Package 'RFc'

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Type Package

Title Client for FetchClimate Web Service

Version 0.1-2

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Description Returns environmental data such as air temperature,
precipitation rate and wind speed from the FetchClimate Web service (<http://fetchclimate.org/>)
based on user specified arguments such as geographical regions or coordinates and time bounds.

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URL https://github.com/dgrechka/RFc

BugReports https://github.com/dgrechka/RFc/issues

Suggests testthat

Depends jsonlite, httr, sp

RoxygenNote 5.0.1

NeedsCompilation no

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R topics documented:

`Availabe data` *Availabe data*

Description

The default instance of FetchClimate at <http://fetchclimate2.cloudapp.net/> provides the following data

Details

Environmental variables:
"abshum" : Absolute air humidity (g/m^3)
"airt" : Air temperature near surface (Degrees C)
"airt_land": Air temperature near surface. Land only areas (Degrees C)
"airt_ocean" : Air temperature near surface. Ocean only areas (Degrees C)
"depth_ocean" : Depth below sea level. Ocean only areas (meters)
"dtr" : Diurnal air temperature rate (Degrees C)
"elev" : Elevation above sea level (meters)
"elev_land" : Elevation above sea level. Land only a areas (meters)
"frs" : Frost days frequency (days/month)
"pet": Potential evapotranspiration (mm/month)
"prate" : Precipitation rate ()
"relhum" : Relative humidity (percentage)
"relhum_land" : Relative humidity. Land only area (percentage)
"soilmoist" : Soil moisture (mm/m)
"sunp" : Sunshine fraction (Percent of maximum possible sunshine)
"wet" : Wet days frequency (days/month)
"windspeed" : Wind speed at 10m (m/s)
"wvp" : Water vapour pressure (hPa)
"wvsp" : Water vapour saturation pressure (hPa)

DataSets [supported variables]:
"CESM1-BGC airt" [airt]
"CESM1-BGC prate" [prate]
"CpcSoilMoisture" [soilmoist]
"CRU CL 2.0" [airt, airt_land, dtr, frs, prate, relhum, relhum_land, sunp, wet, windspeed]
"ETOPO1" [elev]
"FC1 Variables" [airt_land, airt_ocean, depth_ocean, relhum_land]
"GTOPO30" [elev, elev_land]
"Malmstrom PET" [pet]
"NCEP/NCAR Reanalysis 1 (Gauss T62)" [prate]
"NCEP/NCAR Reanalysis 1 (regular grid)" [airt]

"WagnerWVSP" [abshum, wvp, wvsp]
"WorldClim 1.4" [airt, airt_land, prate]

Note that availavle variables as well as datasets are subject to change in time The list above describes the most recent configuration However specifing timestamp parameter other than "Now" may lead to different set of available data Verify the actual list using ‘fcVariables()‘ and ‘fcDataSets()‘ functions

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`fcDataSets` *Fetches information about available datasets*

Description

Fetches information about available datasets

Usage

```
fcDataSets(url = "http://fetchclimate2.cloudapp.net/", timestamp = "NOW")
```

Arguments

`url`	The URL of the service to get the information about
`timestamp`	A character scalar. A string containing the time for which the result must correspond. The format is "YYYY-MM-DD". The special value "NOW" fetch the data using the latest FetchClimate configuration available.

Value

Type: list
Contains a descriptions of the datasets available to fetch the data from

Examples

```
#Getting currently available datasets

fcDataSets()

#Getting datasets available on 1 June 2016

fcDataSets(timestamp='2016-06-01')

#Listing varaibles that are avaialable from "CRU CL 2.0" dataset

fcDataSets(timestamp='2016-06-01')$`CRU CL 2.0`$Variables
```

fcGrid *Fetches gridded data*

Description

Fetches gridded data

Usage

```
fcGrid(variable, latitudeFrom, latitudeTo, latitudeBy, longitudeFrom,
  longitudeTo, longitudeBy, firstYear = 1961, lastYear = 1990,
  firstDay = 1, lastDay = 365, startHour = 0, stopHour = 24,
  url = "http://fetchclimate2.cloudapp.net/", dataSets = "ANY",
  reproduceFor = "NOW", verbose = F)
```

Arguments

variable	An identifier of the variable to fetch. To get the list of available variables use ‘fcVariables()‘ function or see "Available data" section of documentaion
latitudeFrom	A numeric scalar. The lower latitude bound of the spatial grid
latitudeTo	A numeric scalar. The upper latitude bound of the spatial grid
latitudeBy	A numeric scalar. The step of the grid along latitudes
longitudeFrom	A numeric scalar. The lower longitude bound of the spatial grid
longitudeTo	A numeric scalar. The upper longitude bound of the spatial grid
longitudeBy	A numeric scalar. The step of the grid along longitudes.
firstYear	A numeric scalar. Temporal coverage definition: The lower bound of years over which the averaging is performed
lastYear	A numeric scalar. Temporal coverage definition: The upper bound of years over which the averaging is performed
firstDay	A numeric scalar. Temporal coverage definition: The lower bound of the days interval within each year over which the averaging is performed
lastDay	A numeric scalar. Temporal coverage definition: The upper bound of the days interval within each year over which the averaging is performed
startHour	A numeric scalar. Temporal coverage definition: The lower bound of the hours interval within each day over which the averaging is performed
stopHour	A numeric scalar. Temporal coverage definition: The upper bound of the hours interval within each day over which the averaging is performed
url	The URL of the service to query the data from
dataSets	A character vector. An identifier of the data set to fetch the data from. The special value "ANY" enables data stitching from all available data sets.
reproduceFor	A character scalar. A string containing the time for which the result must correspond. The format is "YYYY-MM-DD". The special value "NOW" fetch the data using the latest FetchClimate configuration available.
verbose	A logical scalar. If set to TRUE the method outputs its actions verbosely

Value

Type: SpatialPixelsDataFrame (from sp package) Contains a grid definition the following fields: values, sd, provenance

Examples

```
#Fetching average potential evapotransiration for the upper part of Africa continent
#for Januries 2000-2010
#With 1 degree grid resolution

fcGrid(variable="pet",
     latitudeFrom=0, latitudeTo=35,latitudeBy=1,
     longitudeFrom= -25, longitudeTo=50, longitudeBy=1,
     firstDay=1,lastDay=31,
     firstYear=2000,lastYear=2010)
```

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fcVariables *Fetches information about available variables*

Description

Fetches information about available variables

Usage

```
fcVariables(url = "http://fetchclimate2.cloudapp.net/", timestamp = "NOW")
```

Arguments

url	The URL of the service to get the information about
timestamp	A character scalar. A string containing the time for which the result must correspond. The format is "YYYY-MM-DD". The special value "NOW" fetch the data using the latest FetchClimate configuration available.

Value

Type: list
Contains a descriptions of the variables available for fetching

Examples

```
#Getting currently available variables

fcVariables()

#Getting variables available on 1 June 2016

fcVariables(timestamp='2016-06-01')
```

```
#Obtaining units of "prate" variable

fcVariables(timestamp='2016-06-01')$`prate`$Units
```

`Release notes` *Release notes*

Description

release 0.1-2
Support for obtaining available datasets and varaibles with
fcDataSets()
fcVaraibles()

release 0.1-1
Support for fetching simple time series and grids

`RFc` *RFc: R client for FetchClimate service*

Description

Extracts raw, averaged environmental data (such as air temperature, precipitation rate, wind speed, etc.) published at the FetchClimate Web service (<http://fetchclimate.org/>) for the specified geolocations and time bounds from different data sets.

Time series fetching functions

fcTimeSeriesYearly, fcTimeSeriesDaily, fcTimeSeriesHourly

Gridded data fetching functions

fcGrid

Listing available data functions

fcDataSets fcVariables

`TimeSeries` *Fetches time series data for a set of locations*

Description

For a given set of geo-locations (lat - lon pairs) and given time interval the time series is formed by splitting the time interval either by years or by days or by hours

Usage

```
fcTimeSeriesYearly(variable, latitude, longitude, firstYear, lastYear,
  firstDay = 1, lastDay = 365, startHour = 0, stopHour = 23,
  url = "http://fetchclimate2.cloudapp.net/", dataSets = "ANY",
  reproduceFor = "NOW", verbose = F)

fcTimeSeriesDaily(variable, latitude, longitude, firstDay = 1,
  lastDay = 365, firstYear = 1961, lastYear = 1990, startHour = 0,
  stopHour = 23, url = "http://fetchclimate2.cloudapp.net/",
  dataSets = "ANY", reproduceFor = "NOW", verbose = F)

fcTimeSeriesHourly(variable, latitude, longitude, startHour, stopHour,
  firstYear = 1961, lastYear = 1990, firstDay = 1, lastDay = 365,
  url = "http://fetchclimate2.cloudapp.net/", dataSets = "ANY",
  reproduceFor = "NOW", verbose = F)
```

Arguments

`variable`	An identifier of the variable to fetch. To get the list of available variables use ‘fcVariables()‘ function or see "Available data" section of documentaion
`latitude`	A numeric vector. Latitudes of the point set to fetch values for
`longitude`	A numeric vector. Longitudes of the point set to fetch values for
`firstYear`	A numeric scalar. Temporal coverage definition: The lower bound of years over which the averaging is performed
`lastYear`	A numeric scalar. Temporal coverage definition: The upper bound of years over which the averaging is performed
`firstDay`	A numeric scalar. Temporal coverage definition: The lower bound of the days interval within each year over which the averaging is performed
`lastDay`	A numeric scalar. Temporal coverage definition: The upper bound of the days interval within each year over which the averaging is performed
`startHour`	A numeric scalar. Temporal coverage definition: The lower bound of the hours interval within each day over which the averaging is performed
`stopHour`	A numeric scalar. Temporal coverage definition: The upper bound of the hours interval within each day over which the averaging is performed

url	The URL of the service to query the data from
dataSets	A character vector. An identifier of the data set to fetch the data from. The special value "ANY" enables data stitching from all available data sets.
reproduceFor	A character scalar. A string containing the time for which the result must correspond. The format is "YYYY-MM-DD". The special value "NOW" fetch the data using the latest FetchClimate configuration available.
verbose	A logical scalar. If set to TRUE the method outputs its actions verbosely

Value

A list. Contains the following entries: values, sd, provenance. Each of entries have the following dimensions (using values as an example): length(values) = point set count * time series length; nrow(values) = point set count; ncol(values) = time series length;

Functions

- `fcTimeSeriesYearly`: Yearly timeseries fetching
- `fcTimeSeriesDaily`: Daily timeseries fetching
- `fcTimeSeriesHourly`: Hourly timeseries fetching

Examples

```
#Fetching a whole year average time series
#(varing year one by one starting from 1950 till 2000 inclusevly)
#for a single geo point
fcTimeSeriesYearly(variable="airt",latitude=75.5, longitude=57.7,firstYear=1950,lastYear=2000)

#Fetching diurnal temperature variation (hourly time series) in Moscow for a July 2008
fcTimeSeriesHourly(variable="airt",latitude=55.5, longitude=37.3,
     firstDay=183,lastDay=213,
     firstYear=2008,lastYear=2008,
     startHour=0,stopHour=23)
```

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