Package 'easyclimate'

July 11, 2023

Title Easy Access to High-Resolution Daily Climate Data for Europe

Version 0.2.1

Description Get high-resolution (1 km) daily climate data (precipitation, minimum and maximum temperatures) for points and polygons within Europe.

License GPL (>= 3)

URL https://github.com/VeruGHub/easyclimate

BugReports https://github.com/VeruGHub/easyclimate/issues

Depends R (>= 3.5.0)

Imports R.utils, RCurl, stats, terra (>= 1.2-13)

Suggests sf, testthat (>= 3.0.0)

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NeedsCompilation no

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R topics documented:

`check_server` *Check climate data server*

Description

Check that the online climate data server is available and working correctly.

Usage

```
check_server(climatic_var = NULL, year = NULL, verbose = TRUE)
```

Arguments

`climatic_var`	Optional. One of "Prcp", "Tmin", or "Tmax".
`year`	Optional. Year between 1950 and 2022.
`verbose`	Logical. Print diagnostic messages, or just return TRUE/FALSE?

Details

This function checks access to the latest version of the climatic dataset (version 4).

Value

TRUE if the server seems available, FALSE otherwise.

Examples

```
check_server()
```

`get_daily_climate` *Get daily data for multiple climatic variables*

Description

Extract daily climate data (temperature and precipitation) for a given set of points or polygons within Europe.

Usage

```
get_daily_climate(
  coords = NULL,
  climatic_var = "Prcp",
  period = NULL,
  output = "df",
  version = 4,
  check_connection = TRUE
)
```

Arguments

`coords`	A matrix, data.frame, tibble::tbl_df, `sf::sf()`, or `terra::SpatVector()` object containing point or polygon coordinates in decimal degrees (lonlat/geographic format). Longitude must fall between -40.5 and 75.5 degrees, and latitude between 25.5 and 75.5 degrees. If `coords` is a matrix, it must have only two columns: the first with longitude and the second with latitude data. If `coords` is a data.frame or a tbl_df, it must contain at least two columns called `lon` and `lat` with longitude and latitude coordinates, respectively.
`climatic_var`	Character. Climatic variables to be downloaded ('Tmax', 'Tmin' or 'Prcp'). Various elements can be concatenated in the vector.
`period`	Either numbers (representing years between 1950 and 2022), or dates in "YYYY-MM-DD" format (to obtain data for specific days). To specify a sequence of years or dates use the format 'start:end' (e.g. YYYY:YYYY or "YYYY-MM-DD:YYYY-MM-DD", see examples). Various elements can be concatenated in the vector (e.g. c(2000:2005, 2010:2015, 2020), c("2000-01-01:2000-01-15", "2000-02-01"))
`output`	Character. Either "df", which returns a dataframe with daily climatic values for each point/polygon, or "raster", which returns `terra::SpatRaster()` objects (within a list when more than one climatic variable is downloaded).
`version`	Numeric. Version of the climate data. It uses the latest version (4) by default. The former version (3) is also available, for the sake of reproducibility. See 'references' for details on the climatic data sets.
`check_connection`	Logical. Check the connection to the server before attempting data download?

Value

Either:

- A data.frame (if output = "df")
- A `terra::SpatRaster()` object (if output = "raster")
- A list of `terra::SpatRaster()` objects (if output = "raster" and there is more than one `climatic_var`).

Author(s)

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References

Pucher C. 2023. Description and Evaluation of Downscaled Daily Climate Data Version 4. https://doi.org/10.6084/m9.figshar

Werner Rammer, Christoph Pucher, Mathias Neumann. 2018. Description, Evaluation and Validation of Downscaled Daily Climate Data Version 2. ftp://palantir.boku.ac.at/Public/ClimateData/

Adam Moreno, Hubert Hasenauer. 2016. Spatial downscaling of European climate data. International Journal of Climatology 36: 1444–1458.

Examples

```
# Coords as matrix
coords <- matrix(c(-5.36, 37.40), ncol = 2)
ex <- get_daily_climate(coords, period = "2001-01-01")  # single day
ex <- get_daily_climate(coords, period = c("2001-01-01", "2001-01-03"))  # 1st AND 3rd Jan 2001
ex <- get_daily_climate(coords, period = "2001-01-01:2001-01-03")  # 1st TO 3rd Jan 2001
ex <- get_daily_climate(coords, period = 2008)  # entire year
ex <- get_daily_climate(coords, period = c(2008, 2010))  # 2008 AND 2010
ex <- get_daily_climate(coords, period = 2008:2010)  # 2008 TO 2010

ex <- get_daily_climate(coords, period = "2001-01-01", climatic_var = "Tmin")

# Coords as data.frame or tbl_df
coords <- as.data.frame(coords) #coords <- tibble::as_tibble(coords)
names(coords) <- c("lon", "lat")  # must have these columns
ex <- get_daily_climate(coords, period = "2001-01-01")  # single day

# Coords as sf
coords <- sf::st_as_sf(coords, coords = c("lon", "lat"))
ex <- get_daily_climate(coords, period = "2001-01-01")  # single day

# Several points
coords <- matrix(c(-5.36, 37.40, -4.05, 38.10), ncol = 2, byrow = TRUE)
ex <- get_daily_climate(coords, period = "2001-01-01", output = "raster")  # raster output

# Multiple climatic variables
coords <- matrix(c(-5.36, 37.40), ncol = 2)
```

```
ex <- get_daily_climate(coords, climatic_var = c("Tmin", "Tmax"), period = "2001-01-01")

## Polygons
coords <- terra::vect("POLYGON ((-5 38, -5 37.5, -4.5 37.5, -4.5 38, -5 38))")

# Return raster
ex <- get_daily_climate(coords, period = "2001-01-01", output = "raster")

# Return dataframe for polygon
ex <- get_daily_climate(coords, period = "2001-01-01")
```

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