Package 'pollen'

July 22, 2017

Type Package

Title Analysis of Aerobiological Data

Version 0.53.00

Description

Supports analysis of aerobiological data. Available features include determination of pollen season limits, replacement of outliers (Kasprzyk and Walanus (2014) <doi:10.1007/s10453-014-9332-8>), and calculation of growing degree days.

Imports lubridate, purrr, dplyr

Suggests testthat, knitr, rmarkdown

URL https://github.com/Nowosad/pollen

BugReports https://github.com/Nowosad/pollen/issues

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LazyData TRUE

VignetteBuilder knitr

RoxygenNote 6.0.1

NeedsCompilation no

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R topics documented:

gdd *Growing Degree Days Function*

Description

This function calculates growing degree days (GDD) using the average of the daily maximum and minimum temperatures, a base temperature and a maximum base temperature

Usage

```
gdd(x, tmax, tmin, tbase, tbase_max)
```

Arguments

x	data.frame object containing the data
tmax	daily maximum temperature
tmin	daily minimum temperature
tbase	base temperature
tbase_max	maximum base temperature

Value

a numeric vector with GDD values

Examples

```
set.seed(25)
df <- data.frame(tmax=runif(100, 6, 10), tmin=runif(100, 4,6))

gdd(df, tmax='tmax', tmin='tmin', tbase=5, tbase_max=30)
```

outliers_replacer *A Outliers Replacer Function*

Description

This function finds outliers in pollen time-series and replace them with backgroud values

Usage

```
outliers_replacer(x, value, date, threshold = 5, sum_percent = 100)
```

Arguments

x	A data.frame with dates and pollen count values
value	The name of the column with pollen count values
date	The name of the dates column
threshold	A number indicating how many times outling value needs to be larger than the backgroud to be replaces (default is 5)
sum_percent	A sum_percent parameter

Value

A new data.frame object with replaced outliers

References

Kasprzyk, I. and A. Walanus.: 2014. Gamma, Gaussian and Logistic Distribution Models for Airborne Pollen Grains and Fungal Spore Season Dynamics, Aerobiologia 30(4), 369-83.

Examples

```
data(pollen_count)
df <- subset(pollen_count, site=='Shire')
new_df <- outliers_replacer(df, value="birch", date="date")
identical(df, new_df)

library('purrr')
new_pollen_count <- pollen_count %>% split(., .$site) %>%
                 map_df(~outliers_replacer(., value="hazel", date="date", threshold=4))
```

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pollen *pollen*

Description

The pollen package offers a set of functions for working with aerobiological data.

pollen_count *Pollen count of alder, birch, and hazel*

Description

pollen_count A dataset containing the synthetic data of alder, birch, and hazel pollen count in four locations ('Oz', 'Shire', 'Atlantis', 'Hundred Acre Wood') between 2007 and 2016

Format

A data frame with 8352 rows and 5 variables:

- site
- date
- alder
- birch
- hazel

pollen_season *A Pollen Season Function*

Description

This function calculates the start and the end of pollen season for each year

Usage

```
pollen_season(x, value, date, method, threshold = NULL)
```

Arguments

x	A data.frame with dates and pollen count values
value	The name of the column with pollen count values
date	The name of the dates column
method	The pollen season method - "90", "95", "98", "Mesa", "Jager", "Lejoly", or "Driessen"
threshold	A threshold value used for "Driessen" method

Value

A data.frame object with year, date of pollen season start and date of pollen season end

References

Nilsson S. and Persson S.: 1981, Tree pollen spectra in the Stockholm region (Sweden) 1973-1980, Grana 20, 179-182.

Andersen T.B.: 1991, A model to predict the beginning of the pollen season, Grana 30, 269-275.

Torben B.A.: 1991, A model to predict the beginning of the pollen season, Grana 30, 269-275.

Galan C., Emberlin J., Dominguez E., Bryant R.H. and Villamandos F.: 1995, A comparative analysis of daily variations in the Gramineae pollen counts at Cordoba, Spain and London, UK, Grana 34, 189-198.

Sanchez-Mesa J.A., Smith M., Emberlin J., Allitt U., Caulton E. and Galan C.: 2003, Characteristics of grass pollen seasons in areas of southern Spain and the United Kingdom, Aerobiologia 19, 243-250.

Jager S., Nilsson S., Berggren B., Pessi A.M., Helander M. and Ramfjord H.: 1996, Trends of some airborne tree pollen in the Nordic countries and Austria, 1980-1993. A comparison between Stockholm, Trondheim, Turku and Vienna, Grana 35, 171-178.

Lejoly-Gabriel and Leuschner: 1983, Comparison of air-borne pollen at Louvain-la-Neuve (Belgium) and Basel (Switzerland) during 1979 and 1980, Grana 22, 59-64.

Driessen M. N. B. M., Van Herpen R. M. A. and Smithuis, L. O. M. J.: 1990, Prediction of the start of the grass pollen season for the southern part of the Netherlands, Grana, 29(1), 79-86.

Examples

```
data(pollen_count)
df <- subset(pollen_count, site=='Oz')
pollen_season(df, value="birch", date="date", method="95")

df2 <- subset(pollen_count, site=='Atlantis')
pollen_season(df2, value="alder", date="date", method="95")

library('purrr')
pollen_count %>% split(., .$site) %>%
             map_df(~pollen_season(., value="hazel", date="date", method="95"), .id="site")
```

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