

Package: evapoRe (via r-universe)

August 26, 2024

Title Evapotranspiration R Recipes

Version 1.0.0

Description An R-based application for exploratory data analysis of global EvapoTranspiration (ET) datasets. 'evapoRe' enables users to download, validate, visualize, and analyze multi-source ET data across various spatio-temporal scales. Also, the package offers calculation methods for estimating potential ET (PET), including temperature-based approaches described in : Oudin et al., (2005) [doi:10.1016/j.jhydrol.2004.08.026](https://doi.org/10.1016/j.jhydrol.2004.08.026). 'evapoRe' supports hydrological modeling, climate studies, agricultural research, and other data-driven fields by facilitating access to ET data and offering powerful analysis capabilities. Users can seamlessly integrate the package into their research applications and explore diverse ET data at different resolutions.

Depends R (>= 4.0.0), pRecipe

Imports methods, parallel, utils, data.table, doParallel, foreach, lubridate, raster

License GPL-3

Encoding UTF-8

LazyData true

URL <https://github.com/AkbarR1184/evapoRe>

SystemRequirements PROJ (>= 6, <https://proj.org/download.html>), GDAL (>= 3, <https://gdal.org/download.html>), NetCDF (>= 4, <https://www.unidata.ucar.edu/software/netcdf/>).

RoxygenNote 7.2.3

Suggests rmarkdown, ggpubr, knitr, spelling, kableExtra, tibble, testthat (>= 3.0.0)

Language en-US

VignetteBuilder knitr

Config/testthat/edition 3

Repository https://akbarr1184.r-universe.dev

RemoteUrl https://github.com/akbarr1184/evapore

RemoteRef HEAD

RemoteSha 21faf0e1584f9230899345e7bf4e5c9fbcabc0bb

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download_data	<i>Download various evapotranspiration data products</i>
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Description

The function `download_data` downloads the selected data product.

Usage

```
download_data(
  data_name = "all",
  path = "",
  domain = "raw",
  time_res = "monthly"
)
```

Arguments

`data_name` a character string with the name(s) of the desired data set. Suitable options are:

- "all" for all of the below listed data sets (default),
- "bess" for BESS,
- "camele" for CAMELE,
- "era5" for ERA5,
- "era5-land" for ERA5-Land,
- "fldas" for FLDAS,

	<ul style="list-style-type: none"> • "gldas-clsm" for GLDAS CLSM, • "gldas-noah" for GLDAS NOAH, • "gldas-vic" for GLDAS VIC, • "gleam" for GLEAM V3, • "jra-55" for JRA-55, • "merra-2" for MERRA-2, • "terraclimate" for TerraClimate, • "zheng" for Zheng,
path	a character string with the path where the database will be downloaded.
domain	a character string with the desired domain data set. Suitable options are: <ul style="list-style-type: none"> • "raw" for default available spatial coverage, • "global" for data sets with global (land and ocean) coverage, • "land" for data sets with land only coverage, • "ocean", for data sets with ocean only coverage.
time_res	a character string with the desired time resolution. Suitable options are: <ul style="list-style-type: none"> • "monthly", • "yearly".

Value

No return value, called to download the required data sets.

Examples

```
download_data("gldas-vic", tempdir())
```

download_t_data	<i>Temperature Data Downloader</i>
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Description

Downloading Temperature data from different datasets

Usage

```
download_t_data(
  data_name,
  path = "",
  domain = "raw",
  time_res = "monthly",
  variable = "all"
)
```

Arguments

data_name	a character string indicating the dataset to download. Suitable options are: <ul style="list-style-type: none"> • "terraclimate" for TerraClimate dataset, • "cru" for CRU dataset, • "mswx" for MSWX dataset.
path	a character string with the path where the data will be downloaded.
domain	a character string with the desired domain data set. Suitable options are: <ul style="list-style-type: none"> • "raw" for default available spatial coverage, • "global" for data sets with global (land and ocean) coverage, • "land" for data sets with land only coverage, • "ocean" for data sets with ocean only coverage.
time_res	a character string with the desired time resolution. Suitable options are: <ul style="list-style-type: none"> • "monthly", • "yearly".
variable	a character string indicating the variable to download. Suitable options are: For TerraClimate dataset: <ul style="list-style-type: none"> • "t2m" for average temperature, • "tmin" for minimum temperature, • "tmax" for maximum temperature. <p>Use "all" to download all available variables for the dataset.</p>

Value

No return value, called to download the required data sets.

Examples

```
download_t_data("cru", tempdir())
```

gldas_clsm_esp_ts	<i>Monthly Evapotranspiration data</i>
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Description

A subset of GLDAS CLSM monthly Evapotranspiration data in mm over Spain. More detail about raw data can be found [here](#).

Usage

```
gldas_clsm_esp_ts
```

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

National Aeronautics and Space Administration (NASA)

gldas_clsm_global_ts *Monthly Evapotranspiration data*

Description

Global GLDAS monthly Evapotranspiration data in mm. More details of the raw data can be found [here](#).

Usage

gldas_clsm_global_ts

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

National Aeronautics and Space Administration (NASA)

gldas_clsm_subset_ts *Monthly Evapotranspiration data*

Description

A subset of GLDAS monthly Evapotranspiration data in mm over -10-40E, 30-45N. More details of the raw data can be found [here](#).

Usage

gldas_clsm_subset_ts

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

National Aeronautics and Space Administration (NASA)

muldpm	<i>Multiply by days per month</i>
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Description

The function muldpm multiplies the value by days per month.

Usage

```
muldpm(x)
```

Arguments

x a RasterBrick object with monthly data in [units/day]

Value

a RasterBrick object

Examples

```
tavg_brick <- raster::brick('terraclimate_tavg.nc')
pet_od <- pet(method = "od", tavg = tavg_brick)
pet_od <- muldpm(pet_od)
```

pet *Potential Evapotranspiration*

Description

The function `pet` estimates PET by different methods

Usage

```
pet(x, method = "od")
```

Arguments

`x` a RasterBrick object with average temperature data.

`method` a character string indicating the method to be used. Available options are:

- "bc" for Blaney and Criddle (1950),
- "ha" for Hamon (1961),
- "jh" for Jensen and Haise (1963),
- "mb" for McGuinness and Bordne (1972),
- "od" for Oudin (2005). Default,
- "th" for Thornthwaite (1948).

Value

a RasterBrick object with potential evapotranspiration in [mm/day].

Examples

```
#Calculate PET by Oudin
tavg <- raster::brick("terraclimate_tavg_land_19580101_20221231_025_monthly.nc")
pet_oudin <- pet(tavg, method = "od")
pet_oudin <- muldpm(pet_oudin)
```

pet_oudin_esp_ts *Monthly Potential Evapotranspiration data*

Description

A subset of calculated monthly Potential Evapotranspiration data in mm over Spain. More details of the used method can be found '<https://www.sciencedirect.com/science/article/pii/S0022169404004056>'.

Usage

```
pet_oudin_esp_ts
```

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

Data was calculated using the Oudin method based on raw temperature data. More details of the raw data can be found '<https://journals.ametsoc.org/view/journals/bams/103/3/BAMS-D-21-0145.1.xml>'.

pet_oudin_global_ts *Monthly Potential Evapotranspiration data*

Description

Monthly Potential Evapotranspiration data in mm calculated by Oudin method. More details of the used method can be found '<https://www.sciencedirect.com/science/article/pii/S0022169404004056>'.

Usage

pet_oudin_global_ts

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

Data was calculated using the Oudin method based on raw temperature data. More details of the raw data can be found '<https://journals.ametsoc.org/view/journals/bams/103/3/BAMS-D-21-0145.1.xml>'.

pet_oudin_subset_ts *Monthly Potential Evapotranspiration data*

Description

A subset of Monthly Potential Evapotranspiration data in mm calculated by Oudin method over -10-40E, 30-45N. More details of the used method can be found '<https://www.sciencedirect.com/science/article/pii/S>

Usage

pet_oudin_subset_ts

Format

A data.table with 120 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

Data was calculated using the Oudin method based on raw temperature data. More details of the raw data can be found '<https://journals.ametsoc.org/view/journals/bams/103/3/BAMS-D-21-0145.1.xml>'.

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