

Package ‘pRecipe’

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Title Precipitation R Recipes

Version 0.4.2

Description An open-access tool/framework to download, validate, visualize, and analyze multi-source precipitation data across various spatio-temporal scales. Ultimately providing the hydrology science community with the tools for consistent and reproducible analysis regarding precipitation.

Depends R (>= 4.0.0)

Imports grDevices, methods, parallel, stats, utils, data.table, ggplot2, ggpubr, ncdf4, raster, R.utils, sf

License GPL-3

Encoding UTF-8

LazyData true

URL <https://github.com/MiRoVaGo/pRecipe>

BugReports <https://github.com/MiRoVaGo/pRecipe/issues>

SystemRequirements PROJ (>= 6, <https://proj.org/download.html>), GDAL (>= 3, <https://gdal.org/download.html>), NetCDF (>= 4, <https://www.unidata.ucar.edu/software/netcdf/>), and CDO (>= 2, <https://code.mpimet.mpg.de/projects/cdo>).

RoxygenNote 7.2.1

Suggests rmarkdown, knitr, spelling, testthat (>= 3.0.0)

Config/testthat/edition 3

Language en-US

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NeedsCompilation no

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pRecipe-package *pRecipe: Precipitation R Recipes*

Description

An open-access tool/framework to download, validate, visualize, and analyze multi-source precipitation data across various spatio-temporal scales. Ultimately providing the hydrology science community with the tools for consistent and reproducible analysis regarding precipitation.

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crop_data	<i>Crop precipitation data sets</i>
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Description

The function `crop_data` crops the data sets using a shapefile mask and stores it in the same location of the input file.

Usage

```
crop_data(data_file, shp_path)
```

Arguments

<code>data_file</code>	a character string with the path to the data file.
<code>shp_path</code>	a character string with the path to the ".shp" file.

Value

No return value, called to crop and store store the new data file.

Examples

```
## Not run:  
crop_data("gpcp_tp_mm_global_197901_202205_025_monthly.nc", "cze.shp")  
crop_data("dummie.nc", "cze.shp")  
  
## End(Not run)
```

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

The function `download_data` downloads the selected data product.

Usage

```
download_data(data_name = "all", destination = ".")
```

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),
 - "20cr" for 20CR v3,
 - "chirps" for CHIRPS v2.0,
 - "cmap" for CMAP standard version,
 - "cmorph" for CMORPH,
 - "cpc" for CPC-Global,
 - "cru-ts" for CRU_TS v4.06,
 - "em-earth" for EM-EARTH,
 - "era20c" for ERA-20C,
 - "era5" for ERA5,
 - "ghcn" for GHCN-M v2,
 - "gldas-clsm" for GLDAS CLSM,
 - "gldas-noah" for GLDAS NOAH,
 - "gldas-vic" for GLDAS VIC,
 - "gpcc" for GPCC v2020,
 - "gpcp" for GPCP v2.3,
 - "gpm_imer" for GPM IMERG Final v06,
 - "mswep" for MSWEP v2.8,
 - "ncep-doe" for NCEP/DOE,
 - "ncep-ncar" for NCEP/NCAR,
 - "persiann" for PERSIANN-CDR,
 - "precl" for PREC/L,
 - "terraclimate" for TerraClimate,
 - "trmm-3b43" for TRMM 3B43 v7,
 - "udel" for UDEL v501.
- `destination` a character string with the path where the database will be downloaded.

Value

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

Examples

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

era5_ce_ts	<i>Monthly precipitation data</i>
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Description

A subset of ERA5 monthly precipitation data in mm over 2-28E, 42-58N. More details of the raw data can be found [here](#).

Usage

era5_ce_ts

Format

A data.table with 480 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

European Centre for Medium-Range Weather Forecasts (ECMWF)

era5_cze_ts	<i>Monthly precipitation data</i>
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Description

A subset of ERA5 monthly precipitation data in mm over Czechia. More details of the raw data can be found [here](#).

Usage

era5_cze_ts

Format

A data.table with 480 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

European Centre for Medium-Range Weather Forecasts (ECMWF)

era5_global_ts	<i>Monthly precipitation data</i>
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Description

Global ERA5 monthly precipitation data in mm. More details of the raw data can be found [here](#).

Usage

```
era5_global_ts
```

Format

A data.table with 756 obs. of 2 variables:

date IDate format %Y-%m-%d

value monthly average values

Source

European Centre for Medium-Range Weather Forecasts (ECMWF)

make_ts	<i>Generate time series</i>
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Description

The function make_ts generates a csv time series and stored in the same location of the input file.

Usage

```
make_ts(data_file)
```

Arguments

data_file a character string with the path to the data file.

Value

No return value, called to generate and store csv time series.

Examples

```
## Not run:  
make_ts("gpcp_tp_mm_global_197901_202205_025_monthly.nc")  
make_ts("dummie.nc")  
  
## End(Not run)
```

`mon_to_year`*Rescale a precipitation data product in time*

Description

The function `mon_to_year` aggregates the requested data set from monthly to yearly time steps and stores it in the same location of the input file.

Usage

```
mon_to_year(data_file)
```

Arguments

`data_file` a character string with the path to the data file.

Value

No return value, called to aggregate and store the new data file.

Examples

```
## Not run:  
mon_to_year("gpcp_tp_mm_global_197901_202205_025_monthly.nc")  
mon_to_year("dummie.nc")  
  
## End(Not run)
```

`plot_box`*Precipitation box plot*

Description

Function for plotting (boxplot) monthly time-series of area averaged precipitation.

Usage

```
plot_box(dummie)
```

Arguments

`dummie` a csv generated by [make_ts](#)

Value

ggplot object

plot_density	<i>Precipitation density</i>
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Description

Function for plotting (density) monthly time-series of area averaged precipitation.

Usage

```
plot_density(dummie)
```

Arguments

dummie a csv generated by [make_ts](#)

Value

ggplot object

plot_heatmap	<i>Precipitation heatmap</i>
--------------	------------------------------

Description

Function for plotting (heatmap) monthly time-series of area averaged precipitation.

Usage

```
plot_heatmap(dummie)
```

Arguments

dummie a csv generated by [make_ts](#)

Value

ggplot object

plot_line	<i>Precipitation line plot</i>
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Description

Function for plotting (line) monthly time-series of area averaged precipitation.

Usage

```
plot_line(dummie)
```

Arguments

dummie a csv generated by [make_ts](#)

Value

ggplot object

plot_map	<i>Precipitation map plot</i>
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Description

Function for mapping the first layer of a .nc file

Usage

```
plot_map(dummie)
```

Arguments

dummie a .nc file with precipitation

Value

ggplot object

plot_summary	<i>Precipitation summary plot</i>
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Description

Function for plotting precipitation summary (line, matrix, box, and density)

Usage

```
plot_summary(dummie)
```

Arguments

dummie a csv generated by [make_ts](#)

Value

ggplot object

rescale_data	<i>Subset a precipitation data product in space</i>
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Description

The function `rescale_data` aggregates the requested data sets into desired resolution and stores it in the same location of the input file.

Usage

```
rescale_data(data_file, new_res)
```

Arguments

data_file a character string with the path to the data file.
new_res numeric. Target resolution must be a multiple of 0.25 (e.g., 0.5, 1, 2.5).

Value

No return value, called to aggregate and store the data file.

Examples

```
## Not run:
x <- rescale_data("gpcp_tp_mm_global_197901_202205_025_monthly.nc", 1)
z <- rescale_data("dummie.nc", 1)

## End(Not run)
```

show_info	<i>Show data content</i>
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Description

The function show_info displays the specification of the desired file.

Usage

```
show_info(nc_path)
```

Arguments

nc_path a character with the path to the desired file

Value

character vector with screen print out

subset_space	<i>Subset a precipitation data product in space</i>
--------------	---

Description

The function subset_space subsets (space) the requested data set and stores it in the same location of the input file.

Usage

```
subset_space(data_file, bbox)
```

Arguments

data_file a character string with the path to the data file.
bbox numeric vector. Bounding box in the form: (xmin, xmax, ymin, ymax).

Value

No return value, called to subset and store store the new data file.

Examples

```
## Not run:
subset_space("gpcp_tp_mm_global_197901_202205_025_monthly.nc",
c(12.24, 18.85, 48.56, 51.12))
subset_space("dummie.nc", c(12.24, 18.85, 48.56, 51.12))

## End(Not run)
```

subset_spacetime	<i>Subset a precipitation data product in time and space</i>
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Description

The function `subset_spacetime` subsets (time and space) the requested data set and stores it in the same location of the input file.

Usage

```
subset_spacetime(data_file, years, bbox)
```

Arguments

<code>data_file</code>	a character string with the path to the data file.
<code>years</code>	numeric vector. Time range in the form: (start_year, end_year)
<code>bbox</code>	numeric vector. Bounding box in the form: (xmin, xmax, ymin, ymax).

Value

No return value, called to subset and store the new data file.

Examples

```
## Not run:  
subset_spacetime("gpcp_tp_mm_global_197901_202205_025_monthly.nc",  
c(2000, 2010), c(12.24, 18.85, 48.56, 51.12))  
subset_spacetime("dummie.nc", c(2000, 2010),  
c(12.24, 18.85, 48.56, 51.12))  
  
## End(Not run)
```

subset_time	<i>Subset a precipitation data product in time</i>
-------------	--

Description

The function `subset_time` subsets (time) the requested data set and stores it in the same location of the input file.

Usage

```
subset_time(data_file, years)
```

Arguments

`data_file` a character string with the path to the data file.
`years` numeric vector. Time range in the form: (start_year, end_year)

Value

No return value, called to subset and store the new data file.

Examples

```
## Not run:  
subset_time("gpcp_tp_mm_global_197901_202205_025_monthly.nc",  
c(2000, 2010))  
subset_time("dummie.nc", c(2000, 2010))  
  
## End(Not run)
```

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