Package 'FastrCAT'

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Type Package

Title Analysis of Oceanographic Data from FastCATs

Version 0.0.0.9000

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Description Collection of tools for EcoFOCI fastcat .up files.

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BugReports https://github.github.com/Copepoda/FastrCAT/FastrCAT/issues

Depends R (>= 3.5.0)

Imports sf(>= 0.6.3),
gstat(>= 1.1.6),
rgeos(>= 0.4.1),
ggspatial(>= 1.0.2),
dplyr (>= 0.7.6),
ggplot2 (>= 3.0.0),
grDevices (>= 3.4.2),
lubridate (>= 1.7.4),
measurements (>= 1.2.0),
readr (>= 1.2.1),
stringr (>= 1.3.1),
tidyr (>= 0.8.1),
knitr (>= 1.20),
markdown (>= 0.8),
htmltools (>= 0.3.6),
spatial (>= 7.3.11),
raster(>= 2.8),
sp(>= 1.3),
magrittr(>= 1.5)

Suggests rmarkdown,testthat

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE, roclets = c(``rd", ``namespace", ``collate"))

RoxygenNote 6.1.1

VignetteBuilder knitr

R topics documented:

`boxplot_time_series` *Gulf of Alaska Time Series Boxplot*

Description

Creates either temperature or salinity plots of core EcoFOCI stations in the Gulf of Alaska. Each plot displays the average temperature or salinity for each meter of depth of the core stations for each year for the months when peak sampling of these regions occured. Line 8 and Semidi area are most commonly sampled in May and June, which is considered Spring. Summer sampling in the Gulf of Alaska has been less frequent and starts in the early 2000's. This summer sampling is in the Semidi core area, summer is considered August and September.Post 2010, these core stations were only sampled in odd numbered years. In the future more core areas will be added.

Usage

```
boxplot_time_series(hist_data, core_stations, plot_type, min_depth = 0,
  max_depth = 100, fastcat_data = FALSE)
```

Arguments

`hist_data`	Supply the path and .csv file name of the historical data in quotations. The historical data must be in the format created by the FastrCAT::make_dataframe_fc, which is the same format EcoDAAT exports. Historic data must be queried from EcoDAAT and saved as a .csv file. In the future there will be a direct link to the Oracle database where EcoDAAT data is housed.
`core_stations`	There are three core areas for the Gulf of Alaska which have been regularly sampled and are representative of the Gulf of Alaska. Core areas are all in bottom depth at or greater than 100 and less than 150 meters. Salintiy or temperature data from the surface to 100m will be shown. core_stations are as follows: "Line 8 FOX", "Line 8", "Semidi Spring" and "Semidi Summer". Line 8 FOX is a set of six stations with a bounding box of `57.52, -155.2, 57.72, -154.85`. Line 8 are the 4 core stations of Line 8 FOX. Semidi are 6- 8 stations centrally located in the Semidi area and have been consistently sampled, with a bounding box of '55.1, -158.5, 55.9, -158.0'.
`plot_type`	will accept on of two quoted characters "temperature" or "salinity".
`min_depth`	Minimum depth which is shown on the plot. The default is set as 0 meters.
`max_depth`	Maximum depth which is displayed on the plot. The default is set at 100 meters.

`fastcat_data` An optional argument if you want to add the current years fastcat data. Supply the path and .csv file name to the current years fastcat data. This must be in the format created by the FastrCAT function make_dataframe_fc.

Value

A boxplot of temperature or salinity for each year. The width of the boxplot are proportional to year sample size. The line inside the boxplot is the median and the ends of the boxplot corresponds to the 25th and 75th percentiles. The whiskers extend to the largest or smallest observation greater than or equal 1.5 * Interquartile range. Outliers are circles in orange. The historical median for all years is red and the standard deviation is a blue dashed line. be written to the folder designated by the historical data file path. The plot will be in .png format.

`FastrCAT` *FastrCAT: A package for the analysis of oceanographic data fromo FastCAT's.*

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`fill_missing_stations` *Fill in missing station, foci grid, and haul names.*

Description

Takes the .csv file created with make_dataframe_fc() and haul records queried from EcoDAAT and finds and replaces missing station names, foci grid names, and haul numbers in the dataframe. Make sure that haul records are available for cruise. This is part of the quality/control process prior to the data being ready for EcoDAAT.

Usage

```
fill_missing_stations(path_fc, path_haul_records)
```

Arguments

`path_fc` The path to the directory where the .csv file generated from make_dataframe_fc() is located.

`path_haul_records` The path to the directory where the .csv file of haul records queried from EcoDAAT is located.

Value

a dataframe in .csv format where missing station, foci grid, and hauls names have been corrected.

make_dataframe_fc *Create a Dataframe from .up files*

Description

This function writes a single data frame in .csv format to file containing oceanographic data collected by the FastCat during a cruise. The format and column naming conventions are specific to the needs of EcoDAAT. This is the primary function of the FastrCAT package and must be run prior to all other functions. All other functions depend on the data frame generated. Other outputs of the function are two text files. This first is a cruise summary.The summary contains basic information about the data and some summary statistics.The second is a warnings file, which tells users if data or information is missing incase reprocessing is necessary.

Usage

```
make_dataframe_fc(current_path, GE = FALSE, Cruise_report = TRUE,
  DF = TRUE)
```

Arguments

current_path	The path to directory where all .up files are located for a cruise.
GE	A logical value, Returns the dataframe to the global R environment. By defulaut it is set to FALSE. Set to TRUE if you would like the data available in the global environment.
Cruise_report	A logical value set to TRUE. When TRUE a cruise report will be generated. When set to false a cruise report will not be generated.
DF	Should the dataframe be written to file? The default is TRUE but setting to false allows the data to just be written to the global environment in conjunction with GE set to TRUE.

Value

.csv file of all .up file data. An .html file with a cruise summary and data QAQC output.

map_fc *Mapping of FastCAT data*

Description

Once make_dataframe_fc() has been run, then map_fc can be used. This function makes a station map from the dataframe generated. The rendered map will be located in the plot folder within the current folder.

Usage

```
map_fc(current_path, map_type = "Stations", depth_range = NA)
```

Arguments

current_path	The path to the directory where the .csv file generated by make_dataframe_fc is located.
map_type	Determines the type of map which will be returned. The default map is a station map. Map types are Stations: returns map of station locations, Sample intensity: returns a map of sampling intesity for each 0.3 decimal degrees which is around 30km for the regions that are sampled hexagon, Salinity and Temperature: return an interpolated map using inverse distance weighting method, set on a 0.25 decimal degree grid for the average of the depth_range specified. If depth_range remains as NA, then the entire water column will be averaged. Map types are as follows and should be quoted: "Stations", "Sample Intensity", "Salinity", and "Temperature".
depth_range	The desired depth range for either the "Salinity" or "Temperature". If the parameter is left as NA, then the entire water column will be averaged.Takes a two value vector, a minimum and maximum of desired depth range. For example a depth range of 5-10 meters would be entered as such c(5,10).

Value

A map of the desired type and depth range for a single cruise.

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plot_time_series *Gulf of Alaska Time Series Heat Plots*

Description

Creates either temperature or salinity plots of core EcoFOCI stations in the Gulf of Alaska. Each plot displays the average temperature or salinity for each meter of depth of the core stations for each year for the months when peak sampling of these regions occured. Line 8 and Semidi area are most commonly sampled in May and June, which is considered Spring. Summer sampling in the Gulf of Alaska has been less frequent and starts in the early 2000's. This summer sampling is in the Semidi core area, summer is considered August and September.Post 2010, these core stations were only sampled in odd numbered years. In the future more core areas will be added.

Usage

```
plot_time_series(hist_data, core_stations, plot_type, min_depth = 0,
  max_depth = 100, fastcat_data = FALSE, anomaly = FALSE)
```

Arguments

hist_data	Supply the path and .csv file name of the historical data in quotations. The historical data must be in the format created by the FastrCAT::make_dataframe_fc, which is the same format EcoDAAT exports. Historic data must be queried from EcoDAAT and saved as a .csv file. In the future there will be a direct link to the Oracle database where EcoDAAT data is housed.
core_stations	There are three core areas for the Gulf of Alaska which have been regularly sampled and are representative of the Gulf of Alaska. Core areas are all in bottom depth at or greater than 100 and less than 150 meters. Salintiy or temperature data from the surface to 100m will be shown. core_stations are as follows: "Line

	8 FOX", "Line 8", "Semidi Spring" and "Semidi Summer". Line 8 FOX is a set of six stations with a bounding box of `57.52, -155.2, 57.72, -154.85`. Line 8 are the 4 core stations of Line 8 FOX. Semidi are 6- 8 stations centrally located in the Semidi area and have been consistently sampled, with a bounding box of '55.1, -158.5, 55.9, -158.0'.
`plot_type`	will accept on of two quoted characters "temperature" or "salinity".
`min_depth`	Minimum depth which is shown on the plot. The default is set as 0 meters.
`max_depth`	Maximum depth which is displayed on the plot. The default is set at 100 meters.
`fastcat_data`	An optional argument if you want to add the current years fastcat data. Supply the path and .csv file name to the current years fastcat data. This must be in the format created by the FastrCAT function make_dataframe_fc.
`anomaly`	An optional argument if you want the anomaly of the plot_type selected. This argument is set to FALSE, when set to TRUE then the anomaly will be plotted. The anomoly is calculated using the ...something equation.

Value

A depth by year tile plot of temperature or salinity. The plot will be written to the folder designated by the historical data file path. The plot will be in .png format. It should be noted that the plot throws out the 0 depth value. 0 depth can and has been problematic for fastcat data.

`plot_ts_fc` *Temperature/Salinity by Depth Plots*

Description

Once make_dataframe_fc has been run, then plot_ts_fc can be used. This function creates a depth by salinity and temperature plot for each station. These are all .png files which will be located in the plot folder within the current folder. If a plot folder hasn't been created, it will create on. It only needs to be run once to generate a plot for each station. Each dot is a data point. Check the profile for each station/haul.

Usage

```
plot_ts_fc(current_path)
```

Arguments

`current_path`	The path to directory where dataframe created from make_dataframe_fc() is located.

Value

A plot of temperature and salinity by depth for each station of a cruise. Plots are written in the plot folder and are in the .png format.

`to_ecodaat` *Prepare FastrCAT data for EcoDAAT*

Description

Prepares data for entry into EcoDAAT. Prior to using this function make sure that all issues brought up in the Cruise Report were handled and that missing station information (haul information) has been fixed using the fill_missing_stations() function. This prepares all FastrCAT data files present in a folder and will bind them together as one .csv file for import into EcoDAAT.

Usage

```
to_ecodaat(fc_data_path)
```

Arguments

`fc_data_path`	Path to the folder where all FastrCAT data files are located.

Value

a single .csv files and a ReadMe file of information about the .csv file.

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