Package 'AeroEvapR'

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Type Package

Title Estimating Reservoir Evaporation via Aerodynamic Approach

Version 0.1.6

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Description Developed as an 'R' alternative to the 'AeroEvap' model developed by the Desert Research Institute (DRI) in 'python' <https://github.com/WSWUP/AeroEvap/blob/master/README.rst> which estimates open water evaporation using the aerodynamic mass transfer approach.

Encoding UTF-8

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Depends R (>= 4.2.0)

Imports readxl, data.table, openxlsx

Suggests knitr, rmarkdown,dplyr, ggplot2, lubridate

VignetteBuilder knitr

NeedsCompilation no

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Description

This package uses the aerodynamic mass transfer approach on variables given in the input file to estimate open water evaporation. The output includes calculated evaporation parameters as well as the input values.

Usage

```
aero_calc(df, sensor_height, timestep, out_file_format,out_file_name, verbose)
```

Arguments

df	Dataframe containing input data. Must include all data components ('T_skin', 'WS', 'P', 'T_air', 'RH', 'date'). Ensure date is formatted as a date object before reading into function.
sensor_height	Sensor height (m)
timestep	Measurement frequency (s). For example, hourly data would be timestep = 3600
out_file_format	Format for output file
out_file_name	Name for saved file
verbose	Logical indicator to hide output messages (FALSE will hide messages)

Details

Returns a list with calculated values for evaporation (mm/timestep), bulk transfer coefficient, vapor pressure deficit (kPa), and most stability value

Value

SH	Sensor height (m)
dt	Timestep
E	Evaporation (mm/timestep)
Ce	bulk transfer coefficent (unitless)
VPD	Vapor pressure deficit (kPA)
stability	Monin-Obhukov Similarity Theory stability parameter (z/L)

Note

This package was developed based on AeroEvap, a Python implementation of the aerodynamic mass-transfer approach for open-water evaporation. See AeroEvap on GitHub.

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References

AeroEvap (Python version): https://github.com/WSWUP/AeroEvap/tree/master

Examples

```
old_par <- par(no.readonly = TRUE)

df <- data.frame(
  date = seq(as.POSIXct("2020-01-01"), by = 3600, length.out = 5),
  T_skin = c(20, 21, 22, 21, 20),
  WS = c(3, 3.5, 4, 3.8, 3.2),
  P = rep(101.3, 5),
  T_air = c(18, 18.5, 19, 18.8, 18.2),
  RH = c(50, 52, 51, 49, 50)
)

# Run aero_calc with sample inputs
result <- aero_calc(df,
                    sensor_height = 2,
                    timestep = 3600,
                    out_file_format = "none",
                    out_file_name = NULL,
                    verbose = TRUE)

# View results
print(result)

# Reset graphical parameters
par(old_par)
```

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