Package 'BReco'

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Type Package

Title R Package to Download and Clean Brazilian Environmental Data

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Description With the BReco package, you can to download main brazilian environmental datasets directly to R in the data frame format. You can download and clean data on grenhouse gas emissions, climate data and deforestation information with a set of functions available in the package.

License GPL-3

Encoding UTF-8

LazyData TRUE

RoxygenNote 7.0.2

Repository CRAN

BugReports https://github.com/Helson-Gomes/BReco

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get_fires *A function to download data on annual number of fire focus in Brazil*

Description

Download data from Fire Information for Resource Management System (FIRMS) to Brazil. The data can be downloaded for the national, state and municipal level. The data is referred to the sum of fire focus in each level choosed.

Usage

```
get_fires(level = NULL, panel = FALSE)
```

Arguments

level	The geographic level of interest. This opition can be ("country", "state", and "municipality").
panel	Use panel = TRUE if you want to download the dataset in a panel data format and panel = FALSE otherwise. The default value is FALSE

Value

sigla.state	The state name abbreviation. This variable will not appear if you choose the option level = "country" or level = "municipality".
CD_GEOCMU	Municipality identification code according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica - IBGE). This variable will not appear if you choose the option level = "country" or level = "state".
country	The country name. This variable will not appear if you choose the option level = "state" or level = "municipality".
FIRE_year	The annual number of fire focus in the geographical level of interest between 2001 and 2019. These variables will not appear if you choose the option panel = TRUE.
year	The value of the year. This variable will not appear if you choose the option panel = FALSE.
fires	The annual number of fire focus in the geographical level of interest between 2001 and 2019. These variables will not appear if you choose the option panel = FALSE.

Note

Please, cite: https://earthdata.nasa.gov/earth-observation-data/near-real-time/firms

Examples

```
my_df <- get_fires(level = "state", panel = FALSE)
```

get_gfw *A function to download data on C02 emissions, biomass loss and tree cover loss in Brazil.*

Description

Download brazilian statistics on tree cover loss, CO2 emissions data based on aboveground biomass loss, and information on biomass loss in Brazil.

Usage

```
get_gfw(type_data = NULL, level = NULL)
```

Arguments

type_data	The type of data required. Choose: type_data = "co2 emissions" if you want to download data about brazilian CO2 emissions; type_data = "biomass loss" if you want to download data about brazilian biomass loss; type_data = "tree cover loss" if you want to download data about tree cover loss of the brazilian forests.
level	The territorial level of interest . Choose: level = "Country" if you wannt to download brazilian agregate data; level = "Subnational 1" if you want to download data in state level; level = "Subnational 2" if you want to download data in municipal level.

Value

country	The country name.
threshold	Percentage of canopy cover of interest.
area_h	The geographical area in hectares.
extent_2000_ha	The total covered area in hectares according to the Percentage of canopy cover of interest in the year 2000.
extent_2010_ha	The total covered area in hectares according to the Percentage of canopy cover of interest in the year 2010.
co2_emissions_Mt_year	Metric tonnes of CO2 emissions as a result of aboveground biomass loss at a required level, between 2001-2018, categorized by percent canopy cover.
biomass_loss_Mt_year	Metric tonnes of aboveground biomass loss at the required geographical level, between 2001-2018, categorized by percent canopy cover.
tc_loss_ha_year	Hectares of tree cover loss at the required geographical level, between 2001-2018, categorized by percent canopy cover.

Note

Pleace, cite: Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. ???High-Resolution Global Maps of 21st-Century Forest Cover Change.??? Science 342 (15 November): 850???53. Data available on-line from: http://earthenginepartners.appspot.com/science-2013-global-forest.

Note

Pleace, cite: Zarin, D., Harris, N.L. et al. 2016. Can carbon emissions drop by 50% in five years? Global Change Biology, 22: 1336-1347. doi:10.1111/gcb.13153

Note

Pleace, cite: Global Administrative Areas Database, version 3.6. Available at http://gadm.org/

Examples

```
my_df <- get_gfw(type_data = "co2 emissions", level = "Country")
```

`get_pet` *A function to download data on potential average annual evapotranspiration in Brazil.*

Description

Download data on brazilian annual potential evapotranspiration according to CAMARILLO-NARANJO et al (2019). Data are available at globalclimatemonitor.org. The output values refer to the geographical average of the values for each spatial unit (municipality, state or country).

Usage

```
get_pet(level = "municipality", panel = FALSE)
```

Arguments

`level`	The geographic level of interest. This opition can be ("country", "state", or "municipality")
`panel`	Use panel = TRUE if you want to download the dataset in a panel data format and panel = FALSE otherwise. The default value is FALSE

Value

YCNTRD	The central longitude coordinate of the geographical area of interest.
XCNTRD	The central latitude coordinate of the geographical area of interest.
CD_GEOCMU	Municipality identification code according to the Brazilian Institute of Geography and Statistics (IBGE). This variable will not appear if you choose the option level = "country" or level = "state".
sigla.state	The state name abbreviation. This variable will not appear if you choose the option level = "country" or level = "municipality".
code.state	The state identification code according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica - IBGE). This variable will not appear if you choose the option level = "country" or level = "municipality".
country	The country name. This variable will not appear if you choose the option level = "state" or level = "municipality".
PET_year	The annual average potential evapotranspiration of the geographical level required. These variables will not appear if you choose the option panel = TRUE.
evapotranspiration	The annual average potential evapotranspiration of the geographical level required in panel data format. This variable will not appear if you choose the option panel = FALSE.
year	The year of interest. This variable will not appear if you choose the option panel = FALSE.

Note

Please, cite: https://www.globalclimatemonitor.org/

Note

Please, cite: CAMARILLO-NARANJO, Juan Mariano et al. The global climate monitor system: from climate data-handling to knowledge dissemination. International journal of digital earth, v. 12, n. 4, p. 394-414, 2019.

Examples

```
my_df <- get_pet(level = "state", panel = FALSE)
```

---

get_prodes *A function do download environmental data from brazilian Legal Amazon*

Description

Download the data from the General Coordination for Earth Observation in Brazil (Coordenacao-Geral de Observacao da Terra - PRODES). The data contains information on the increase in deforestation, non-forest area, forest area, hydrography, cloud cover and deforestation area in the Brazilian Legal Amazon between 2002 and 2018.

Usage

```
get_prodes(year = NULL, state = NULL)
```

Arguments

state	A brazilian Legal Amazon state name abbreviation ("AC", "AM", "AP", "MA", "MT", "PA", "RO", "RR", "TO"). If you choose state = NULL, the function will return a table with information for all states in brazilian Legal Amazon.
year	The year of interest. Choose an year between 2002 and 2018.

Value

Nr	The number of each row in the data frame.
Lat	The latitude coordinate.
Long	The longitude coordinate.
Latgms	Latitude coordinates in degrees, minutes and seconds.
Longms	Longitude coordinates in degrees, minutes and seconds.
Municipio	The name of each municipality.
CodIbge	Municipality identification code according to the Brazilian Institute of Geography and Statistics (IBGE).
Estado	The state name abbreviation. This variable will not appear if you choose the option level = "country" or level = "municipality".
AreaKm2	The territorial area of the municipality in square kilometers.
Desmatado	The deforested area in the year of interest in square kilometers.
Incremento	The increase in the deforestation between the required year and the previous year in square kilometers.
Floresta	The forest area in square kilometers.
Nuvem	The average area covered by clouds.
NaoObservado	Total excluded area due to excess of cloud in the year.
NaoFloresta	The non-forest area in square kilometers.
Hidrografia	Hydrography areas.
Soma	Percentage of the monitored area in relation to the total area.

Note

Pleace,cite: http://www.dpi.inpe.br/prodesdigital/prodesmunicipal.php.

Examples

```
my_df <- get_prodes(year = 2018, state = NULL)
```

get_rainfall *A function to download data on annual average rainfall in Brazil*

Description

Download data on brazilian annual average rainfall according to CAMARILLO-NARANJO et al (2019). Data are available at "globalclimatemonitor.org". The output values refer to the geographical average of the values for each spatial unit (municipality, state or country)

Usage

```
get_rainfall(level = "municipality", panel = FALSE)
```

Arguments

level	The geographic level of interest. This opition can be ("country", "state", or "municipality")
panel	Use panel = TRUE if you want to download the database in a panel data format and panel = FALSE otherwise. The default value is FALSE

Value

YCNTRD	The central longitude coordinate of the geographical area of interest.
XCNTRD	The central latitude coordinate of the geographical area of interest.
CD_GEOCMU	Municipality identification code according to the Brazilian Institute of Geography and Statistics (IBGE). This variable will not appear if you choose the option level = "country" or level = "state".
sigla.state	The state name abbreviation. This variable will not appear if you choose the option level = "country" or level = "municipality".
code.state	The state identification code according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica - IBGE). This variable will not appear if you choose the option level = "country" or level = "municipality".
NM_MUNICIP	The name of each municipality. This variable not appear if you choose the option level = "state" or level = "country".
country	The country name. This variable will not appear if you choose the option level = "state" or level = "municipality".
PREC_year	The annual average rainfall (mm) between 1901 and 2019. These variables will not appear if you choose the option level = "state" or level = "country".
rainfall	The annual average rainfall (mm) when you choose the option panel = TRUE.

Note

Please, cite https://www.globalclimatemonitor.org/.

Note

Please, cite CAMARILLO-NARANJO, Juan Mariano et al. The global climate monitor system: from climate data-handling to knowledge dissemination. International journal of digital earth, v. 12, n. 4, p. 394-414, 2019.

Examples

```
my_df <- get_rainfall(level = "state", panel = FALSE)
```

`get_seeg` *A function to download data on greenhouse gas emissions in Brazil*

Description

Download data from Greenhouse Gas Emissions and Removal Estimation System ("Sistema de Estimativas de Emisscoes e Remocoes de Gases de Efeito Estufa") - SEEG - available in "seeg.eco.br".

Usage

```
get_seeg(state = NULL, activity = NULL, gas = NULL, type_data = NULL, panel = FALSE)
```

Arguments

`state`	A brazilian state code ("AC", "AM", "PA", "RO", "RR", "AP", "TO", "MA", "PI", "CE", "RN", "PB", "PE", "AL", "SE", "BA", "ES", "MG", "SP", "RJ", "PR", "SC", "RS", "MS", "MT", "GO")
`activity`	An economical activity ("agriculture", "energy", "land use change", "industry", "waste")
`gas`	The type of gas of interest ("CO2e (t) GTP-AR2", "CO2e (t) GTP-AR4", "CO2e (t) GTP-AR5", "CO2e (t) GWP-AR2", "CO2e (t) GWP-AR4", "CO2e (t) GWP-AR5", "CO2 (t)", "CO (t)", "CH4 (t)", "NOx (t)", "N2O (t)", "COVNM (t)", "CF4 (t)", "C2F6 (t)", "SF6 (t)", "HFC-23 (t)", "HFC-32 (t)", "HFC-134a (t)", "HFC-125 (t)", "HFC-143a (t)", "HFC-152a (t)", "NOX (t)"
`type_data`	Use type = "emissions" if you want to download data on gas emissions and type = "removal" if you want to download data on gas removals.
`panel`	Use panel = TRUE if you want to download the database in a panel data format and panel = FALSE otherwise.

Details

If you choose panel = FALSE, the value of the greenhouse gas emissions or removals will be returned in columns named with the number of each year.

Value

setor	The economic activity of interest.
Emissao_Remocao	Returns "Emissao" to emissions and "Remocao" to removal.
Gas	The type of gas.
Estado	The state name abbreviation.
year	The value of the year. This variable will not appear if you choose the option panel = FALSE.
value	The value of greenhouse gas emissions or removals. This variable will not appear if you choose the option panel = FALSE.

Note

Please, cite seeg.eco.br.

Examples

```
my_df <- get_seeg(state = NULL, activity = NULL, type_data = NULL, panel = TRUE)
```

---

get_temperature *A function to download data on annual average temperature in Brazil*

Description

Download data on brazilian annual average temperature according to CAMARILLO-NARANJO et al (2019). Data are available at globalclimatemonitor.org. The output values refer to the geographical average of the values for each spatial unit (municipality, state or country)

Usage

```
get_temperature(level = "municipality", panel = FALSE)
```

Arguments

level	The geographic level of interest. This opition can be ("country", "state", or "municipality")
panel	Use panel = TRUE if you want to download the database in a panel data format and panel = FALSE otherwise. The default value is FALSE

Details

If you choose panel = FALSE, the values will be returned in columns according to the each year.

Value

YCNTRD	The central longitude coordinate of the geographical area of interest.
XCNTRD	The central latitude coordinate of the geographical area of interest.
CD_GEOCMU	Municipality identification code according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica - IBGE). This variable will not appear if you choose the option level = "country" or level = "state".
sigla.state	The state name abbreviation. This variable will not appear if you choose the option level = "country" or level = "municipality".
NM_MUNICIP	The name of each municipality. This variable not appear if you choose the option level = "state" or level = "country".
country	The country name. This variable will not appear if you choose the option level = "state" or level = "municipality".
TEMP_year	The annual average temperature (degrees Celsius) between 1901 and 2019. These variables will not appear if you choose the option level = "state" or level = "country".

Note

Please, cite https://www.globalclimatemonitor.org/.

Note

Please, cite CAMARILLO-NARANJO, Juan Mariano et al. The global climate monitor system: from climate data-handling to knowledge dissemination. International journal of digital earth, v. 12, n. 4, p. 394-414, 2019.

Examples

```
my_df <- get_temperature(level = "state", panel = FALSE)
```

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