

Package ‘wdiEF’

February 19, 2025

Title Calculation of the Water Deficit Index (WDI) and the Evaporative Fraction (EF) on Rasters

Version 1.0.3

Description

Calculates the Water Deficit Index (WDI) and the Evaporative Fraction (EF) using geospatial data, such as fractional vegetation cover (FVC) and surface-air temperature difference (TS-TA). Terms like ``raster'', ``CRS'' are part of standard geospatial terminology.

License GPL-3

Encoding UTF-8

RoxygenNote 7.3.2

Imports dplyr, stats, terra

Suggests testthat (>= 3.0.0)

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NeedsCompilation no

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calculate_EF *Calculate the Evaporative Fraction (EF)*

Description

This function calculates the EF from two rasters: fractional vegetation cover (FVC) and the surface-air temperature difference (TS-TA). It saves the resulting EF raster to the specified output path.

Usage

```
calculate_EF(  
  FVC_path,  
  TS_TA_path,  
  output_path,  
  n_intervals = 20,  
  percentile = 0.01  
)
```

Arguments

FVC_path	Character. File path to the FVC raster. Must have the same CRS and extent as the TS-TA raster.
TS_TA_path	Character. File path to the raster of TS-TA (surface-air temperature difference). TS and TA must have the same unit of measurement (Kelvin preferably).
output_path	Character. File path where the EF raster will be saved.
n_intervals	Integer. Number of intervals for splitting FVC values (default: 20).
percentile	Numeric. Percentage used for identifying wet and dry edges (default: 0.01).

Details

- The input rasters (FVC and TS-TA) must have the same CRS (Coordinate Reference System) and extent.
- If they differ, the function will attempt to reproject and resample the rasters automatically.

Value

A raster object representing the Evaporative Fraction (EF).

Examples

```
# Paths to example data included in the package  
library(terra)  
  
FVC_raster <- rast(system.file("extdata", "FVC_reduced.tif", package = "wdiEF"))  
TS_TA_raster <- rast(system.file("extdata", "TS_TA_reduced.tif", package = "wdiEF"))  
  
# Output path (temporary file for example purposes)
```

```
output_path <- tempfile(fileext = ".tif")

# Run the function
calculate_EF(
  FVC_path = FVC_raster,
  TS_TA_path = TS_TA_raster,
  output_path = output_path,
  n_intervals = 20,
  percentile = 0.01
)

# Print the output path
print(output_path)
```

`calculate_WDI`*Calculate the Water Deficit Index (WDI)*

Description

This function calculates the WDI from two rasters: fractional vegetation cover (FVC) and the surface-air temperature difference (TS-TA). It saves the resulting WDI raster to the specified output path.

Usage

```
calculate_WDI(
  FVC_path,
  TS_TA_path,
  output_path,
  n_intervals = 20,
  percentile = 0.01
)
```

Arguments

<code>FVC_path</code>	Character. File path to the FVC raster. Must have the same CRS and extent as the TS-TA raster.
<code>TS_TA_path</code>	Character. File path to the raster of TS-TA (surface-air temperature difference). TS and TA must have the same unit of measurement (Kelvin preferably).
<code>output_path</code>	Character. File path where the WDI raster will be saved.
<code>n_intervals</code>	Integer. Number of intervals for splitting FVC values (default: 20).
<code>percentile</code>	Numeric. Percentage used for identifying wet and dry edges (default: 0.01).

Details

- The input rasters (FVC and TS-TA) must have the same CRS (Coordinate Reference System) and extent.
- If they differ, the function will attempt to reproject and resample the rasters automatically.

Value

A raster object representing the Water Deficit Index (WDI).

Examples

```
# Paths to example data included in the package
library(terra)

FVC_raster <- rast(system.file("extdata", "FVC_reduced.tif", package = "wdiEF"))
TS_TA_raster <- rast(system.file("extdata", "TS_TA_reduced.tif", package = "wdiEF"))

# Output path (temporary file for example purposes)
output_path <- tempfile(fileext = ".tif")

# Run the function
calculate_WDI(
  FVC_path = FVC_raster,
  TS_TA_path = TS_TA_raster,
  output_path = output_path,
  n_intervals = 20,
  percentile = 0.01
)

# Print the output path
print(output_path)
```

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