



Easy data access and visualization using the ERDDAP data server

Cara Wilson & Dale Robinson

NOAA CoastWatch West Coast Node (WCN)

STAR Seminar

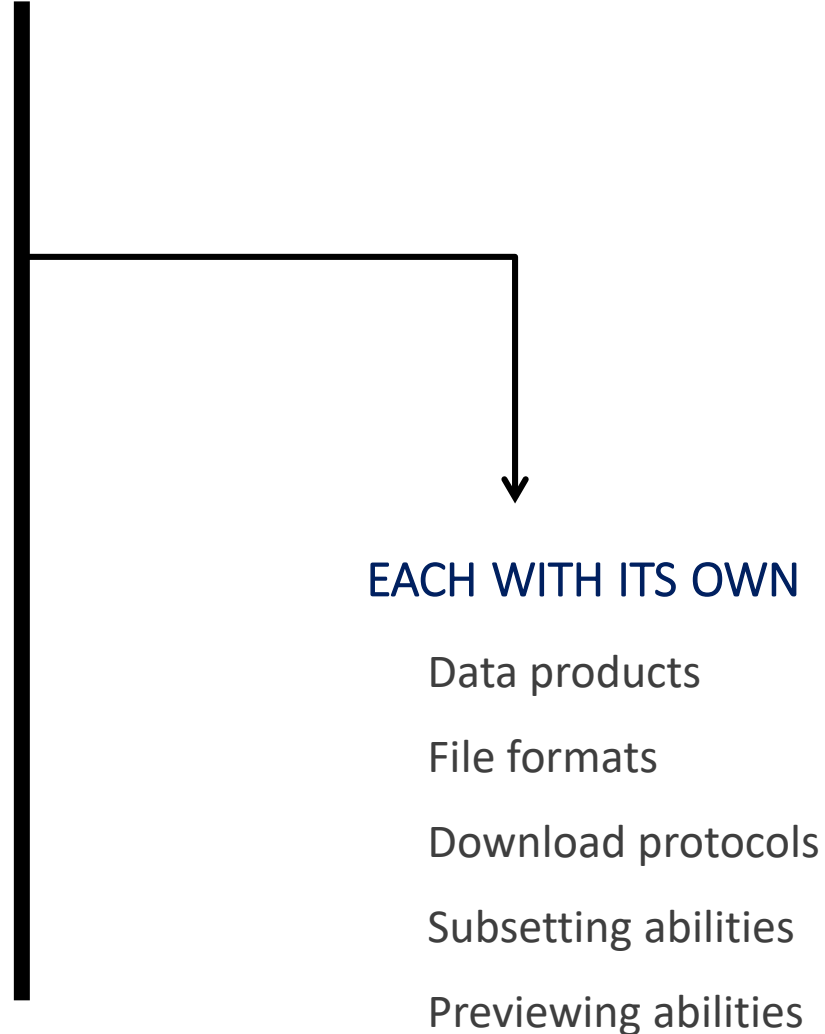
August 22, 2019



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



ERDDAP – designed to make data access easier

DATA AGGREGATION

LOCAL STORAGE

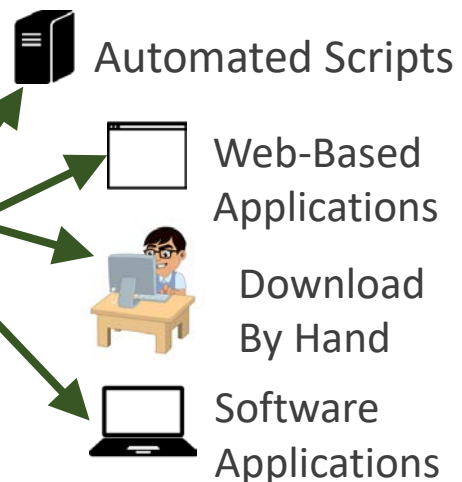


REMOTE SERVERS



ERDDAP

DATA DISTRIBUTION



ERDDAP provides a simple, consistent way to:

- Subset datasets temporally and spatially
 - Download data in > 30 formats
 - Access data within analysis tools (R, Matlab, python...) using urls which completely define the data request
 - Machine-to-machine data exchange
-
- ERDDAP developed at SWFSC/ERD by Bob Simons
 - ~80 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

NOAA ERDDAPs

- [CoastWatch-Central Ops](#)
- [CoastWatch-West Coast Node \(WCN\)](#)
- [CoastWatch-PolarWatch](#)
- [CoastWatch-Caribbean/Gulf of Mexico](#)
- [CoastWatch-Pacific Node](#)
- [CoastWatch-Great Lakes Node](#)
- [NOAA Unified Access Framework](#)
- [NOAA NCEI](#)
- [NOAA NCEI](#)
- [NOS CO-OPS](#)
- [NMFS NEFSC](#)
- [OAR PMEL](#)
- [NOAA Observing System Monitoring Center](#)
- [NOAA IOOS Sensors](#)
- [NOAA IOOS National Glider Data Assembly Center](#)
- [NOAA IOOS CeNCOOS](#)
- [NOAA IOOS NERACOOS](#)
- [NOAA IOOS PacIOOS](#)
- [NOAA IOOS SCCOOS](#)
- [NOAA IOOS SECOORA](#)



ERDDAP Google Group for Admins

<https://groups.google.com/forum/#!forum/erddap>

- Active ERDDAP user's group
- Aimed at administrators

The screenshot shows the ERDDAP Google Group forum page. At the top, there's a browser address bar with the URL groups.google.com/forum/#!forum/erddap. Below the browser, there's a navigation bar with tabs for "Post-Trip Rep...", "Reports | Campfire C...", "(99+) ERDDAP - Goo...", "National Outings | Qu...", "R Exercises for the N...", and "About CoastWatch | ...". The main header features the NOAA logo, a search bar with the text "Search for messages", and a user profile icon. Below the header, there's a "Groups" section with a "NEW TOPIC" button, a refresh button, a "Mark all as read" button, and a "Filters" dropdown. The group name "ERDDAP" is displayed, along with "Shared publicly" and "32 of 125 topics (99+ unread)". A welcome message states: "Welcome to the ERDDAP Users group. This group is aimed at users and admins of the ERDDAP data broker/server. It is the hoped that through this group we can bring together and share experiences with using ERDDAP and help others better use the software. If you an ERRDDAP admin please remember not to post any information that might compromise your server or any of the data servers that your ERRDDAP instance communicates with." Below the welcome message, a list of forum topics is shown, each with a profile picture, title, author, post/view counts, and date. The first topic, "A gentle introduction to ERDDAP" by Conor Delaney, is highlighted with a blue border. Other topics include "Introduction (1)", "Searching across multiple Erddaps (6)", "Problem with datetime handling for download (5)", "Editing ISO 19115 XML mapping (6)", "My data file is too big. ERDDAP runs out of memory. (15)", and "estimation of subset file size".

Topic	Author	Posts	Views	Date
A gentle introduction to ERDDAP	Conor Delaney	2	139	4/26/16
Introduction (1)	Conor Delaney	1	110	11/4/15
Searching across multiple Erddaps (6)	Adam Leadbetter	6	6	Aug 14
Problem with datetime handling for download (5)	paloma de la vallee	5	3	Aug 13
Editing ISO 19115 XML mapping (6)	Nate Rosenstock	6	10	Aug 1
My data file is too big. ERDDAP runs out of memory. (15)	Bob Simons	15	44	Jul 29
estimation of subset file size	Bob Simons	4	8	Jul 24



The ERDDAP interface is functional (not 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	Sum-mary	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	RSS		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	RSS		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	RSS		NOAA OAR AOML	nodcPJJU
	set	data	graph			public	Animal Telemetry Network (ATN)	?	F I M	background	RSS		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	RSS		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	RSS		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	RSS		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	RSS		NASA/GSFC OBPG	jplAquariusSSSMonthlyV5
data			graph		files	public	Audio data from a local source.	?	M	background	RSS		???	testGridWav
	set	data	graph		files	public	Audio data from a local source.	?	M	background	RSS		???	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	RSS		NCEI	nceiPH53sst1day
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	RSS		NCEI	nceiPH53sstn1day
data			graph			public	AVISO Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 1992-2010, Monthly	?	F I M	background	RSS		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	RSS		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	RSS		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	RSS		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	RSS		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	RSS		UCSC, UCSD	charmForecast0day
	set	data	graph			public	CalCOFI Continuous Underway Fish-Egg Sampler	?	F I M	background	RSS		NOAA SWFSC	erdCalCOFIcufes
	set	data	graph			public	CalCOFI Cruises	?	M	background	RSS		NOAA SWFSC	erdCalCOFICruises



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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
	set	data	graph		
data			graph		
data			graph	M	
		data	graph		files
	set	data	graph		
data			graph	M	
data			graph	M	
data			graph	M	
data			graph	M	
data			graph		files
	set	data	graph		files
data			graph	M	public
data			graph	M	public
data			graph		public
data			graph	M	public
data			graph	M	public
data			graph	M	public
data			graph	M	public
data			graph	M	public
data			graph	M	public
	set	data	graph		public
	set	data	graph		public

Two types of data:

- Gridded (Accessed though GridDAP)
- Tabular (Accessed through TableDAP or Subset)

GDC, SO, Metadata	Back- ground Info	RSS	E mail	Institution	Dataset ID
M	background			NOAA NMFS SWFSC E...	allDatasets
I M	background	RSS		Remote Sensing Sy...	jplAmsreSstMon
I M	background	RSS		Remote Sensing Sy...	jplAmsreSstMon_LonPM180
I M	background	RSS		NOAA OAR AOML	nodcPJJU
I M	background	RSS		Animal Telemetry ...	gtoppAT
I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSS3MonthV5
I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSS7DayV5
I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSSDailyV5
I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSSMonthlyV5
M	background	RSS		???	testGridWav
M	background	RSS		???	testTableWav
F I M	background	RSS		NCEI	nceiPH53sst1day
F I M	background	RSS		NCEI	nceiPH53sst1day
F I M	background	RSS		Centre National d...	jplAvisoSshMon
F I M	background	RSS		Centre National d...	jplAvisoSshMon_LonPM180
F I M	background	RSS		UCSC, UCSD	charmForecast1day
F I M	background	RSS		UCSC, UCSD	charmForecast2day
F I M	background	RSS		UCSC, UCSD	charmForecast3day
F I M	background	RSS		UCSC, UCSD	charmForecast0day
F I M	background	RSS		NOAA SWFSC	erdCalCOFIcufes
M	background	RSS		NOAA SWFSC	erdCalCOFICruises



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Good metadata is crucial for data discoverability

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	Sum-mary	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	RSS		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	RSS		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	RSS		NOAA OAR AOML	nodcPJUU
	set	data	graph			public	Animal Telemetry Network (ATN)	?	F I M	background	RSS		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	RSS		NASA/GSFC OBPB	jplAquariusSSS3MonthV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, 7-Day	?	F I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSS7DayV5
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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	RSS		UCSC, UCSD	charmForecast3day
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	set	data	graph			public	CalCOFI Continuous Underway Fish-Egg Sampler	?	F I M	background	RSS		NOAA SWFSC	erdCalCOFIcufes
	set	data	graph			public	CalCOFI Cruises	?	M	background	RSS		NOAA SWFSC	erdCalCOFICruises



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Easy to serve data from other institutions. Full credit is given to the source.

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

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data			graph	M		public	AMSRE Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 2002-2010, Monthly, Lon+/-180		F I M	background	RSS		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	RSS		NOAA OAR AOML	nodcPJJU
	set	data	graph			public	Animal Telemetry Network (ATN)		F I M	background	RSS		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	RSS		NASA/GSFC OBPB	jplAquariusSSS3MonthV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, 7-Day		F I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSS7DayV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, Daily		F I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSSDailyV5
data			graph	M		public	Aquarius Sea Surface Salinity, L3 SMI, Version 5, 1.0°, Global, 2011-2015, Monthly		F I M	background	RSS		NASA/GSFC OBPB	jplAquariusSSSMonthlyV5
data			graph		files	public	Audio data from a local source.		M	background	RSS		???	testGridWav
	set	data	graph		files	public	Audio data from a local source.		M	background	RSS		???	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	RSS		NCEI	nceiPH53sst1day
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data			graph			public	AVISO Model Output, obs4MIPs NASA-JPL, Global, 1 Degree, 1992-2010, Monthly		F I M	background	RSS		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	RSS		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	RSS		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	RSS		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	RSS		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	RSS		UCSC, UCSD	charmForecast0day
	set	data	graph			public	CalCOFI Continuous Underway Fish-Egg Sampler		F I M	background	RSS		NOAA SWFSC	erdCalCOFIcufes
	set	data	graph			public	CalCOFI Cruises		M	background	RSS		NOAA SWFSC	erdCalCOFICruises



WCN's data catalog has ~1,000 satellite datasets

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Easier access to scientific data

ERDDAP > griddap > Make A Graph

Dataset Title: **Aquarius Sea Surface Salinity, Version 2, Global, 3-Month** [RSS](#)
Institution: NASA/GSFC OBPG (Dataset ID: jplAquariusSSS3Month)
Information: [Summary](#) | [License](#) | [FGDC](#) | [ISO 19115](#) | [Metadata](#) | [Background](#) | [Data Access Form](#)

Graph Type:
X Axis:
Y Axis:
Color:

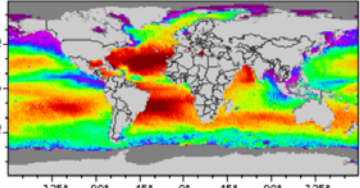
Dimensions Start Stop
latitude (degrees_north)
longitude (degrees_east)

Graph Settings
Color Bar: Continuity: Scale:
Min: Max: N Sections:
Draw the land mask:

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

Optional:
Then set the File Type: and [Download the Data or an Image](#)
or view the URL: [http://coastwatch.pfeg.noaa.gov/erddap/griddap/jplAquariusSSS3Month.htmlTable?sss\[\(2013-09-21T00:00:00Z\)\]](http://coastwatch.pfeg.noaa.gov/erddap/griddap/jplAquariusSSS3Month.htmlTable?sss[(2013-09-21T00:00:00Z)])
([Documentation](#) / [Bypass this form](#)) ([File Type information](#))

Click on the map to specify a new center point.
Zoom:



Sea Surface Salinity (psu)
Aquarius Sea Surface Salinity, Version 2, Global, 3-Month
(2013-09-21T00:00:00Z)
Data courtesy of NASA/GSFC OBPG

Distributed via our ERDDAP Server

ERDDAP makes it easy to get the data you need.

0.5 – 1.0 million data requests per day

WCN data catalog has non-satellite data (~400 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



Allows automated processes via RESTful services

Example of a URL data request

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

Dataset ID: [erdVHsstaWS3day](#)

File Type: [.largePng \(.nc, .mat, .json, .geotif, .kml, .csv...\)](#)

Variable: [?sst](#)

Time range: [\[\(2016-10-21T12:00:00Z\):1:\(2016-10-21T12:00:00Z\)\]](#)

Altitude: [\[0.0\]](#)

Latitude Range: [\[\(41.75\):1:\(30.86\)\]](#)

Longitude Range: [\[\(-128.25\):1:\(-114.75\)\]](#)

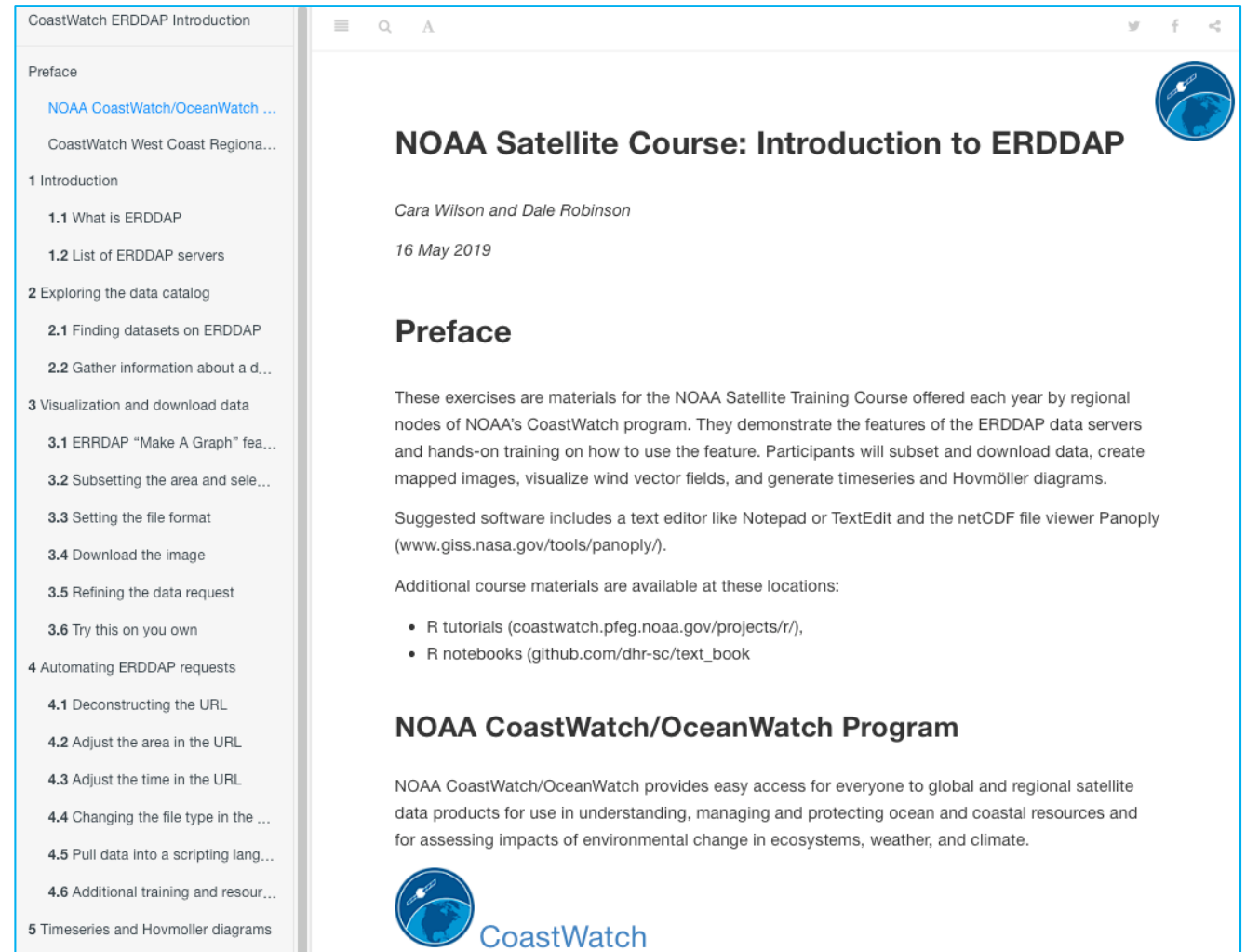


Today's "Introduction to ERDDAP" tutorial is online

Online ERDDAP tutorial

- Developed by WCN for the NOAA satellite course
- Walks users through using ERDDAP
- Demonstrates visualizing both gridded and tabular datasets

I will demo parts of the tutorial today



CoastWatch ERDDAP Introduction

Preface

[NOAA CoastWatch/OceanWatch ...](#)

CoastWatch West Coast Regiona...

1 Introduction

1.1 What is ERDDAP

1.2 List of ERDDAP servers

2 Exploring the data catalog

2.1 Finding datasets on ERDDAP

2.2 Gather information about a d...

3 Visualization and download data

3.1 ERDDAP "Make A Graph" fea...

3.2 Subsetting the area and sele...

3.3 Setting the file format

3.4 Download the image

3.5 Refining the data request

3.6 Try this on you own

4 Automating ERDDAP requests

4.1 Deconstructing the URL

4.2 Adjust the area in the URL

4.3 Adjust the time in the URL

4.4 Changing the file type in the ...

4.5 Pull data into a scripting lang...

4.6 Additional training and resour...

5 Timeseries and Hovmoller diagrams

NOAA Satellite Course: Introduction to ERDDAP

Cara Wilson and Dale Robinson

16 May 2019

Preface

These exercises are materials for the NOAA Satellite Training Course offered each year by regional nodes of NOAA's CoastWatch program. They demonstrate the features of the ERDDAP data servers and hands-on training on how to use the feature. Participants will subset and download data, create mapped images, visualize wind vector fields, and generate timeseries and Hovmöller diagrams.

Suggested software includes a text editor like Notepad or TextEdit and the netCDF file viewer Panoply (www.giss.nasa.gov/tools/panoply/).

Additional course materials are available at these locations:

- R tutorials (coastwatch.pfeg.noaa.gov/projects/r/),
- R notebooks (github.com/dhr-sc/text_book)

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/erddap/>



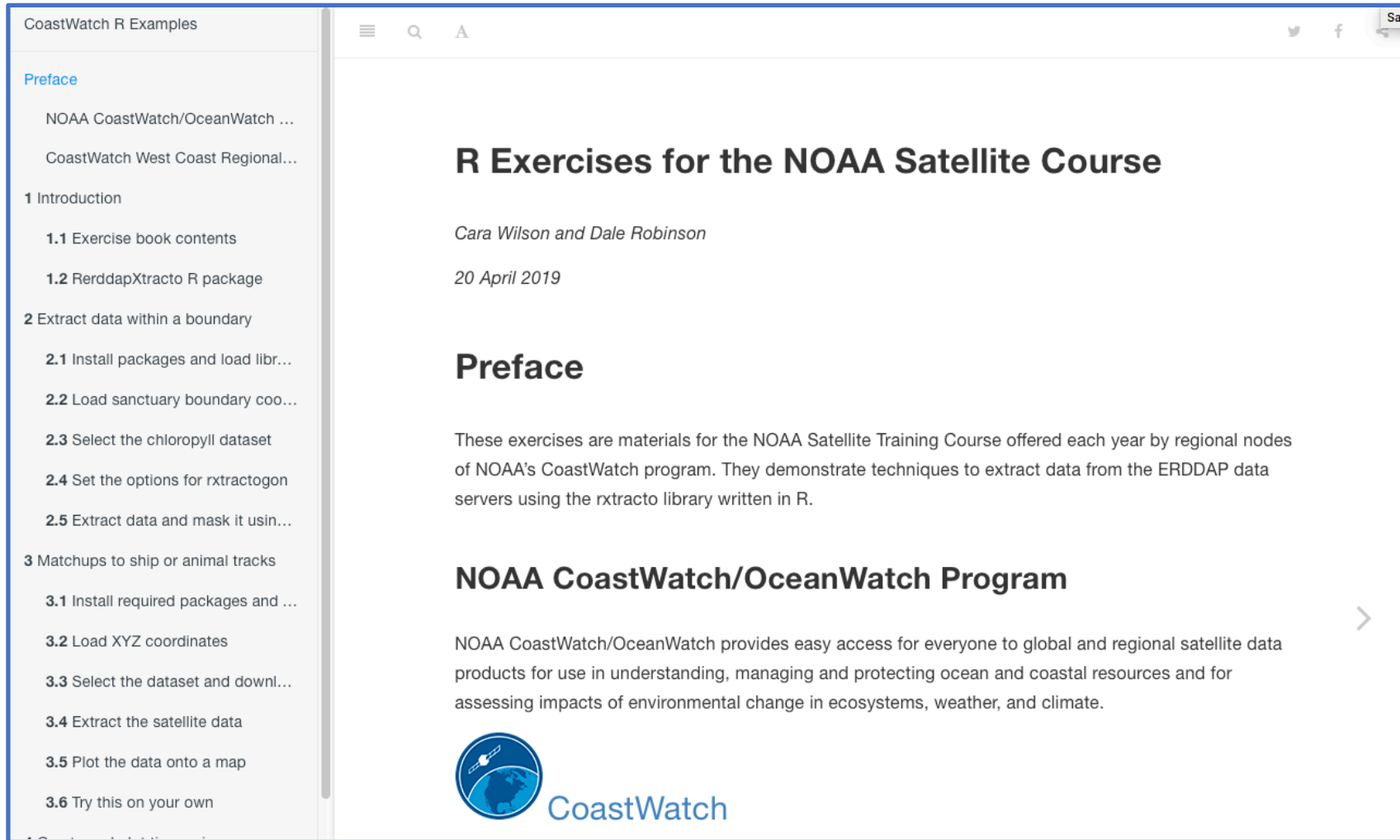
rerddapXtracto tools help R users extract data from ERDDAP

- R package written by Roy Mendelssohn (SWFSC/ERD), based on code originally written by Dave Foley for Matlab
- Developed based on user needs identified from the NOAA satellite courses
- Uses the rerddap and plotdap R packages
- All packages are on cran
- Three main functions are within rerddapXtracto:
 - rxtracto**: extracts data along xyt points (e.g. tagged animals, ship stations, etc.)
 - rxtractogon**: extracts data within a user-supplied polygon
 - rxtracto_3D**: extracts data from a 3-dimensional (latitude, longitude and time)
- Will work on any dataset on any ERDDAP

<https://coastwatch.pfeg.noaa.gov/xtracto>
<https://github.com/rmendels/rerddapXtracto>



An rerddapXtracto tutorial is available online



CoastWatch R Examples

[Preface](#)

NOAA CoastWatch/OceanWatch ...

CoastWatch West Coast Regional...

1 Introduction

1.1 Exercise book contents

1.2 RerddapXtracto R package

2 Extract data within a boundary

2.1 Install packages and load libr...

2.2 Load sanctuary boundary coo...

2.3 Select the chlorophyll dataset

2.4 Set the options for rxtractogon

2.5 Extract data and mask it usin...

3 Matchups to ship or animal tracks

3.1 Install required packages and ...

3.2 Load XYZ coordinates

3.3 Select the dataset and downl...

3.4 Extract the satellite data

3.5 Plot the data onto a map

3.6 Try this on your own

R Exercises for the NOAA Satellite Course

Cara Wilson and Dale Robinson

20 April 2019

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 rxtracto library written in R.

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CoastWatch

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



Live Demonstration

- Visualize the N. Pacific SST 'Blob'
- Visualize a N. Pacific Chlorophyll bloom
- Hurricane Jose (Sept 2017)
- BGC-Argo data on PolarWatch ERDDAP
- Search for datasets across all ERDDAPs

<https://irishmarineinstitute.github.io/search-erddaps/>

<https://coastwatch.pfeg.noaa.gov/erddap/download/SearchMultipleERDDAPs.html>

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

