

# Environmental Data Summary workshop

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# Prereq

- R
- Rstudio
- Survey data with lat, lon, time columns
- Git (<https://git-scm.com/downloads>)
- ~~Pifsc VPN and access to M: and G: drives~~
- Know how ERDDAP works.

# Topics

- 1. Environmental Data Summary (EDS) project
- 2. git-based version control system
- 3. ERDDAP - OceanWatch & CoastWatch
- 4. Clone & Run EDS program
- 5. Branch & customize EDS R codes for your own research



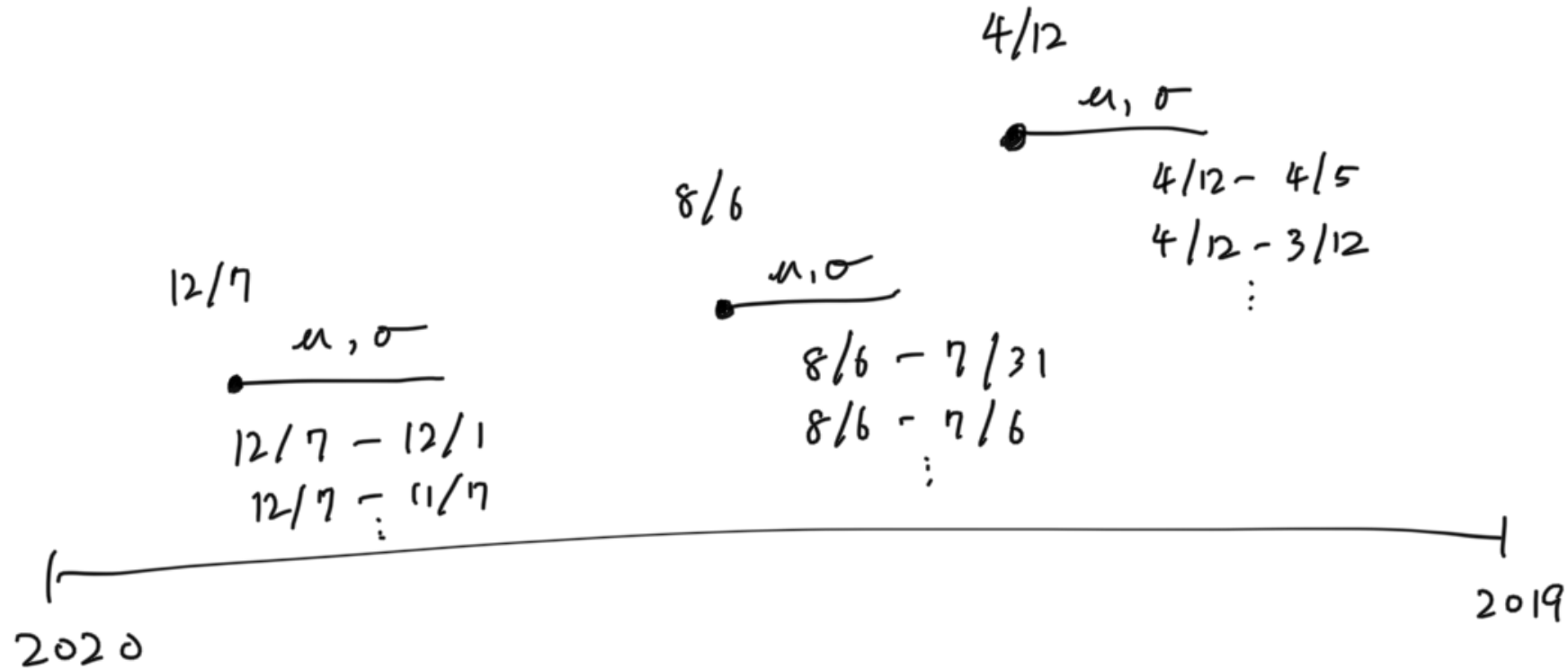
# Environmental Data Summary (EDS) project

- Enhance *in situ* data with relevant external environmental data (SST, Chl\_a, Bathymetry...)
- Useful for subsequent correlative & statistical analyses.
- Originally conceptualized & developed by T.A. Oliver
- Revised and maintained by K.A. Tanaka & T.A. Oliver
- [kisei.tanaka@noaa.gov](mailto:kisei.tanaka@noaa.gov) & [thomas.oliver@noaa.gov](mailto:thomas.oliver@noaa.gov)
- [Citation:](#)
- Tanaka KR, Oliver TA (2021) NOAA's National Coral Reef Monitoring Program Environmental Data Summary

# Two types of environmental data

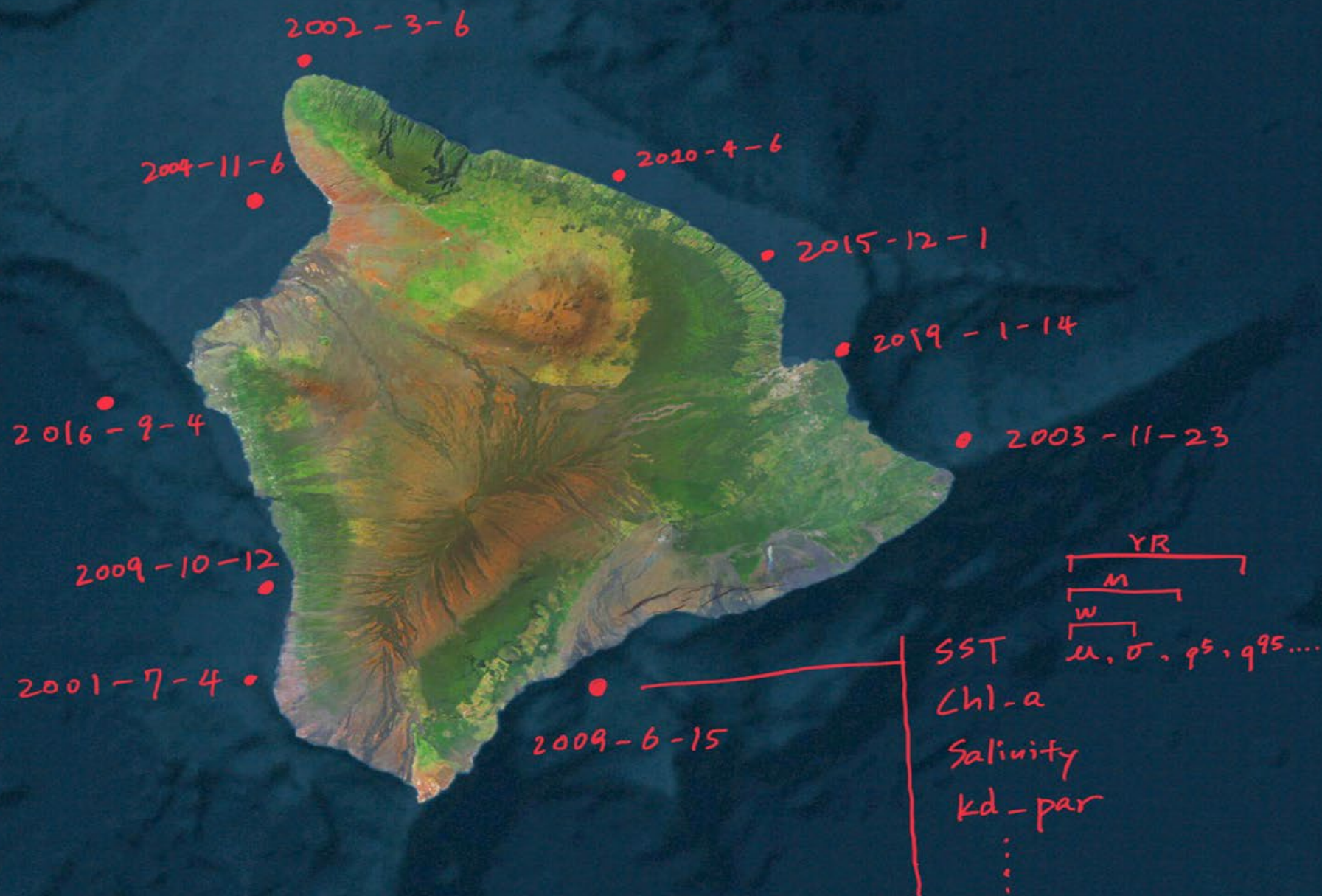
- Static (climatologies, e.g., average SST 1980-2020)
- Dynamic (timeseries, e.g., daily SST)

# Dynamic Time Series Summary



A statistically summarized environmental value (mean, max, min, ci95, sd, 5th and 95th quantiles) computed over past 3 days, week, 1 year, 3 years...etc from any given survey date.

Lat	Lon	Time



# Why Git

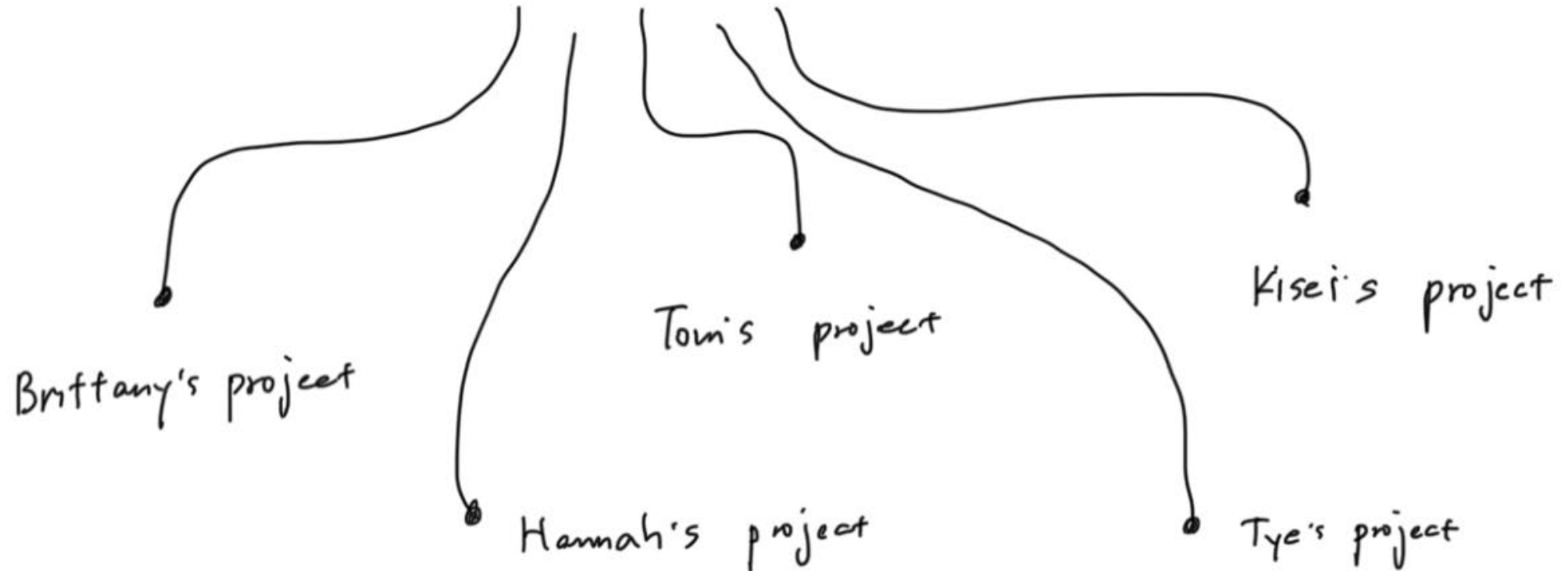
- Complete control on changes made to your system.
- Best suited for reproducible research case studies, projects, tutorials, and media
- An ideal team project management platform

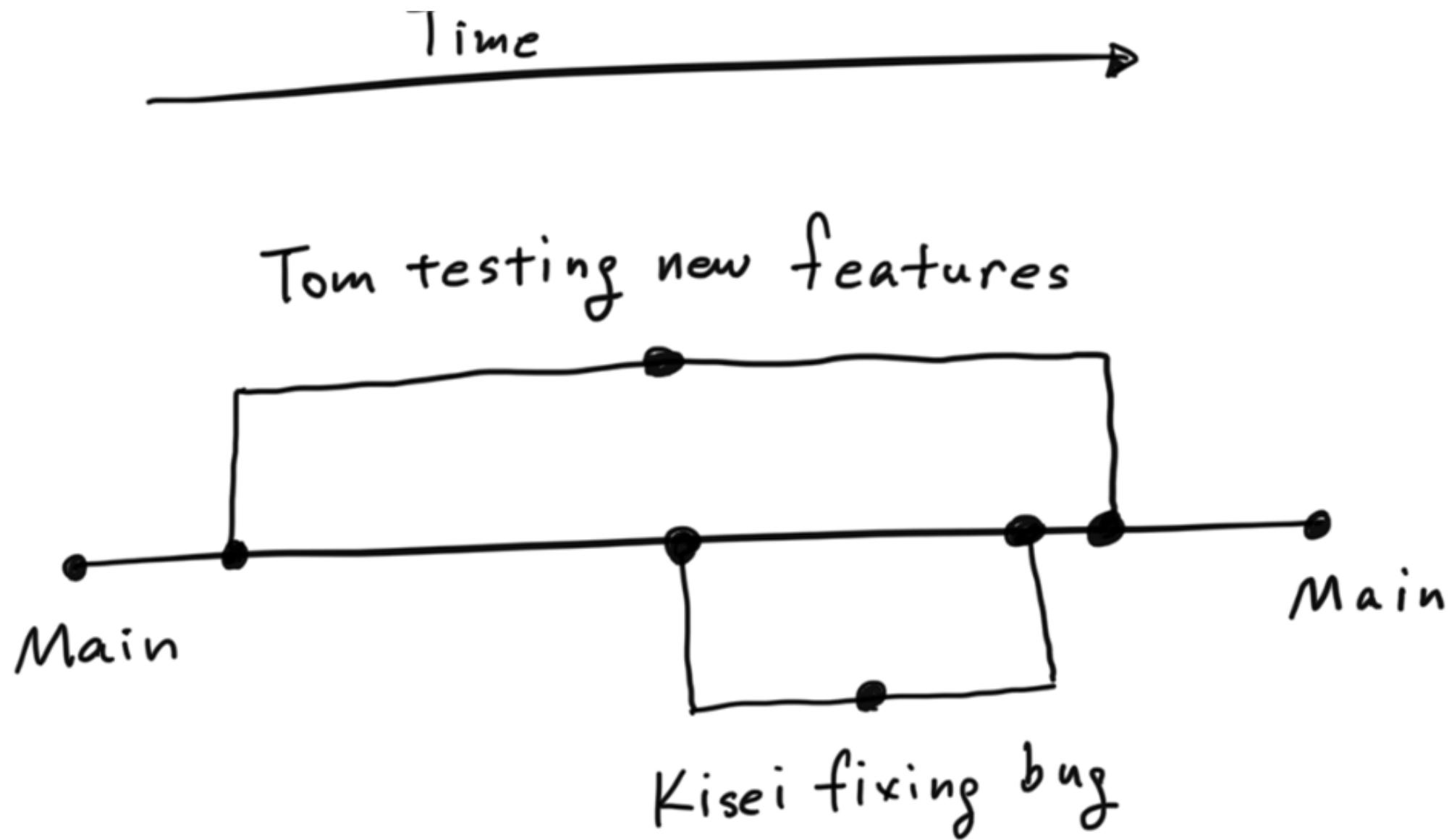


# Centralized Version Control System

routine update → Main Repo

- 2002 - 2020
- 57 islands
- Fish-Benthic REA
- SST, chl-a, DHW...





# ERDDAP

- an open-source data server to download scientific datasets in common file formats
- Easy access to remote sensing data, climate data, fishery data.... Etc
- OceanWatch (n=109) & Coastwatch (n=1739)
- Pacific Islands Ocean Observing System (PacIOOS)
- <http://erddap.com/>



# ERDDAP

Easier access to scientific data

## ERDDAP

ERDDAP is a data server that gives you a simple, consistent way to download subsets of scientific datasets in common file formats and make graphs and maps. This particular ERDDAP installation has oceanographic data (for example, data from satellites and buoys).

## Easier Access to Scientific Data

Our focus is on making it easier for you to get scientific data.

**Different scientific communities have developed different types of data servers.**

For example, OPeNDAP, WCS, SOS, OBIS, and countless custom web pages with forms. Each is great on its own. But without ERDDAP, it is difficult to get data from different types of servers:

- Different data servers make you format your data request in different ways.
- Different data servers return data in different formats, usually not the common file format that you want.
- Different datasets use different formats for time data, so the results are hard to compare.

**ERDDAP unifies the different types of data servers so you have a consistent way to get the data you want, in the format you want.**

## Start Using ERDDAP: Search for Interesting Datasets

- **Do a Full Text Search for Datasets**

- **View a List of All 109 Datasets**
- **Search for Datasets by Category**

Datasets can be categorized in different ways by the values of various metadata attributes. Click on an attribute ([cdm\\_data\\_type](#), [institution](#), [ioos\\_category](#), [keywords](#), [long\\_name](#), [standard\\_name](#), [variableName](#)) to see a list of categories (values) for that attribute. Then, you can click on a category to see a list of relevant datasets.

- **Search for Datasets with  
[Advanced Search](#) ?**





## ERDDAP &gt; search

## Do a Full Text Search for Datasets:

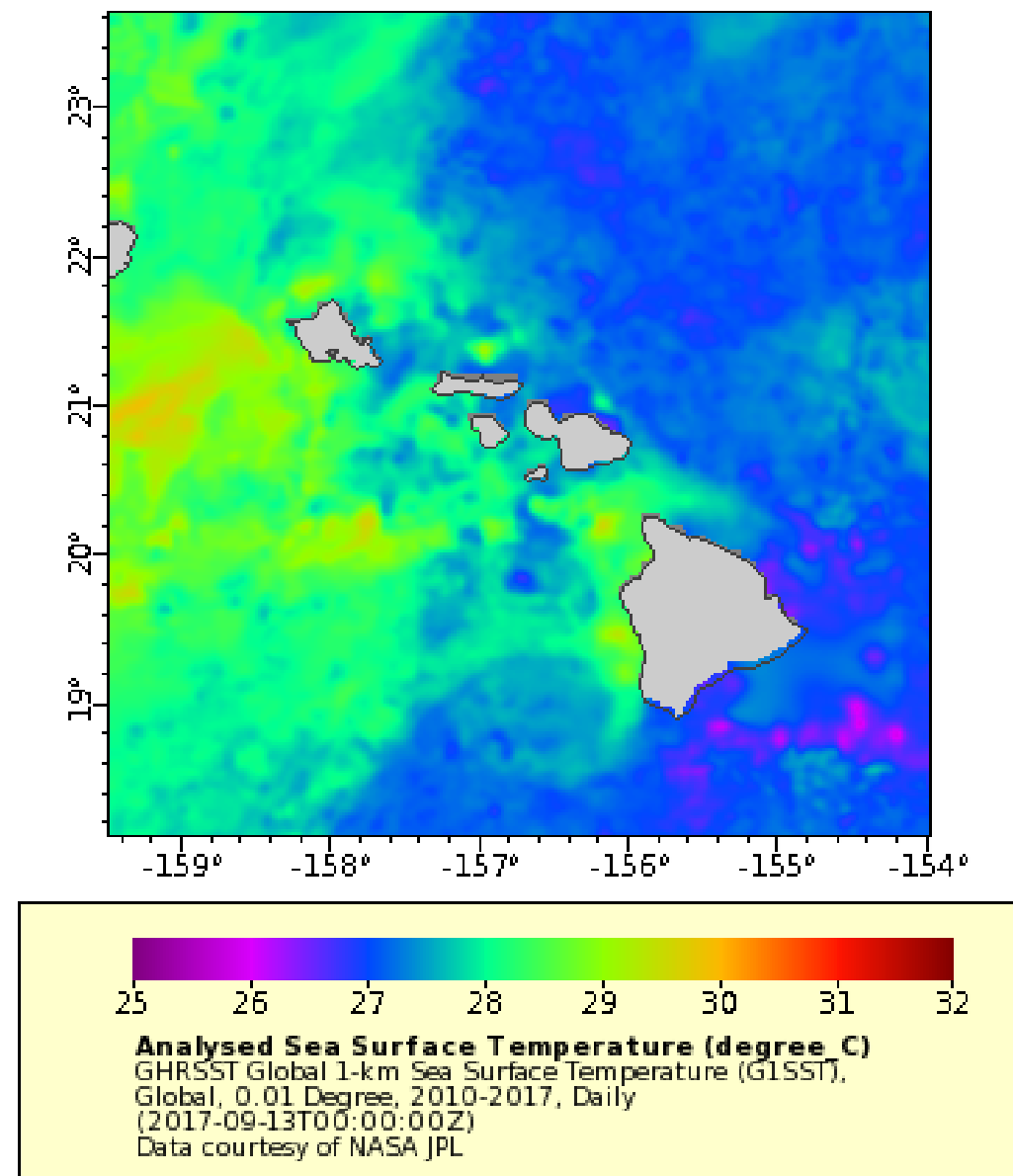
sst 

28 matching datasets, with the most relevant ones listed first.

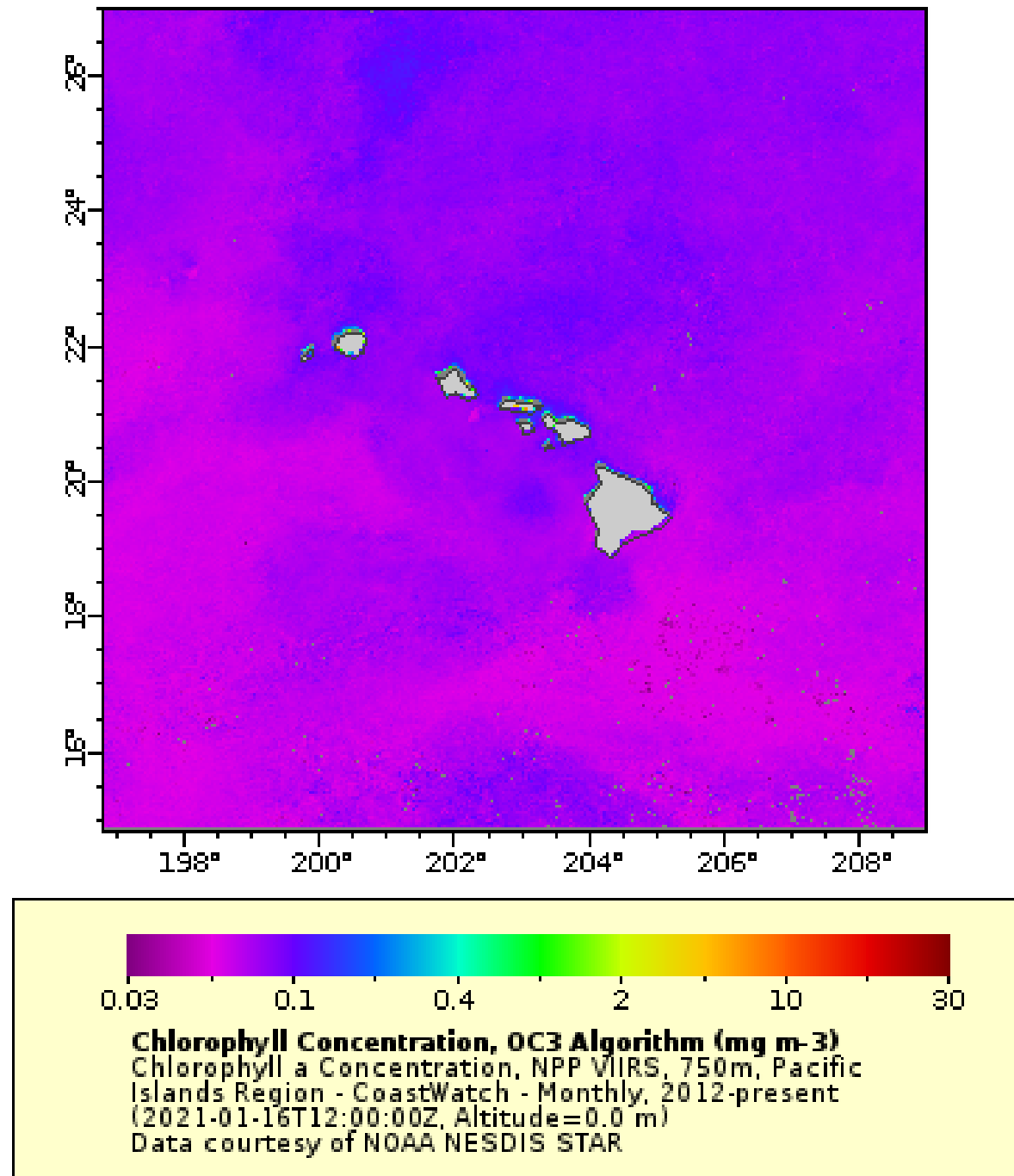
(Or, refine this search with [Advanced Search](#) )

Grid DAP Data	Sub-set	Table DAP Data	Make A Graph	W M S	Source Data Files	Title	Summary	FGDC, ISO, Metadata	Back-ground Info	RSS	E mail	Institution	Dataset ID
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - 8-day, 1985-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0_8day
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - Daily, 1985-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature Anomaly, Coral Reef Watch, CoralTemp - Daily, 1985-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_anom_v1_0
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - Cumulative Mean 1985-2008	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0_1985-2008-clim
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - Cumulative Mean 1985-2018	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0_1985-2018-clim
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<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - Cumulative Mean 2019	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0_2019-clim
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp - Monthly, 1985-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v1_0_monthly
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp, v3.1 - Cumulative Mean 2020	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v3_1_2020-clim
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Coral Reef Watch, CoralTemp, v3.1 - Monthly, 1985-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/STAR ... <a href="#">?</a>	CRW_sst_v3_1_monthly
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<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, NOAA geopolar blended - 8-day, 2002-Present (2017 Reanalysis)	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	Office of Satelli... <a href="#">?</a>	goes-poes-8day-ghrsst-RAN
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, NOAA geopolar blended - Cumulative mean 2003-2017 (2017 Reanalysis)	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	Office of Satelli... <a href="#">?</a>	goes-poes-ghrsst-RAN-2003-2017-clim
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, NOAA geopolar blended - Cumulative mean 2018 (2017 Reanalysis)	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	Office of Satelli... <a href="#">?</a>	goes-poes-ghrsst-RAN-2018-clim
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, NOAA geopolar blended - Daily, 2002-Present (2017 Reanalysis)	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	Office of Satelli... <a href="#">?</a>	goes-poes-1d-ghrsst-RAN
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, NOAA geopolar blended - Monthly, 2002-Present (2017 Reanalysis)	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	Office of Satelli... <a href="#">?</a>	goes-poes-monthly-ghrsst-RAN
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Pathfinder Ver 5.3, Night, Cumulative Mean, 2018	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NCEI	pf5-3-2018-mean
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Pathfinder Ver 5.3, Night, Cumulative Mean, 1982-2017	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NCEI	pf5-3-1982-2017-mean
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Pathfinder Ver 5.3, Night - 8-Day, 1981-2018	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NCEI	pf5-3-weekly
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		Sea Surface Temperature, Pathfinder Ver 5.3, Night - Monthly, 1981-2018	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NCEI	pf5-3-monthly
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		ZZZ - DEPRECATED - SST, Pathfinder Ver 5.2 (L3C), Night, Global, Science Quality (Monthly Composite), 1981-2012	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA National Cen... <a href="#">?</a>	noaa_pifsc_1690_ba7c_a22e
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		ZZZ - DEPRECATED - OceanWatch - Sea-Surface Temperature, GOES-POES - 2Day, 2012-present	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/Ocean... <a href="#">?</a>	OceanWatch_goes-poes_sst_2day
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		ZZZ - DEPRECATED - OceanWatch - Sea-Surface Temperature, AVHRR Pathfinder v5&v5.1 - Monthly, 1981-2009	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/Ocean... <a href="#">?</a>	OceanWatch_pf5_sst_monthly
<a href="#">data</a>			<a href="#">graph</a>	<a href="#">M</a>		ZZZ - DEPRECATED - OceanWatch - Sea-Surface Temperature, AVHRR Pathfinder v5&v5.1 - Weekly,	<a href="#">?</a>	<a href="#">F</a> <a href="#">I</a> <a href="#">M</a>	<a href="#">background</a>	<a href="#">RSS</a>	<a href="#">✉</a>	NOAA/NESDIS/Ocean... <a href="#">?</a>	OceanWatch_pf5_sst_weekly

GHRSSST Global 1-km Sea Surface Temperature (G1SST), Global,  
0.01 Degree, 2010-2017, Daily



Chlorophyll a Concentration, NPP VIIRS, 750m, Pacific Islands  
Region - CoastWatch - Monthly, 2012-present



# Clone & Run EDS program

- Demo repo
- [https://github.com/krtanaka/eds\\_workshop\\_2021](https://github.com/krtanaka/eds_workshop_2021)
- Main repo
- [https://github.com/krtanaka/env\\_data\\_summary](https://github.com/krtanaka/env_data_summary)



# EDS parameter file, what you need to enter

- Customizable list of environmental variables to download
  - data/EDS\_parameters.csv
- Variable name,
- temporal resolution, (day, 8 days, month, climatology)
- ERDDAP URL,
- dataset.ID,
- Start and end date
- Time steps
- Summaries
- Mask or non-mask

 main ▾

 1 branch

 0 tags





Go to file

Add file ▾

 Code ▾

Kisei Tanaka test

76f9759 1 hour ago  15 commits

	data	ok	8 days ago
	outputs	test	7 hours ago
	scripts	test	1 hour ago
	.gitignore	ok	8 days ago
	EDS_Workshop_2021.Rproj	ok	8 days ago

Help people interested in this repository understand your project by adding a README.

Add a README

main ▾

1 branch

0 tags

Go to file

Add file ▾

Code ▾

## Kisei Tanaka test

data	ok
outputs	test
scripts	test
.gitignore	ok
EDS_Workshop_2021.Rproj	ok

### Clone

HTTPS SSH GitHub CLI

[https://github.com/krtanaka/eds\\_workshop\\_2](https://github.com/krtanaka/eds_workshop_2)



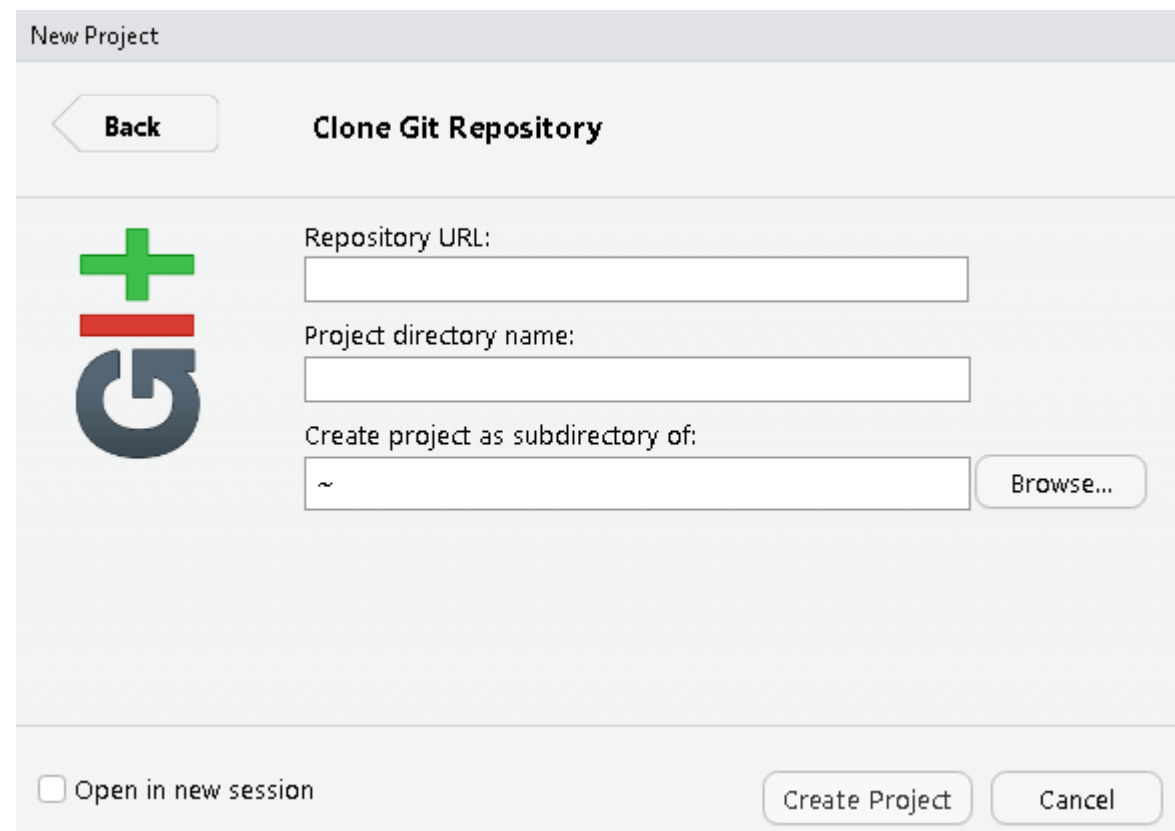
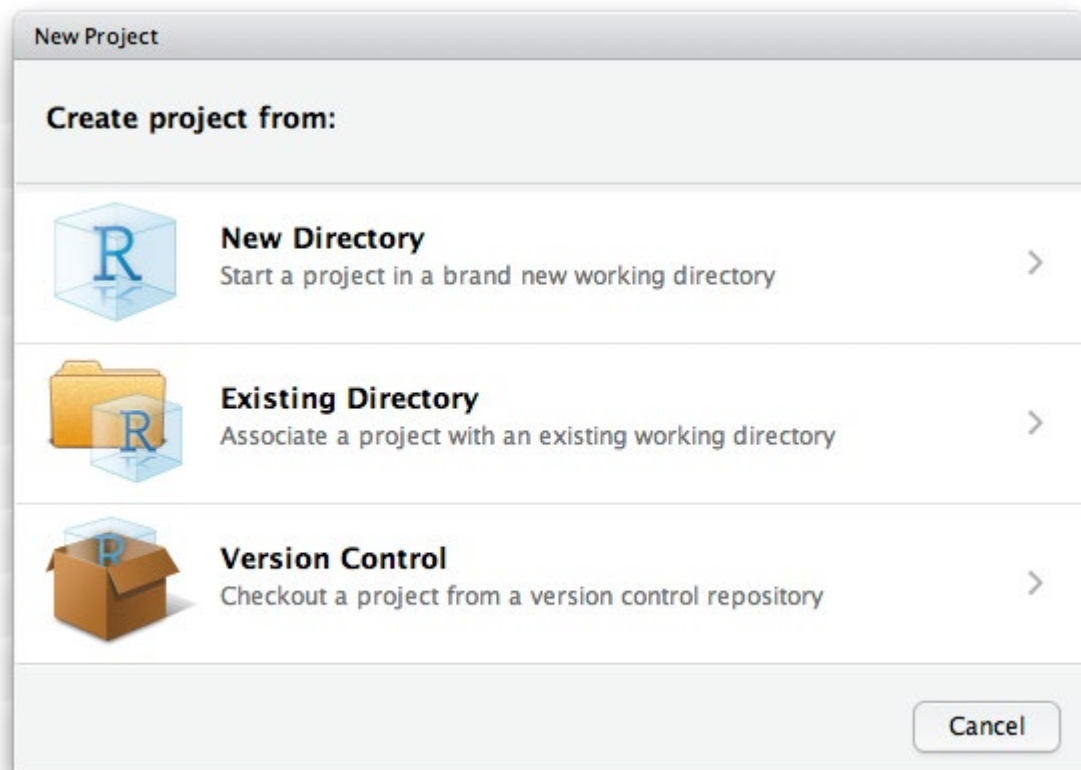
Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop


Download ZIP

Help people interested in this repository understand your project by adding a README.

Add a README









# Branch & customize EDS program

 [krtanaka](#) / [env\\_data\\_summary](#) Unw

[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

[main](#) **7 branches** [0 tags](#) [Go to file](#) [Add file](#) [Code](#)

**Kisei Tanaka** added 1-month summary output 5239676 2 days ago [193 commits](#)

 data	removed heavy files	12 days ago
 outputs	ok	12 days ago
 scripts	added 1-month summary output	2 days ago
 .gitignore	initial commit	4 months ago
 README.md	Update README.md	14 days ago
 env_data_summary.Rproj	Rename fish_benthic_env.Rproj to env_data_summary.Rproj	14 days ago

main

7 branches

0 tags

Switch branches/tags



Find or create a branch...

Branches

Tags

✓ main

default

K.R.Tanaka-EFH-Uku

K.R.Tanaka-EFH

K.R.Tanaka-PowerAnalysis

K.R.Tanaka-ROMS\_OCC

T.A.Oliver-Box\_Join

T.A.Oliver

[View all branches](#)

# NCRMP Environment