Package ‘DataMetProcess’

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Title Meteorological Data Processing
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Description Set of tools aimed at processing meteorological data, converting hourly recorded data to daily, monthly and annual data.
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Description

Allows you to correct the timezone based on a date column and another time column

Usage

adjustDate(data = NULL, col_date = NULL, col_hour = NULL, fuso = NULL)

Arguments

data: Data frame containing the data
col_date: Column containing the dates
col_hour: Column containing the time. It must be in the format "hh", "hh:mm", or "hh:mm:ss"; only the hours "hh" will be used for conversion.
fuso: Time zone for correction. Query OlsonNames()

Value

Data frame with the corrected timezone

Examples

address <- base::system.file("extdata", "ex1_inmet.CSV", package = "DataMetProcess")

df <- read.table(address, h=TRUE, sep = ";", dec = ",", skip = 8, na.strings = -9999, check.names = FALSE)

df$Data = as.Date(df$Data, format = "%d/%m/%Y")

df <- adjustDate(df, colnames(df)[1], colnames(df)[2],
...
**describeDMY**

```r
defus = "America/Bahia"

head(df[1:2])
```

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**calculateDMY**

*Calculation of daily, monthly and annual scales*

**Description**

Performs data processing on an hourly scale for daily, monthly or annual scales

**Usage**

```r
calculateDMY(
  data = NULL,
  col_date = NULL,
  col_sum = NULL,
  col_mean = NULL,
  n.round = 2,
  type = c("Daily", "Monthly", "Yearly")
)
```

**Arguments**

- **data**: Data frame containing the data
- **col_date**: String with the column of data containing the date (R default date: "%Y-%m-%d")
- **col_sum**: String with the column of data to apply the sum process
- **col_mean**: String with the column of data to apply the averaging process
- **n.round**: Integer, number of decimal places
- **type**: String, receives "Daily", "Monthly" or "Yearly" ("Daily" default). Defines the scale of processing to be performed

**Value**

Data frame with the defined scale

**Examples**

```r
address <-
base::system.file("extdata",
  "ex1_inmet.CSV",
  package = "DataMetProcess")

df <- read.table(
```
calculateETrefPM

The FAO Penman–Monteith for calculating daily reference evapotranspiration

df$Data = as.Date(df$Data, format = "%d/%m/%Y")

df.d <- calculateDMY(
data = df,
col_date = "Data",
col_sum = colnames(df)[c(3,7)],
col_mean = colnames(df)[-c(1,2,3,7)],
type = "Daily"
)

df.m <- calculateDMY(
data = df.d,
col_date = "Data",
col_sum = colnames(df.d)[c(2)],
col_mean = colnames(df.d)[-c(1,2)],
type = "Monthly"
)

df.a <- calculateDMY(
data = df.m,
col_date = "Data",
col_sum = colnames(df.m)[c(2)],
col_mean = colnames(df.m)[-c(1,2)],
type = "Yearly"
)

Description

Calculation of daily reference evapotranspiration using the PM method for a dataset stored in a data.frame (Allen et al., 1998).
Usage

calculateETrefPM(
  data = NULL,
  Lat = NULL,
  Alt = NULL,
  Alt_an = NULL,
  DAP = 1,
  Date = NULL,
  Temp = NULL,
  G = NULL,
  Humid = NULL,
  Rad = NULL,
  Press = NULL,
  Wind = NULL,
  Kc = NULL
)

Arguments

data                Data frame containing the data
Lat                 Numeric, latitude in decimals
Alt                 Numeric, altitude in meters
Alt_an              Numeric, anemometer height in meters
DAP                 Numeric, days after planting for the first column date
Date                String with the column name containing date records (R default date: "%Y-%m-%d")
Temp                String with the column name containing temperature records in °C
G                   Optional, if NULL will be considered as zero. String with the column name containing soil heat flux (MJ/m²/day)
Humid               String with the column name containing relative humidity records in %
Rad                 String with the column name containing global radiation records in MJ/m²
Press               String with the column name containing atmospheric pressure records in hPa
Wind                String with the column name containing wind speed records in m/s
Kc                   Optional, when not NULL the crop evapotranspiration ETc is calculated based on ETref. String with the column name containing crop coefficient (Kc) records

Details

The FAO Penman–Monteith method:

\[
ET_{ref \ PM} = \frac{0.408 \Delta (Rn - G) + \gamma \frac{900}{T + 273} u_2 (e_s - e_a)}{\Delta + \gamma (1 + 0.34 u_2)}
\]

where: ETref - reference evapotranspiration (mm/dia), \(\Delta\) - slope of the saturated water–vapor-pressure curve (kPa/°C), \(Rn\) - net radiation (MJ/m²/day), \(G\) - soil heat flux (MJ/m²/day), \(\gamma\) - psychrometric constant (kPa/°C), \(T\) - average daily air temperature (°C), \(u_2\) - wind speed at 2m height (m/s), \(e_s\) - saturation vapor pressure (kPa), \(e_a\) - actual vapor pressure (kPa)
calculateETrefPM

Value

Data frame with: Date; ETref - reference evapotranspiration (mm/dia); LLI - irrigation level (mm/dia); DJ - julian day; DAP - days after planting; es - saturation vapor pressure (kPa); ea - actual vapor pressure (kPa); delta - slope of the saturated water–vapor-pressure curve (kPA/°C); y - psychrometric constant (kPA/°C); Rn - net radiation (MJ/m²/dia); ETc - crop evapotranspiration (mm/dia) (depends on supply of Kc)

References


Examples

address <- base::system.file("extdata", "ex2_daily.CSV", package = "DataMetProcess")
df <- read.table(address, h = TRUE, sep = ";")
#converting to Mj/m
df$radiacao_global_kj_m <- df$radiacao_global_kj_m/1000
colnames(df)[3] <- "radiacao_global_mj_m"
df.Eto <- calculateETrefPM(data = df, Lat = -21.980353, Alt = 859.29, Alt_an = 10, DAP = 1, Date = colnames(df)[1], Temp = colnames(df)[7], G = NULL, Humid = colnames(df)[15], Rad = colnames(df)[3], Press = colnames(df)[4], Wind = colnames(df)[18], Kc = NULL)
list_inmet  

List of data available at INMET by year

Description

Collects the available files for the year and returns a list containing: 1) a table containing the addresses of each file inside the zip for later extraction by the down_inmet() function, 2) another structured table with the information available in the file name (e.g., city, station code, year, date of start and end date) and 3) the address of the zip file.

Usage

list_inmet(year = NULL, filename = NULL)

Arguments

year  
year for download in the INMET database

filename  
string containing the path and name of the file with the extension ".zip", if NULL (default) it will be saved in a temporary file

Value

List containing: 1) a table containing the addresses of each file inside the zip for later extraction by the unzip() function of the utils package, 2) another structured table with the information available in the file name (e.g., city, station code, year, date of start and end date) and 3) the address of the zip file.

Examples

```r
file.down <- tempfile()
file.save <- tempfile()

info.inmet <- DataMetProcess::list_inmet(year="2000", file.down)

unzip.file <-
  utils::unzip(
    zipfile = file.down, #or info.inmet$Saved
    exdir = file.save
  )

unzip.file
```
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