastWatch/OceanWatch Program

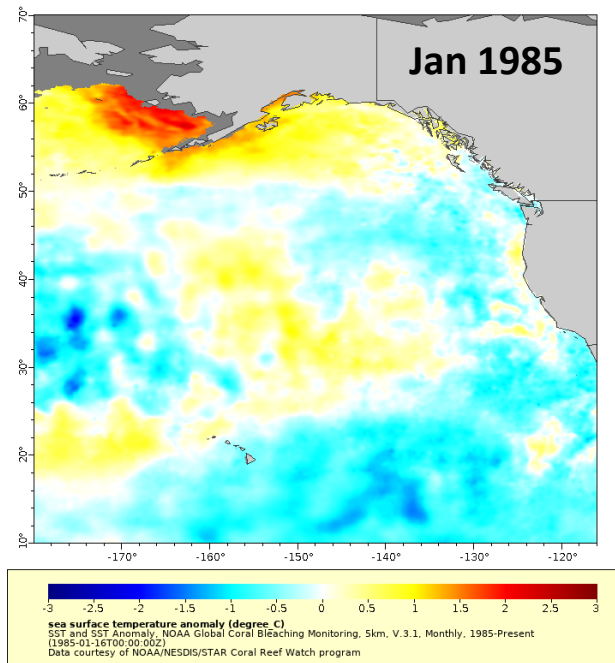
NOAA CoastWatch/OceanWatch provides easy access for everyone to global and regional satellite data products for use in understanding, managing and protecting ocean and coastal resources and for assessing impacts of environmental change in ecosystems, weather, and climate.



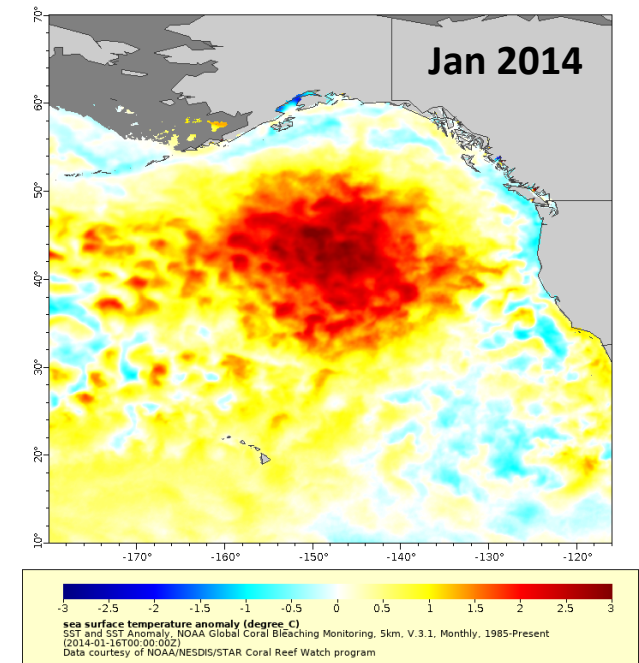
CoastWatch

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





Questions???



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