Package ‘basemaps’

May 19, 2021

Type Package

Title Accessing Spatial Basemaps in R

Version 0.0.1

Depends R (>= 3.5.0)

Date 2021-05-18

Description A lightweight package to access spatial basemaps from open sources such as OpenStreetMap, Carto, Mapbox and others in R.

License GPL-3

Encoding UTF-8

Imports sf, slippymath, httr, curl, pbapply, magick, raster, stars,
utils, grDevices

Suggests rgdal, ggplot2, png, mapview, mapedit, testthat, covr

BugReports `https://github.com/16eagle/basemaps/issues`

RoxygenNote 7.1.1

NeedsCompilation no

Author Jakob Schwalb-Willmann [aut, cre]
(<https://orcid.org/0000-0003-2665-1509>)

Maintainer Jakob Schwalb-Willmann `<dev@schwalb-willmann.de>`

Repository CRAN

Date/Publication 2021-05-19 11:00:09 UTC

R topics documented:

basemap *Get a spatial basemap*

Description

These functions (down)load and cache a basemap of a defined extent `ext`, `map_service` and `map_type` and return it as an object of the defined class. Alternatively to defining the following arguments, `set_defaults` can be used to define basemap preferences once for the running session.

Usage

```
basemap(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  class = "stars",
  force = FALSE,
  ...,
  verbose = TRUE
)

basemap_raster(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_stars(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)
```

```
basemap_mapview(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_plot(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_ggplot(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_gglayer(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)
```

```
basemap_magick(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_png(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)

basemap_geotif(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL,
  force = NULL,
  ...,
  verbose = TRUE
)
```

Arguments

`ext` extent to be covered by the basemap as any spatial class supported by `st_bbox`.

`map_service` character, a map service, either `"osm"`, `"carto"` or `"mapbox"`. Default is `"osm"`.

`map_type` character, a map type, e.g. `"streets"`. For a full list of available map types, see `get_maptypes`.

`map_res` numeric, resolution of base map in range from 0 to 1.

`map_token` character, authentification token for services that require registration, which are `"osm_thunderforest"` and `"mapbox"`. Register at `https://www.thunderforest.com/` and/or `https://www.mapbox.com/` to get tokens. Ignored for all other map services.

`map_dir` character, cache directory where downloaded basemap tiles will be stored. By default, a temporary directory is used, which is destroyed when the session is terminated.

`class` character, output class, either `"stars"`, `"raster"`, `"mapview"`, `"plot"`, `"ggplot"`, `"gglayer"`, `"magick"`, `"png"` or `"geotif"`..

`force` logical, whether to force download over cached files or not. Default is `FALSE`.

`...` additional arguments, including

- `browse`, logical, for `class = "png"` and interactive sessions only. Whether to open the png file in the system's default PNG viewer or not. Default is `TRUE`.
- `col`, character vector of colours for transforming single-layer basemaps into RGB, if `class = "png"` or `class = "magick"`. Default is `topo.colors(25)`.

`verbose` logical, if `TRUE`, messages and progress information are displayed on the console (default).

Value

A basemap of the defined class in Web/Pseudo Mercator Projection (EPSG: 3857)

Note

See get_maptypes for available map services and their sources.

The use of the map services `"osm_thunderforest"` and `"mapbox"` require registration to obtain an API token/key which can be supplied to `map_token`. Register at `https://www.thunderforest.com/` and/or `https://www.mapbox.com/` to get a token.

Examples

```
library(basemaps)

# example extent
data(ext)

# view all available maps
get_maptypes()

# set defaults for the basemap
set_defaults(map_service = "osm", map_type = "terrain_bg")
# for osm_thunderforest and mapbox maps, you need a API token.
# Register for free at thunderforest.com and mapbox.com to get a token

## Not run:
# load and return basemap map as raster (default)
map <- basemap(ext)

# or as many different classes such as:
basemap_magick(ext)
basemap_plot(ext)

## End(Not run)
```

data *Example extent*

Description

The example datasets contain the sf objects ext and ext_eur that can be used to call basemap and the associated functions.

Usage

```
data(ext)

data(ext_eur)
```

Format

sf object

An object of class sf (inherits from data.frame) with 1 rows and 3 columns.

defaults *Set, get and reset* basemaps *defaults*

Description

These functions set, get or reset the defaults of all map arguments passed to basemap and associated functions.

Usage

```
set_defaults(
  ext = NULL,
  map_service = NULL,
  map_type = NULL,
  map_res = NULL,
  map_token = NULL,
  map_dir = NULL
)

get_defaults()

reset_defaults()
```

Arguments

`ext` extent to be covered by the basemap as any spatial class supported by `st_bbox`.

`map_service` character, a map service, either `"osm"`, `"carto"` or `"mapbox"`. Default is `"osm"`.

`map_type` character, a map type, e.g. `"streets"`. For a full list of available map types, see `get_maptypes`.

`map_res` numeric, resolution of base map in range from 0 to 1.

`map_token` character, authentification token for services that require registration, which are `"osm_thunderforest"` and `"mapbox"`. Register at `https://www.thunderforest.com/` and/or `https://www.mapbox.com/` to get tokens. Ignored for all other map services.

`map_dir` character, cache directory where downloaded basemap tiles will be stored. By default, a temporary directory is used, which is destroyed when the session is terminated.

Value

For `get_defaults`, a list of defaults, otherwise none.

Examples

```
library(basemaps)
data(ext)

# set defaults for the basemap
set_defaults(ext = ext, map_service = "osm", map_type = "terrain_bg")

# get defaults
get_defaults()

## Not run:
# load and return basemap map as raster (default)
map <- basemap()

## End(Not run)

# reset defaults
reset_defaults()
```

`draw_ext` *Draw extent*

Description

This function lets you draw an extent on an interactive map. It is a simple wrapper around `mapedit::drawFeatures()` written by Tim Appelhans et al.

Usage

```
draw_ext()
```

Value

An sf object

Examples

```
## Not run:
library(basemaps)

# draw extent interactively
ext <- draw_ext()

# set defaults for the basemap
set_defaults(ext = ext, map_service = "osm", map_type = "terrain_bg")
# for mapbox maps, you need a map_token. Register for free at mapbox.com to get a token

# load and return basemap map as raster (default)
map <- basemap()

## End(Not run)
```

---

get_maptypes *Get all supported map types*

Description

This function returns every supported map type that can be used as input to the map_type argument of set_defaults, basemap or associated functions.

Usage

```
get_maptypes(map_service = NULL)
```

Arguments

map_service character, optional, either "osm", "osm_stamen", "osm_thunderforest", "carto", "mapbox" or "esri". Otherwise, a list of map types for both services is returned.

Value

A character vector of supported map types

Source

"osm": Open Street Map contributors (https://www.openstreetmap.org/copyright), Open Topo Map (https://opentopomap.org/), Martin Tesar (http://mtbmap.cz/)

"osm_stamen": Stamen (http://maps.stamen.com/), Open Street Map contributors (https://www.openstreetmap.org/copyright)

"osm_thunderforest": Thunderforest (https://www.thunderforest.com/), Open Street Map contributors (https://www.openstreetmap.org/copyright)

"carto": Carto (https://carto.com/)

"mapbox": Mapbox (https://www.mapbox.com)

"esri": Esri (https://www.esri.com/en-us/home)

See Also

basemap

Examples

```
# for all services
get_maptypes()

# for osm only
get_maptypes("osm")
# or
get_maptypes()$osm

# for mapbox only
get_maptypes("mapbox")
# or
get_maptypes()$mapbox

# same for all other map services
```

Index