

Package ‘imgw’

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Title Polish Meteorological and Hydrological Data

Version 0.2.0

Description Download Polish meteorological and hydrological data from the Institute of Meteorology and Water Management - National Research Institute (<<https://dane.imgw.pl/>>).

This package also allows for adding geographical coordinates for each observation.

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Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Depends R (>= 3.1)

Imports RCurl, XML

Suggests testthat, knitr, rmarkdown, dplyr, tidy

URL <https://imgw.ml>

BugReports <https://github.com/bczernecki/imgw/issues>

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

clean_metadata_hydro	2
clean_metadata_meteo	2
hydro	3

hydro_abbrev	4
hydro_annual	4
hydro_daily	5
hydro_metadata	6
hydro_monthly	6
hydro_shortening	7
hydro_stations	8
meteo	8
meteo_abbrev	9
meteo_daily	10
meteo_hourly	11
meteo_metadata	11
meteo_monthly	12
meteo_shortening	13
meteo_sounding	14
meteo_stations	15

Index 16

clean_metadata_hydro *Hydrological metadata cleaning*

Description

Internal function for hydrological metadata cleaning

Usage

```
clean_metadata_hydro(address, interval)
```

Arguments

address	URL address of the metadata file
interval	temporal interval

clean_metadata_meteo *Meteorological metadata cleaning*

Description

Internal function for meteorological metadata cleaning

Usage

```
clean_metadata_meteo(address, rank = "synop", interval = "hourly")
```

Arguments

address	URL address of the metadata file
rank	stations' rank
interval	temporal interval

Examples

```
my_add = paste0("https://dane.imgw.pl/data/dane_pomiarowo_obserwacyjne/",
               "dane_meteorologiczne/dobowe/synop/s_d_format.txt")
clean_metadata_meteo(address = my_add, rank = "synop", interval = "hourly")
```

hydro	<i>Hydrological data from IMGW</i>
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Description

Downloading hourly, daily, and monthly hydrological data from the SYNOP / CLIMATE / PRECIP stations available in the danepubliczne.imgw.pl collection

Usage

```
hydro(interval, year, coords = FALSE, value = "H", station = NULL,
       col_names = "short", ...)
```

Arguments

interval	temporal resolution of the data ("daily", "monthly", or "semiannual_and_annual")
year	vector of years (e.g., 1966:2000)
coords	add coordinates of the stations (logical value TRUE or FALSE)
value	type of data (can be: state - "H" (default), flow - "Q", or temperature - "T")
station	vector of hydrological stations danepubliczne.imgw.pl can be name of station CAPITAL LETTERS(character) It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
x <- hydro("monthly", year = 1999)
head(x)
```

hydro_abbrev	<i>Definitions of hydrological parameters used for shortening column names</i>
--------------	--

Description

The object contains 3 columns that are currently used for improving readability of the downloaded dataset: `fullname`, `abbr_eng`, and `fullname_eng`

Usage

```
hydro_abbrev
```

Format

The data contains a `data.frame` with ca. 20 elements described in three ways:

- `fullname` original column names as downloaded from the repository
- `abbr_eng` shorten column names with abbreviations derived from the most popular scheme used for meteorological parameters
- `fullname_eng` detailed description of downloaded meteorological variables

The object is created mostly to be used altogether with the `hydro_shortening()` function

Examples

```
data(hydro_abbrev)
head(hydro_abbrev)
```

hydro_annual	<i>Semi-annual and annual hydrological data</i>
--------------	---

Description

Downloading hydrological data for the semi-annual and annual period available in the `danepubliczne.imgw.pl` collection

Usage

```
hydro_annual(year, coords = FALSE, value = "H", station = NULL,
             col_names = "short", ...)
```

Arguments

year	vector of years (e.g., 1966:2000)
coords	add coordinates of the stations (logical value TRUE or FALSE)
value	type of data (can be: state - "H" (default), flow - "Q", or temperature - "T")
station	name or ID of hydrological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
yearly <- hydro_annual(year = 2000, value = "H", station = "ANNOPOL")
head(yearly)
```

hydro_daily	<i>Daily hydrological data</i>
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Description

Downloading daily hydrological data from the danepubliczne.imgw.pl collection

Usage

```
hydro_daily(year, coords = FALSE, station = NULL,
  col_names = "short", ...)
```

Arguments

year	vector of years (e.g., 1966:2000)
coords	add coordinates of the stations (logical value TRUE or FALSE)
station	name or ID of hydrological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
daily <- hydro_daily(year = 2000)
head(daily)
```

hydro_metadata	<i>Hydrological metadata</i>
----------------	------------------------------

Description

Downloading the description (metadata) to hydrological data available in the danepubliczne.imgw.pl repository. By default, the function returns a list or data frame for a selected subset

Usage

```
hydro_metadata(interval)
```

Arguments

interval temporal resolution of the data ("daily", "monthly", or "semiannual_and_annual")

Examples

```
meta <- hydro_metadata(interval = "daily")
meta <- hydro_metadata(interval = "monthly")
meta <- hydro_metadata(interval = "semiannual_and_annual")
```

hydro_monthly	<i>Monthly hydrological data</i>
---------------	----------------------------------

Description

Downloading monthly hydrological data from the danepubliczne.imgw.pl collection

Usage

```
hydro_monthly(year, coords = FALSE, station = NULL,
  col_names = "short", ...)
```

Arguments

year	vector of years (e.g., 1966:2000)
coords	add coordinates of the stations (logical value TRUE or FALSE)
station	name or ID of hydrological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
monthly <- hydro_monthly(year = 2000)
head(monthly)
```

hydro_shortening	<i>Shortening column names for hydrological variables</i>
------------------	---

Description

Shortening column names of hydrological parameters to improve the readability of downloaded dataset and removing duplicated column names

Usage

```
hydro_shortening(data, col_names = "short", remove_duplicates = TRUE)
```

Arguments

data	downloaded dataset with original column names
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
remove_duplicates	whether to remove duplicated column names (default TRUE - i.e., columns with duplicated names are deleted)

Examples

```
monthly <- hydro_monthly(year = 1969)
colnames(monthly)
abbr <- hydro_shortening(data = monthly, col_names = "polish", remove_duplicates = TRUE)
head(abbr)
```

hydro_stations	<i>Location of the hydrological stations</i>
----------------	--

Description

The object contains weather stations coordinates, ID numbers, and elevations

Usage

```
hydro_stations
```

Format

The data contains a data.frame with 1304 obs. of 3 variables:

- id Station ID
- X Longitude
- Y Latitude

The object is in the geographic coordinates using WGS84 (EPSG:4326).

Examples

```
data(hydro_stations)
head(hydro_stations)
```

meteo	<i>Meteorological data from IMGW</i>
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Description

Downloading hourly, daily, and monthly meteorological data from the SYNOP / CLIMATE / PRE-CIP stations available in the danepubliczne.imgw.pl collection

Usage

```
meteo(interval, rank, year, status = FALSE, coords = FALSE,
       station = NULL, col_names = "short", ...)
```


Arguments

interval	temporal resolution of the data ("hourly", "daily", "monthly")
rank	rank of the stations ("synop", "climate", "precip")
year	vector of years (e.g., 1966:2000)
status	leave the columns with measurement and observation statuses (default status = FALSE - i.e. the status columns are deleted)
coords	add coordinates of the station (logical value TRUE or FALSE)
station	vector of hydrological stations danepubliczne.imgw.pl can be name of station CAPITAL LETTERS(character) It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
x <- meteo("monthly", rank = "synop", year = 2018, coords = TRUE)
head(x)
```

meteo_abbrev	<i>Definitions of meteorological parameters used for shortening column names</i>
--------------	--

Description

The object contains 3 columns that are currently used for improving readability of the downloaded dataset: fullname, abbr_eng, and fullname_eng

Usage

```
meteo_abbrev
```

Format

The data contains a data.frame with ca. 250 elements described in three ways:

- fullname original column names as downloaded from the repository
- abbr_eng shorten column names with abbreviations derived from the most popular scheme used for meteorological parameters
- fullname_eng detailed description of downloaded meteorological variables

The object is created mostly to be used altogether with the meteo_shortening function

Examples

```
data(meteo_abbrev)
head(meteo_abbrev)
```

meteo_daily	<i>Daily meteorological data</i>
-------------	----------------------------------

Description

Downloading daily (meteorological) data from the SYNOP / CLIMATE / PRECIP stations available in the danepubliczne.imgw.pl collection

Usage

```
meteo_daily(rank, year, status = FALSE, coords = FALSE,
            station = NULL, col_names = "short", ...)
```

Arguments

rank	rank of the stations ("synop", "climate", or "precip")
year	vector of years (e.g., 1966:2000)
status	leave the columns with measurement and observation statuses (default status = FALSE - i.e. the status columns are deleted)
coords	add coordinates of the station (logical value TRUE or FALSE)
station	name or ID of meteorological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
daily <- meteo_daily(rank = "climate", year = 2000)
head(daily)
```

meteo_hourly	<i>Hourly meteorological data</i>
--------------	-----------------------------------

Description

Downloading hourly (meteorological) data from the SYNOP / CLIMATE / PRECIP stations available in the danepubliczne.imgw.pl collection

Usage

```
meteo_hourly(rank, year, status = FALSE, coords = FALSE,
             station = NULL, col_names = "short", ...)
```

Arguments

rank	rank of the stations ("synop", "climate", or "precip")
year	vector of years (e.g., 1966:2000)
status	leave the columns with measurement and observation statuses (default status = FALSE - i.e. the status columns are deleted)
coords	add coordinates of the station (logical value TRUE or FALSE)
station	name or ID of meteorological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
...	other parameters that may be passed to the 'shortening' function that shortens column names

Examples

```
hourly <- meteo_hourly(rank = "climate", year = 1984)
head(hourly)
```

meteo_metadata	<i>Meteorological metadata</i>
----------------	--------------------------------

Description

Downloading the description (metadata) to the meteorological data available in the danepubliczne repository.imgw.pl. By default, the function returns a list or data frame for a selected subset

Usage

```
meteo_metadata(interval, rank)
```

Arguments

```
interval      temporal resolution of the data ("hourly", "daily", "monthly")
rank          rank of station ("synop", "climate", "precip")
```

Examples

```
meta <- meteo_metadata(interval = "hourly", rank = "synop")
meta <- meteo_metadata(interval = "daily", rank = "synop")
meta <- meteo_metadata(interval = "monthly", rank = "precip")
```

meteo_monthly	<i>Monthly meteorological data</i>
---------------	------------------------------------

Description

Downloading monthly (meteorological) data from the SYNOP / CLIMATE / PRECIP stations available in the danepubliczne.imgw.pl collection

Usage

```
meteo_monthly(rank, year, status = FALSE, coords = FALSE,
              station = NULL, col_names = "short", ...)
```

Arguments

```
rank          rank of the stations ("synop", "climate", or "precip")
year          vector of years (e.g., 1966:2000)
status        leave the columns with measurement and observation statuses (default status =
              FALSE - i.e. the status columns are deleted)
coords        add coordinates of the station (logical value TRUE or FALSE)
station       name or ID of meteorological station(s). It accepts names (characters in CAPITAL LETTERS) or stations' IDs (numeric)
col_names     three types of column names possible: "short" - default, values with shorten
              names, "full" - full English description, "polish" - original names in the dataset
...          other parameters that may be passed to the 'shortening' function that shortens
              column names
```

Examples

```
monthly <- meteo_monthly(rank = "climate", year = 1969)
head(monthly)

# a descriptive (long) column names:
monthly2 <- meteo_monthly(rank = "synop", year = 2018, col_names = "full")
head(monthly2)
```

meteo_shortening	<i>Shortening column names for meteorological variables</i>
------------------	---

Description

Shortening column names of meteorological parameters to improve the readability of downloaded dataset and removing duplicated column names

Usage

```
meteo_shortening(data, col_names = "short", remove_duplicates = TRUE)
```

Arguments

data	downloaded dataset with original column names
col_names	three types of column names possible: "short" - default, values with shorten names, "full" - full English description, "polish" - original names in the dataset
remove_duplicates	whether to remove duplicated column names (default TRUE - i.e., columns with duplicated names are deleted)

Examples

```
monthly <- meteo_monthly(rank = "climate", year = 1969)
colnames(monthly)
abbr <- meteo_shortening(data = monthly, col_names = "short", remove_duplicates = TRUE)
head(abbr)
```

meteo_sounding	<i>Sounding data</i>
----------------	----------------------

Description

Downloading the mea (i.e., measurements of the vertical profile of atmosphere) sounding data

Usage

```
meteo_sounding(wmo_id, yy, mm, dd, hh)
```

Arguments

wmo_id	international WMO station code (World Meteorological Organization ID); For Polish stations: Łeba - 12120, Legionowo - 12374, Wrocław- 12425
yy	year - single number
mm	month - single number denoting month
dd	day - single number denoting day
hh	hour - single number denoting initial hour of sounding; for most stations this measurement is done twice a day (i.e. at 12 and 00 UTC), sporadically 4 times a day

Value

Returns two lists with values described at: weather.uwyo.edu ; The first list contains:

1. PRES - Pressure (hPa)
2. HGHT - Height (metres)
3. TEMP - Temperature (C)
4. DWPT - Dew point (C)
5. RELH - Relative humidity (
6. MIXR - Mixing ratio (g/kg)
7. DRCT - Wind direction (deg)
8. SKNT - Wind speed (knots)
9. THTA = (K)
10. THTE = (K)
11. THTV = (K)

The second list contains metadata and calculated thermodynamic / atmospheric instability indices

Source

<http://weather.uwyo.edu/upperair/sounding.html>

Examples

```
sounding <- meteo_sounding(wmo_id = 12120, yy = 2019, mm = 4, dd = 4, hh = 0)
head(sounding)
plot(sounding[[1]]$HGHT, sounding[[1]]$PRES, type = 'l')
```

meteo_stations	<i>Location of the meteorological stations</i>
----------------	--

Description

The object contains weather stations coordinates, ID numbers, and elevations

Usage

```
meteo_stations
```

Format

The data contains a data.frame with 1998 obs. of 3 variables:

- id Station ID
- X Longitude
- Y Latitude

The object is in the geographic coordinates using WGS84 (EPSG:4326).

Examples

```
data(meteo_stations)
head(meteo_stations)
```

Index

- *Topic **abbreviations**
 - hydro_abbrev, 4
 - meteo_abbrev, 9
 - *Topic **datasets**
 - hydro_abbrev, 4
 - hydro_stations, 8
 - meteo_abbrev, 9
 - meteo_stations, 15
 - *Topic **hydro**
 - hydro_abbrev, 4
 - *Topic **meteo**
 - hydro_stations, 8
 - meteo_abbrev, 9
 - meteo_stations, 15
 - *Topic **shortening**
 - hydro_abbrev, 4
 - meteo_abbrev, 9
- clean_metadata_hydro, 2
clean_metadata_meteo, 2
- hydro, 3
hydro_abbrev, 4
hydro_annual, 4
hydro_daily, 5
hydro_metadata, 6
hydro_monthly, 6
hydro_shortening, 7
hydro_stations, 8
- meteo, 8
meteo_abbrev, 9
meteo_daily, 10
meteo_hourly, 11
meteo_metadata, 11
meteo_monthly, 12
meteo_shortening, 13
meteo_sounding, 14
meteo_stations, 15