

Package ‘clidatajp’

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Title Data from Japan Meteorological Agency

Version 0.5.3

Description Includes climate data from Japan Meteorological Agency ('JMA') <<https://www.jma.go.jp/jma/indexe.html>>.
Can download climate data from 'JMA'.

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Encoding UTF-8

Depends R (>= 3.5.0)

URL <https://github.com/matutosi/clidatajp>
<https://github.com/matutosi/clidatajp/tree/develop> (devel)
<https://matutosi.github.io/clidatajp/>

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as_numeric_without_warnings
<i>Wrapper function to convert into numeric without warnings</i>

Description

Wrapper function to convert into numeric without warnings

Usage

as_numeric_without_warnings(x)

Arguments

x A string.

Value

A numeric or NA.

choose_with_menu	<i>Choose data with menu.</i>
------------------	-------------------------------

Description

Choose data with menu.

Usage

```
choose_with_menu(df, filter_cols, extract = NULL)
```

Arguments

df	A dataframe
filter_cols	A string or string vector
extract	A string

Value

If extract is NULL, return a dataframe, else return a vector.

Examples

```
if(interactive()){
  data(climate_world)
  climate_world <-
    climate_world %>%
    dplyr::mutate_all(stringi::stri_unescape_unicode)

  choose_with_menu(climate_world, filter_cols = "continent")
  4 # input

  choose_with_menu(climate_world, filter_cols = c("continent", "country", "station"))
  4 # input
  3 # input
  2 # input
}
```

clean_station	<i>Clean up station information</i>
---------------	-------------------------------------

Description

Helper function for download_climate().

Usage

```
clean_station(station)
```

Arguments

station A String of station information.

Value

A tibble including station information.

Examples

```
data(station_links)
station_links %>%
  head(1) %>%
  `$( "station")` %>%
  stringi::stri_unescape_unicode() %>%
  clean_station()
```

climate_jp	<i>Climate data in Japan</i>
------------	------------------------------

Description

Climate data downloaded from Japan Meteorological Agency web pages. URLs of each station are listed in data(station_links). <https://www.data.jma.go.jp/gmd/cpd/monitor/nrmlist/>

Usage

```
climate_jp
```

```
japan_climate
```

Format

A data frame with 3768 (157 stations * 12 months * 2 periods) rows and 14 variable:

no Station no

month Month

period Period of observations

temperature Mean temperature

precipitation Mean precipitation

snowfall Mean snowfall

insolation Mean insolation

station Station name. To avoid duplication, including country name after station name. Can split by "_". Escaped by `stringi::stri_escape_unicode()`.

country Country name. Escaped by `stringi::stri_escape_unicode()`.

latitude Latitude. (degree)

NS North or South.

longitude Longitude. (degree)

WE West or East.

altitude Altitude (m)

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 3768 rows and 14 columns.

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(japan_climate)
japan_climate %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode)
```

climate_jp_full	<i>Climate normals of all stations in Japan</i>
-----------------	---

Description

Monthly normals downloaded from Japan Meteorological Agency web pages for all stations in `data(station_jp_full)`. Values are raw strings of the web pages, because they include marks of 'JMA' ("@", ")", "]" and "#" show quality of the value, "///" and "—" show no value). Use `as_numeric_without_warnings()` after removing the marks, or use `download_detail()`, which cleans the marks. Stations of "AMeDAS" have no value in 11 of the columns, because only 10 items are observed. <https://www.data.jma.go.jp/obd/stats/etrn/index.php>

Usage

```
climate_jp_full
```

Format

A data frame with 21697 rows (1669 stations * 13 rows) and 21 variables. All variables are character.

month Month (1 to 12) or yearly value. Escaped by `stringi::stri_escape_unicode()`.

air_pressure_land Mean air pressure on land (hPa)

air_pressure_sea Mean air pressure on sea level (hPa)

precipitation Mean precipitation (mm)

temperature Mean temperature (degree Celsius)

temperature_max Mean of daily maximum temperature (degree Celsius)

temperature_min Mean of daily minimum temperature (degree Celsius)

steam_pressure Mean steam pressure (hPa)

moisture Mean relative humidity (percent)

wind_speed Mean wind speed (m/s)

wind_direction Most frequent wind direction. Escaped by `stringi::stri_escape_unicode()`.

sunshine Mean sunshine duration (hour)

global_solar_radiation Mean global solar radiation (MJ/m²)

snow_fall Mean snow fall (cm)

snow_fall_max_per_day Mean of daily maximum snow fall (cm)

snow_deepest Mean of deepest snow (cm)

cloud_cover Mean cloud cover

days_of_snow Mean days of snow

days_of_fog Mean days of fog

days_of_thunderstorm Mean days of thunderstorm

station_no Station no. Can be joined to `station_no` of `data(station_jp_full)`. Escaped by `stringi::stri_escape_unicode()`.

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(climate_jp_full)
climate_jp_full %>%
  head_3() %>%
  dplyr::mutate_if(is.character, stringi::stri_unescape_unicode)
```

climate_world

*Climate data in the world***Description**

Climate data downloaded from Japan Meteorological Agency web pages. URLs of each station are listed in data(station_links). <https://www.data.jma.go.jp/gmd/cpd/monitor/nrmlist/>

Usage

climate_world

world_climate

Format

A data frame with 41328 (3444 stations * 12 months) rows and 12 variable:

no Station no

continent Continent. Escaped by stringi::stri_escape_unicode().

country Country name. Escaped by stringi::stri_escape_unicode().

station Station name. To avoid duplication, including country name after station name. Can split by "_". Escaped by stringi::stri_escape_unicode().

month Month

temperature Mean temperature

precipitation Mean precipitation

latitude Latitude. (degree)

NS North or South.

longitude Longitude. (degree)

WE West or East.

altitude Altitude (m)

An object of class tbl_df (inherits from tbl, data.frame) with 41328 rows and 12 columns.

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(world_climate)
world_climate %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode)
```

detail_colnames	<i>Helper functions for download_detail()</i>
-----------------	---

Description

detail_colnames() joins header rows into column names, clean_detail_value() removes marks of 'JMA' from values, and to_numeric_when_all() converts a vector into numeric only when all values can be converted.

Usage

```
detail_colnames(header)
```

```
clean_detail_value(x)
```

```
to_numeric_when_all(x)
```

Arguments

header	A dataframe of header rows.
x	A string vector of values.

Value

detail_colnames(): a string vector of column names. clean_detail_value(): a string vector. to_numeric_when_all(): a numeric vector or a string vector.

Examples

```
header <- data.frame(x = c("temperature", "temperature"),
                    y = c("temperature", "mean"))
detail_colnames(header)
clean_detail_value(c("21.6", "0.0 "), "--", "///")
to_numeric_when_all(c("21.6", "0.0", NA))
to_numeric_when_all(c("21.6", "north"))
```

detail_url	<i>Build urls of detail climate data in Japan</i>
------------	---

Description

Japan Meteorological Agency ('JMA') provides detail climate data (yearly, monthly, daily, hourly and 10 minutes values) for each station. detail_url() builds urls of the data, and download_detail() downloads the data of the url. You can see web page as below. <https://www.data.jma.go.jp/obd/stats/etrn/index.php>

Usage

```

detail_url(
  prec_no,
  block_no,
  item = "daily",
  year = NULL,
  month = NULL,
  day = NULL
)

detail_item(item, block_no)

```

Arguments

<code>prec_no</code>	A string or numeric of area no.
<code>block_no</code>	A string or numeric of station no. Keep leading zero of 'AMeDAS' as a string (ex. "0588").
<code>item</code>	A string to specify data type. See details.
<code>year</code>	A numeric or string of year.
<code>month</code>	A numeric or string of month.
<code>day</code>	A numeric or string of day.

Details

A station is specified by a pair of `prec_no` (area) and `block_no` (station). Use `download_prec_no()` and `download_block_no()` to get the numbers. Note that `block_no` of "kansho" (weather station) has 5 digits (ex. "47759") and that of "AMeDAS" has 4 digits (ex. "0588"). Suffix of item ("`_s`" or "`_a`") is set to match the type of `block_no`.

`item` can be a short name in the following list, or a name of php file without extension (ex. "daily_s1").

annually Yearly values.

monthly Monthly values in a year (year is required).

monthly_all Monthly values of all years ("kansho" only).

daily Daily values in a month (year and month are required).

hourly Hourly values in a day (year, month and day are required).

10min 10 minutes values in a day (year, month and day are required).

nml_ym Normals of each month.

nml_daily Normals of each day in a month (month is required).

nml_season Normals of first and last day of frost, snow and ice ("kansho" only).

Value

A string vector of urls.

Examples

```
detail_url(61, 47759, "daily", 2023, 6)
detail_url(61, "0588", "hourly", 2023, 6, 20)
detail_url(61, 47759, "daily", 2023, 1:3)
```

download_climate

Download climate data of the world

Description

For polite scraping, 5 sec interval is set in download_climate(), it takes over 5 hours to get climate data of all stations. Please use existing links by "data(climate_world)", if you do not need to renew climate data. You can see web page as below. <https://www.data.jma.go.jp/gmd/cpd/monitor/nrmlist/>

Usage

```
download_climate(url)
```

Arguments

url A String to specify target html.

Value

A tibble including climate and station information, or NULL when failed.

Examples

```
# If you want all climate data, remove head().
# The codes take > 5 sec because of poliste scraping.

library(magrittr)
library(stringi)
library(dplyr)
data(station_links)
station_links <-
  station_links %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode) %>%
  head(3) %T>%
  {
    continent <- `$(., "continent")
    no        <- `$(., "no")
  } %>%
  `$( "url")

climate <- list()
for(i in seq_along(station_links)){
  print(stringr::str_c(i, " / ", length(station_links)))
```

```

    climate[[i]] <- download_climate(station_links[i])
  }
  # run only when download_climate() succeeded
  if(sum(is.null(climate[[1]]),
        is.null(climate[[2]]),
        is.null(climate[[3]])) == 0){
    month_per_year <- 12
    climate_world <-
      dplyr::bind_rows(climate) %>%
      dplyr::bind_cols(
        tibble::tibble(continent = rep(continent, month_per_year))) %>%
      dplyr::bind_cols(
        tibble::tibble(no = rep(no, month_per_year))) %>%
      dplyr::relocate(no, continent, country, station)
    climate_world
  }

```

download_detail

Download detail climate data in Japan

Description

For polite scraping, 5 sec interval is set in download_detail(). Please do not download too many data at once. Use detail_url() to build an url of the data.

Usage

```
download_detail(url, as_numeric = TRUE)
```

Arguments

url	A string to specify target html.
as_numeric	A logical. If TRUE, columns of numbers are converted into numeric. Marks of 'JMA' for missing values are treated as NA.

Value

A tibble including detail climate data, or NULL when failed.

Examples

```

url <- detail_url(61, 47759, "daily", 2023, 6)
download_detail(url)

```

download_links	<i>Download links for areas, countries and stations</i>
----------------	---

Description

For polite scraping, 5 sec interval is set in `download_links()`, it takes about 15 minutes to get all station links. Please use existing links by "data(station_links)", if you do not need to renew links. You can see web page as below. <https://www.data.jma.go.jp/gmd/cpd/monitor/nrmlist/>

Usage

```
download_area_links(
  url = "https://www.data.jma.go.jp/gmd/cpd/monitor/nrmlist/"
)

download_links(url)
```

Arguments

`url` A String to specify target html.

Value

A string vector of url links, or NULL when failed.

Examples

```
# If you want links for all countries and all sations, remove head().
# The codes take over 5 sec because of poliste scraping.

library(magrittr)
library(stringi)
library(dplyr)
library(tibble)
area_links <- download_area_links()
station_links <- NULL
continent <- NULL
continents <-
  c("\u30a2\u30d5\u30ea\u30ab",
    "\u30a2\u30b8\u30a2",
    "\u5357\u30a2\u30e1\u30ea\u30ab",
    "\u5317\u4e2d\u30a2\u30e1\u30ea\u30ab",
    "\u30aa\u30bb\u30a2\u30cb\u30a2",
    "\u30e8\u30fc\u30ed\u30c3\u30d1")
area_links <- head(area_links, 1) # for test
for(i in seq_along(area_links)){
  print(stringr::str_c("area: ", i, " / ", length(area_links)))
  country_links <- download_links(area_links[i])
  country_links <- head(country_links, 1) # for test
```

```

    for(j in seq_along(country_links)){
      print(stringr::str_c("    country: ", j, " / ", length(country_links)))
      links <- download_links(country_links[j])
      station_links <- c(station_links, links)
      continent      <- c(continent,      rep(continents[i], length(links)))
    }
  }
station_links <- tibble::tibble(url = station_links, continent = continent)
station_links

```

download_prec_no	<i>Download prec_no and block_no of stations in Japan</i>
------------------	---

Description

A station of detail climate data is specified by a pair of prec_no (area) and block_no (station). download_prec_no() downloads all prec_no, and download_block_no() downloads block_no of the area. For polite scraping, 5 sec interval is set in both functions. You can see web page as below. <https://www.data.jma.go.jp/obd/stats/etrn/index.php>

Usage

```

download_prec_no()

download_block_no(prec_no)

```

Arguments

prec_no A string or numeric of area no.

Value

download_prec_no(): a tibble of prec_no and area. download_block_no(): a tibble of prec_no, block_no, station and type. NULL when failed.

Examples

```

prec_no <- download_prec_no()
prec_no
download_block_no(61)

```

gracefully_fail	<i>Graceful fail</i>
-----------------	----------------------

Description

Graceful fail

Usage

```
gracefully_fail(remote_file)
```

Arguments

remote_file	A string of remote file.
-------------	--------------------------

Value

An XML document when succeeded, or invisible NULL when failed.

References

<https://gist.github.com/kvasilopoulos/47f24348ed75cdb6365312b17f4b914c>

head_3	<i>Wrapper function to head 3 items</i>
--------	---

Description

Wrapper function to head 3 items

Usage

```
head_3(x)
```

Arguments

x	An object.
---	------------

Value

An object like x with length 3.

mean_cli	<i>Downloaded tables of climate normals in Japan</i>
----------	--

Description

Raw tables downloaded from Japan Meteorological Agency web pages, before cleaning into `data(climate_jp_full)`. Kept for reproducibility of `data-raw/climate_jp_full.R`. Each element is a table of a station of `data(station_jp_full)`, and the order of the elements is the same as the rows of the data. Column names are not set, and the first rows are headers of the web page. <https://www.data.jma.go.jp/obd/stats/etrn/index.php>

Usage

```
mean_cli
```

Format

A list of 1673 tibbles.

21 columns 157 tables of "kansho" (weather station).

10 columns 1512 tables of "AMeDAS".

NULL 4 stations, which have no normals.

Examples

```
data(mean_cli)
length(mean_cli)
dim(mean_cli[[1]])
```

sleep	<i>Wrapper function to sleep</i>
-------	----------------------------------

Description

Wrapper function to sleep

Usage

```
sleep(sec = 5)
```

Arguments

`sec` A numeric to sleep (sec).

Value

No return value, called for side effects.

station_jp	<i>Climate stations in Japan</i>
------------	----------------------------------

Description

Climate stations in Japan

Usage

station_jp

Format

A data frame with 157 rows and 11 variable:

region Region. Escaped by `stringi::stri_escape_unicode()`.

pref Prefecture. Escaped by `stringi::stri_escape_unicode()`

no Station no.

station Station name. To avoid duplication, including country name after station name. Can split by "_". Escaped by `stringi::stri_escape_unicode()`.

altitude Altitude. (m)

latitude Latitude. (degree)

longitude Longitude. (degree)

NS North or South.

WE West or East.

yomi Pronunciation in Japanese. Escaped by `stringi::stri_escape_unicode()`

city City name. Escaped by `stringi::stri_escape_unicode()`.

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(station_jp)
station_jp %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode)
```

station_jp_full	<i>All stations in Japan</i>
-----------------	------------------------------

Description

Station information downloaded from Japan Meteorological Agency web pages. `data(station_jp)` includes only 157 stations of climate data, while this data includes all 1673 stations. A pair of `prec_no` and `station_no` specifies a station in `detail_url()` and `download_detail()`. Note that `station_no` of "kansho" (weather station) has 5 digits (159 stations) and that of "AMeDAS" has 4 digits (1514 stations). <https://www.data.jma.go.jp/obd/stats/etrn/index.php>

Usage

```
station_jp_full
```

Format

A data frame with 1673 rows and 16 variables:

station Station name. Escaped by `stringi::stri_escape_unicode()`.
prec_no Area no of 'JMA'. Escaped by `stringi::stri_escape_unicode()`.
station_no Station no of 'JMA', which is used as `block_no` in `detail_url()`. Escaped by `stringi::stri_escape_unicode()`.
yomi Pronunciation in Japanese. Escaped by `stringi::stri_escape_unicode()`.
altitude Altitude (m)
precipitation Flag of observation (1: observed, 0: not observed). Character, not numeric.
wind Flag of observation (1: observed, 0: not observed)
temperature Flag of observation (1: observed, 0: not observed)
sunshine Flag of observation (1: observed, 0: not observed)
snow Flag of observation (1: observed, 0: not observed)
moisture Flag of observation (1: observed, 0: not observed)
prec Area name of `prec_no`. Escaped by `stringi::stri_escape_unicode()`.
latitude Latitude (degree)
longitude Longitude (degree)
end_date Date of the end of observation. "9999-99-99" shows that the station is in operation (1287 stations). Escaped by `stringi::stri_escape_unicode()`.
memo Note of 'JMA'. Escaped by `stringi::stri_escape_unicode()`.

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(station_jp_full)
station_jp_full %>%
  head_3() %>%
  dplyr::mutate_if(is.character, stringi::stri_unescape_unicode)
```

station_links	<i>Station name and its URL</i>
---------------	---------------------------------

Description

Station name and its URL

Usage

```
station_links
```

Format

A data frame with 3444 rows and 4 variable:

no Station no

station Station information including no, month, temperature, precipitation, station, country, latitude, NS, longitude, WE, altitude. The information is NOT cleaned Row information downloaded from each URL. Escaped by stringi::stri_escape_unicode().

url URL of station.

continent Continent. Escaped by stringi::stri_escape_unicode().

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(station_links)
station_links %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode)
```

station_world	<i>Climate stations of the world</i>
---------------	--------------------------------------

Description

Climate stations of the world

Usage

```
station_world
```

Format

A data frame with 3444 rows and 9 variable:

no Station no

station Station name. To avoid duplication, including country name after station name. Can split by "_". Escaped by `stringi::stri_escape_unicode()`.

continent Continent. Escaped by `stringi::stri_escape_unicode()`.

country Country name. Escaped by `stringi::stri_escape_unicode()`.

altitude Altitude (m)

latitude Latitude (degree)

NS North or South.

longitude Longitude (degree)

WE West or East

Examples

```
library(magrittr)
library(stringi)
library(dplyr)
data(station_world)
station_world %>%
  dplyr::mutate_all(stringi::stri_unescape_unicode)
```

wi

Calculate warm index and cold index

Description

Calculate warm index and cold index

Usage

`wi(x)`

`ci(x)`

Arguments

`x` A numeric vector

Value

A string vector of url links.

References

Kira, T. 1945. A new classification of climate in eastern Asia as the basis for agricultural geography, Hort. Inst. Kyoto Univ., Kyoto. (in Japanese) Warmth Index (WI) and Cold Index (CI) was proposed by Kira (1945), which is known closely related to the distribution of vegetation. Indices can be calculated by following equations. $wi = \sum (Ti - 5)$, where wi is Warm index, Ti (Celsius) is mean temperature of each month in a year when $Ti > 5$. Indices can be calculated by following equations. $wi = -\sum (Ti - 5)$, where wi is Cold index, when $Ti < 5$.

Examples

```
temp <- c(-7.8, -7.2, -2.4, 5.2, 11.7, 16.5, 20.5, 21.1, 15.6, 8.8, 2.0, -4.1)
wi(temp)
ci(temp)
wi <- sum(c(0, 0, 0, 0.2, 6.7, 11.5, 15.5, 16.1, 10.6, 3.8, 0, 0))
ci <- sum(c(12.8, 12.2, 7.4, 0, 0, 0, 0, 0, 0, 0, 3.0, 9.1))
```

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