Package 'wdiEF'

May 8, 2026

Type Package

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

Version 1.0.4

Date 2025-10-20

Description Provides functions to calculate the Water Deficit Index (WDI) and the Evaporative Fraction (EF) using geospatial raster data such as fractional vegetation cover (FVC) and surface-air temperature difference (TS-TA). The package automates regression-based edge fitting and produces continuous spatial maps of surface moisture and evaporative dynamics.

License GPL-3

Encoding UTF-8

RoxygenNote 7.3.2

Imports dplyr, stats, terra

Suggests testthat (>= 3.0.0)

NeedsCompilation no

Author Gaelle Hamelin [aut, cre] (ORCID: <https://orcid.org/0009-0007-2148-7937>)

Maintainer Gaelle Hamelin <gaelle.hamelin@institut-agro.fr>

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Contents

`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

`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 WDI 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 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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