Package 'ssebiEF'

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Type Package

Title Calculation of SSEBI and Evaporative Fraction from Raster Data

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Description Calculates a modified Simplified Surface Energy Balance Index (SSEBI) and the Evaporative Fraction (EF) using geospatial raster data such as albedo and surface-air temperature difference (TS–TA). The SSEBI is computed from albedo and TS–TA to estimate surface moisture and evaporative dynamics, providing a robust assessment of surface dryness while accounting for atmospheric variations. Based on Roerink, Su, and Menenti (2000) <doi:10.1016/S1464-1909(99)00128-8>.

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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`calculate_EF` *Calculate the Evaporative Fraction (EF)*

Description

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

Usage

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

Arguments

`albedo_path`	Character. File path to the albedo 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 albedo values (default: 20).
`percentile`	Numeric. Percentage used for identifying wet and dry edges (default: 0.01).

Details

- The input rasters (`albedo` 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)

albedo_raster <- rast(system.file("extdata", "albedo_reduced.tif", package = "ssebiEF"))
TS_TA_raster <- rast(system.file("extdata", "TS_TA_reduced.tif", package = "ssebiEF"))

# Output path (temporary file for example purposes)
```

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

# Run the function
calculate_EF(
  albedo_path = albedo_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_SSEBI` *Calculate the Simplified Surface Energy Balance Index (SSEBI)*

Description

This function calculates the SSEBI from two rasters: albedo and the surface-air temperature difference (TS-TA). It saves the resulting SSEBI raster to the specified output path.

Usage

```
calculate_SSEBI(
  albedo_path,
  TS_TA_path,
  output_path,
  n_intervals = 20,
  percentile = 0.01
)
```

Arguments

`albedo_path`	Character. File path to the albedo 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 SSEBI raster will be saved.
`n_intervals`	Integer. Number of intervals for splitting albedo values (default: 20).
`percentile`	Numeric. Percentage used for identifying wet and dry edges (default: 0.01).

Details

- The input rasters (`albedo` 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 Simplified Surface Energy Balance Index (SSEBI).

Examples

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

albedo_raster <- rast(system.file("extdata", "albedo_reduced.tif", package = "ssebiEF"))
TS_TA_raster <- rast(system.file("extdata", "TS_TA_reduced.tif", package = "ssebiEF"))


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

# Run the function
calculate_SSEBI(
  albedo_path = albedo_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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