Package: CLimd (via r-universe)

September 7, 2024

Type Package

Title Generating Rainfall Rasters from IMD NetCDF Data

Version 0.1.0

Depends R(>= 2.10)

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Description The developed function is a comprehensive tool for the analysis of India Meteorological Department (IMD) NetCDF rainfall data. Specifically designed to process high-resolution daily gridded rainfall datasets. It provides four key functions to process IMD NetCDF rainfall data and create rasters for various temporal scales, including annual, seasonal, monthly, and weekly rainfall. For method details see, Malik, A. (2019).<DOI:10.1007/s12517-019-4454-5>. It supports different aggregation methods, such as sum, min, max, mean, and standard deviation. These functions are designed for spatio-temporal analysis of rainfall patterns, trend analysis,geostatistical modeling of rainfall variability, identifying rainfall anomalies and extreme events and can be an input for hydrological and agricultural models.

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Encoding UTF-8

Imports raster,ncdf4,qpdf

RoxygenNote 7.2.3

VignetteBuilder knitr

NeedsCompilation no

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Contents

`AnnualRF_raster` *Generating Annual rainfall raster from IMD NetCDF file*

Description

Generating Annual rainfall raster from IMD NetCDF file

Usage

```
AnnualRF_raster(nc_data, output_dir = NULL, fun = "sum", year)
```

Arguments

`nc_data`	Path to the IMD rainfall NetCDF file
`output_dir`	Directory to save the generated annual rainfall raster (Optional)
`fun`	Aggregation function ("sum", "min", "max", "mean", "sd")(Default is "sum")
`year`	Year for which to generate annual rainfall raster

Value

Annual rainfall raster in GeoTIFF format

References

1. Pai et al. (2014). Development of a new high spatial resolution (0.25° X 0.25°)Long period (1901-2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region, MAUSAM, 65(1),1-18. 2. Hijmans, R. J. (2022). raster: Geographic Data Analysis and Modeling. R package version 3.5-13. 3. Kumar et al. (2023). SpatGRID:Spatial Grid Generation from Longitude and Latitude List. R package version 0.1.0.

Examples

```
library(CLimd)
# Example usage:
nc_data <- system.file("extdata", "imd_RF_2022.nc", package = "CLimd")
output_dir <- NULL
fun<-"sum"
year<-2022
# Calculate annual rainfall sum for 2022
annual_rainfall_sum<-AnnualRF_raster(nc_data, output_dir=NULL, fun="sum", year)
```

MonthRF_raster *Generating Monthly Rainfall Rasters from IMD NetCDF file*

Description

Generating Monthly Rainfall Rasters from IMD NetCDF file

Usage

```
MonthRF_raster(nc_data, output_dir = NULL, fun = "sum", year)
```

Arguments

nc_data	Path to the IMD rainfall NetCDF file
output_dir	Directory to save the generated monthly rainfall raster (Optional)
fun	Aggregation function ("sum", "min", "max", "mean", "sd")(Default is "sum")
year	Year for which to generate monthly rainfall raster

Value

A list of monthly rainfall rasters in GeoTIFF format

References

1. Pai et al. (2014). Development of a new high spatial resolution (0.25° X 0.25°)Long period (1901-2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region, MAUSAM, 65(1),1-18. 2. Hijmans, R. J. (2022). raster: Geographic Data Analysis and Modeling. R package version 3.5-13. 3. Kumar et al. (2023). SpatGRID:Spatial Grid Generation from Longitude and Latitude List. R package version 0.1.0.

Examples

```
library(CLimd)
# Example usage:
nc_data <- system.file("extdata", "imd_RF_2022.nc", package = "CLimd")
output_dir <- NULL
fun<-"sum"
year<-2022
# Calculate monthly rainfall sums for 2022
monthly_rainfall <-MonthRF_raster(nc_data, output_dir=NULL, fun="sum", year)
# Calculate monthly rainfall means for 2022
fun<-"mean"
monthly_rainfall_means <- MonthRF_raster(nc_data, output_dir=NULL, fun="mean", year)
```

`SeasonalRF_raster` *Generating Seasonal rainfall rasters from IMD NetCDF file*

Description

Generating Seasonal rainfall rasters from IMD NetCDF file

Usage

```
SeasonalRF_raster(nc_data, output_dir = NULL, fun = "sum", year)
```

Arguments

`nc_data`	Path to the IMD rainfall NetCDF file
`output_dir`	Directory to save the generated seasonal rainfall rasters (Optional)
`fun`	Aggregation function ("sum", "min", "max", "mean", "sd")(Default is "sum")
`year`	Year for which to generate seasonal rainfall raster

Value

Returns a list containing the four seasonal rasters in GeoTIFF format

References

1. Pai et al. (2014). Development of a new high spatial resolution (0.25° X 0.25°)Long period (1901-2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region, MAUSAM, 65(1),1-18. 2. Hijmans, R. J. (2022). raster: Geographic Data Analysis and Modeling. R package version 3.5-13. 3. Kumar et al. (2023). SpatGRID:Spatial Grid Generation from Longitude and Latitude List. R package version 0.1.0.

Examples

```
library(CLimd)
# Example usage:
nc_data <- system.file("extdata", "imd_RF_2022.nc", package = "CLimd")
output_dir <- NULL
fun<-"sum"
year<-2022
# Calculate seasonal rainfall sum for 2022
seasonal_rainfall <-SeasonalRF_raster(nc_data, output_dir=NULL, fun="sum", year)
```

WeeklyRF_raster *Generating weekly rainfall rasters from IMD NetCDF file*

Description

Generating weekly rainfall rasters from IMD NetCDF file

Usage

```
WeeklyRF_raster(nc_data, output_dir = NULL, fun = "sum", year)
```

Arguments

nc_data	Path to the IMD rainfall NetCDF file
output_dir	Directory to save the generated weekly rainfall rasters (Optional)
fun	Aggregation function ("sum", "min", "max", "mean", "sd")(Default is "sum")
year	Year for which to generate weekly rainfall raster

Value

A list of weekly rainfall rasters in GeoTIFF format

References

1. Pai et al. (2014). Development of a new high spatial resolution (0.25° X 0.25°)Long period (1901-2010) daily gridded rainfall data set over India and its comparison with existing data sets over the region, MAUSAM, 65(1),1-18. 2. Hijmans, R. J. (2022). raster: Geographic Data Analysis and Modeling. R package version 3.5-13. 3. Kumar et al. (2023). SpatGRID:Spatial Grid Generation from Longitude and Latitude List. R package version 0.1.0.

Examples

```
library(CLimd)
# Example usage:
nc_data <- system.file("extdata", "imd_RF_2022.nc", package = "CLimd")
output_dir <- NULL
fun<-"sum"
year<-2022
# Calculate weekly rainfall sum for 2022
weekly_rainfall_sum <-WeeklyRF_raster(nc_data, output_dir=NULL, fun="sum", year)
```

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