pastclim: : CHEAT SHEET

Basics

pastclim is an **R package** to easily **download and manipulate paleoclimatic data.**

INSTALLATION

Installation through devtools

```
library(devtools)
install_github("EvolEcolGroup/pastclim“,
               build_vignettes = TRUE)
```

VIGNETTE

```
vignette("pastclim_overview",
         package = "pastclim")
```

Data

NATIVE DATASETS

Beyer2020:
- 22 variables
- present-120k years ago
- every 1000/2000 years

Krapp2021:
- 22 variables
- present-800k years ago
- every 1000 years

Example: Do not use for analyses!
- 3 variables
- 3 time slices

LIST ALL AVAILABLE DATASETS

```
vignette("available_datasets",
         package = "pastclim")
```

ADD MORE DATA

Follow the instructions from the **“custom datasets” vignette**

```
vignette(“custom_datasets",
         package = "pastclim")
```

Download the data

Download the full dataset

By default it will be stored within the package

```
download_dataset(dataset="Beyer2020")
```

Download only a few variables

```
download_dataset(dataset="Beyer2020",
    bio_variables = c("bio01","bio05"))
```

Download a dataset into a path of choice

```
download_dataset(dataset="Beyer2020",
        path_to_nc = "~/paleoclimate")
```

Working with locations

Retrieve the climate for several locations scattered in time and/or space.

Format them as a data.frame with longitude, latitude, age.

```
locations <- data.frame(
    x=c(0,90,-120,-7),      # longitude
    y=c(20,45,60,37),       # latitude
    time=c(0,-10000, -20000, -10000))
```

Retrieve the climate

```
location_slice(
    x= locations[,c("x", "y")],
    time_bp = locations$time,
    bio_variables=c("bio01","bio12"),
    dataset="Example")
```

WARNING: Some locations may fall under ice or water, where the climate is unavailable. `nn_interpol = TRUE` (the default) interpolates the climate among the neighbouring cells.

Retrieve time series of the climate for each location (interpolation not available)

```
location_series(
    x= locations[,c("x", "y")],
    bio_variables=c("bio01","bio12"),
    dataset="Example")
```

Working with regions

Get climate for the world

```
region_slice(
        time_bp = -20000,
        bio_variables=c("bio01", "bio12"),
        dataset = "Example")
```

Get time series for the world

```
region_series(
        bio_variables=c("bio01", "bio12"),
        dataset = "Example")
```

Both functions can include the arguments

- *‘crop’* to crop results based on a polygon
- *‘ext’* to crop results based on an extent

Cropping

Eight preset extents are available in *pastclim* and can be listed through the command

```
names(region_extent)
```

- "Africa"
- "America"
- "Asia"
- "Europe"
- "Eurasia"
- "N_America"
- "S_America"
- "Oceania"

Get time series for Asia using an extent

```
region_series(
    bio_variables=c("bio01", "bio12"),
    dataset = "Example",
    ext=region_extent$Asia)
```

pastclim includes five pre-generated masks for the main continental masses

```
names(region_outline)
```

- "Africa"
- "North_America"
- "Eurasia"
- "Oceania"
- "South_America"

Get climate from Africa using a mask

```
region_slice(
        time_bp = -20000,
        c("bio01", "bio12"),
        dataset = "Example",
        crop = region_outline$Africa)
```

Sampling

Sampling 100 random points from a region

```
climate_20k <- region_slice(
        time_bp = -20000,
        bio_variables = c("bio01", "bio10"),
        dataset = "Example")

sample_region_slice(
        climate_20k,
        size = 100)
```

Sampling from a time series, 100 points from the first time slice, 50 from the second.

```
climate_ts <- region_series(
        time_bp = c(-20000,-10000),
        bio_variables = c("bio10", "bio12"),
        dataset = "Example")

sample_region_series(
        climate_ts,
        size = c(100,50))
```

To sample the same amount from all time slices write only one number

Citation

Cite pastclim

```
citation("pastclim")
```

Cite database

```
help("Beyer2020")
```

Need help?

https://rdrr.io/github/EvolEcolGroup/pastclim/man/

https://github.com/EvolEcolGroup/pastclim

https://evolecolgroup.github.io/pastclim/

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 Michela Leonardi, Andrea Manica• am315@cam.ac.uk • https://rdrr.io/github/EvolEcolGroup/pastclim • Learn more at **webpage or vignette** • package version 1.1.0 • Updated: 2022-09