

Package ‘adw’

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Title Angular Distance Weighting Interpolation

Version 0.3.1

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Description

The irregularly-spaced data are interpolated onto regular latitude-longitude grids by weighting each station according to its distance and angle from the center of a search radius.

URL <https://github.com/PanfengZhang/adw>

BugReports <https://github.com/PanfengZhang/adw/issues>

Depends R (>= 4.2.0)

Imports methods, sf, terra

License GPL-3

Encoding UTF-8

RoxygenNote 7.2.3

LazyData true

Suggests knitr, rmarkdown, ggplot2

VignetteBuilder knitr

NeedsCompilation no

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adw	<i>Angular Distance Weighting Interpolation.</i>
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Description

The irregularly-spaced data are interpolated onto regular latitude-longitude grids by weighting each station according to its distance and angle from the center of a search radius.

Usage

```
adw(ds, extent, gridsize = 5, cdd = 1000, m = 4, nmin = 3, nmax = 10)
```

Arguments

ds	a input dataframe which contains the column names of lon, lat, value.
extent	a extent numeric vector of length 4 in the order c(xmin, xmax, ymin, ymax), or a polygon object with class 'sf' (package 'sf'), or a polygon object with class 'SpatVector' (package 'terra'). Assume that the coordinate reference system is WGS1984 (EPSG: 4326).
gridsize	the grid size, i.e. the grid resolution. units: degree.
cdd	correlation decay distance, i.e. the maximum search radius. unit: kilometer. default value: 1000km.
m	is used to adjust the weighting function further, higher values of m increase the rate at which the weight decays with distance. default value 4.
nmin	the minimum number of observation points required to interpolate a grid within the search radius (i.e. cdd); if the number of stations within the search radius (cdd) is less than nmin, a missing value will be generated to fill this grid. default value 3.
nmax	The number of nearest points within the search radius to use for interpolation. default value 10.

Value

a regular latitude-longitude dataframe grid (interpolated values).

References

Caesar, J., L. Alexander, and R. Vose, 2006: Large-scale changes in observed daily maximum and minimum temperatures: Creation and analysis of a new gridded data set. *Journal of Geophysical Research*, 111, <https://doi.org/10.1029/2005JD006280>.

Examples

```

set.seed(2)
dd <- data.frame(lon = runif(100, min = 110, max = 117),
                 lat = runif(100, min = 31, max = 37),
                 value = runif(100, min = -10, max = 10))

head(dd)

# example 1
grd <- adw(dd, extent = c(110, 117, 31, 37), gridsize = 0.5, cdd = 500)
head(grd)

# example 2
urlmap <- "https://geo.datav.aliyun.com/areas_v3/bound/410000.json"
hmap <- sf::read_sf(urlmap, as_tibble = FALSE) |> sf::st_make_valid() # return a 'sf' object.
grd <- adw_sf(dd, extent = hmap, gridsize = 0.5, cdd = 500)
head(grd)

# example 3
urlmap <- "https://geo.datav.aliyun.com/areas_v3/bound/410000.json"
hmap <- terra::vect(urlmap) # return a 'SpatVector' object.
grd <- adw(dd, extent = hmap, gridsize = 0.5, cdd = 500)
head(grd)

```

adw_sf

Angular Distance Weighting Interpolation, adw_sf.

Description

The irregularly-spaced data are interpolated onto regular latitude-longitude grids by weighting each station according to its distance and angle from the center of a search radius.

Usage

```
adw_sf(ds, extent, gridsize = 5, cdd = 1000, m = 4, nmin = 3, nmax = 10)
```

Arguments

ds	a input dataframe which contains the column names of lon, lat, value.
extent	a polygon object with class 'sf' (package 'sf'). Assume that the coordinate reference system is WGS1984 (EPSG: 4326).
gridsize	the grid size, i.e. the grid resolution. units: degree.
cdd	correlation decay distance, i.e. the maximum search radius. unit: kilometer. default value: 1000km.
m	is used to adjust the weighting function further, higher values of m increase the rate at which the weight decays with distance. default value 4.

nmin	the minimum number of observation points required to interpolate a grid within the search radius (i.e. cdd); if the number of stations within the search radius (cdd) is less than nmin, a missing value will be generated to fill this grid. default value 3.
nmax	The number of nearest points within the search radius to use for interpolation. default value 10.

Value

a regular latitude-longitude dataframe grid (interpolated values).

References

Caesar, J., L. Alexander, and R. Vose, 2006: Large-scale changes in observed daily maximum and minimum temperatures: Creation and analysis of a new gridded data set. *Journal of Geophysical Research*, 111, <https://doi.org/10.1029/2005JD006280>.

Examples

```
set.seed(2)
dd <- data.frame(lon = runif(100, min = 110, max = 117),
                 lat = runif(100, min = 31, max = 37),
                 value = runif(100, min = -10, max = 10))
head(dd)
urlmap <- "https://geo.datav.aliyun.com/areas_v3/bound/410000.json"
hmap <- sf::read_sf(urlmap, as_tibble = FALSE) |> sf::st_make_valid() # return a 'sf' object.
grd <- adw_sf(dd, extent = hmap, gridsize = 0.5, cdd = 500)
head(grd)
```

adw_terra

Angular Distance Weighting Interpolation, adw_terra.

Description

The irregularly-spaced data are interpolated onto regular latitude-longitude grids by weighting each station according to its distance and angle from the center of a search radius.

Usage

```
adw_terra(ds, extent, gridsize = 5, cdd = 1000, m = 4, nmin = 3, nmax = 10)
```

Arguments

ds	a input dataframe which contains the column names of lon, lat, value.
extent	a polygon object with class 'SpatVector' (package 'terra'). Assume that the coordinate reference system is WGS1984 (EPSG: 4326).
gridsize	the grid size, i.e. the grid resolution. units: degree.

cdd	correlation decay distance, i.e. the maximum search radius. unit: kilometer. default value: 1000km.
m	is used to adjust the weighting function further, higher values of m increase the rate at which the weight decays with distance. default value 4.
nmin	the minimum number of observation points required to interpolate a grid within the search radius (i.e. cdd); if the number of stations within the search radius (cdd) is less than nmin, a missing value will be generated to fill this grid. default value 3.
nmax	The number of nearest points within the search radius to use for interpolation. default value 10.

Value

a regular latitude-longitude dataframe grid (interpolated values).

References

Caesar, J., L. Alexander, and R. Vose, 2006: Large-scale changes in observed daily maximum and minimum temperatures: Creation and analysis of a new gridded data set. *Journal of Geophysical Research*, 111, <https://doi.org/10.1029/2005JD006280>.

Examples

```
set.seed(2)
dd <- data.frame(lon = runif(100, min = 110, max = 117),
                 lat = runif(100, min = 31, max = 37),
                 value = runif(100, min = -10, max = 10))
head(dd)
# example
urlmap <- "https://geo.datav.aliyun.com/areas_v3/bound/410000.json"
hmap <- terra::vect(urlmap) # return a 'SpatVector' object.
grd <- adw(dd, extent = hmap, gridsize = 0.5, cdd = 500)
head(grd)
```

adw_vector

Angular Distance Weighting Interpolation, adw_vector.

Description

The irregularly-spaced data are interpolated onto regular latitude-longitude grids by weighting each station according to its distance and angle from the center of a search radius.

Usage

```
adw_vector(ds, extent, gridsize = 5, cdd = 1000, m = 4, nmin = 3, nmax = 10)
```

Arguments

ds	a input dataframe which contains the column names of lon, lat, value.
extent	a extent numeric vector of length 4 in the order c(xmin, xmax, ymin, ymax).
gridsize	the grid size, i.e. the grid resolution. units: degree.
cdd	correlation decay distance, i.e. the maximum search radius. unit: kilometer. default value: 1000km.
m	is used to adjust the weighting function further, higher values of m increase the rate at which the weight decays with distance. default value 4.
nmin	the minimum number of observation points required to interpolate a grid within the search radius (i.e. cdd); if the number of stations within the search radius (cdd) is less than nmin, a missing value will be generated to fill this grid. default value 3.
nmax	The number of nearest points within the search radius to use for interpolation. default value 10.

Value

a regular latitude-longitude dataframe grid (interpolated values).

References

Caesar, J., L. Alexander, and R. Vose, 2006: Large-scale changes in observed daily maximum and minimum temperatures: Creation and analysis of a new gridded data set. *Journal of Geophysical Research*, 111, <https://doi.org/10.1029/2005JD006280>.

Examples

```
set.seed(2)
dd <- data.frame(lon = runif(100, min = 110, max = 117),
                 lat = runif(100, min = 31, max = 37),
                 value = runif(100, min = -10, max = 10))
head(dd)
# example
grd <- adw(dd, extent = c(110, 117, 31, 37), gridsize = 0.5, cdd = 500)
head(grd)
```

tavg

Henan Province temperature data

Description

Henan Province temperature data

Usage

```
tavg
```

tavg

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Format

A data frame with 116 rows and 3 variables:

lon numeric, longitude

lat numeric, latitude

value numeric, average temperature value ...

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