

Package ‘PMEvapotranspiration’

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Type Package

Title Calculation of the Penman-Monteith Evapotranspiration using Weather Variables

Version 0.1.0

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Description The Food and Agriculture Organization-56 Penman-Monteith is one of the important method for estimating evapotranspiration from vegetated land areas. This package helps to calculate reference evapotranspiration using the weather variables collected from weather station. Evapotranspiration is the process of water transfer from the land surface to the atmosphere through evaporation from soil and other surfaces and transpiration from plants. The package aims to support agricultural, hydrological, and environmental research by offering accurate and accessible reference evapotranspiration calculation. This package has been developed using concept of Córdova et al. (2015)<[doi:10.1016/j.apm.2022.09.004](https://doi.org/10.1016/j.apm.2022.09.004)> and Debnath et al. (2015) <[doi:10.1007/s40710-015-0107-1](https://doi.org/10.1007/s40710-015-0107-1)>.

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calculateET0 *PMEvapotranspiration*

Description

FAO-56 Penman-Monteith evapotranspiration

Usage

calculateET0(T_max, T_min, Latitude, altitude, RH_min, RH_max, u2, n, J)

Arguments

T_max	Maximum temperature in degree Celsius
T_min	Minimum temperature in degree Celsius
Latitude	Latitude in decimal degree
altitude	altitude in meter
RH_min	Minimum Relative humidity in percentage
RH_max	Maximum Relative humidity in percentage
u2	The average wind speed (m/s) measured at 2 m above the ground level
n	Actual daily sunshine duration
J	number of the day in the year between 1 (1 January) and 365 or 366 (31 December)

Value

Returns a list containing the calculated reference evapotranspiration (ET0) and other intermediate values used in the calculation. The list includes:

- ET0: Reference evapotranspiration calculated using FAO-56 Penman-Monteith Equation.
- T_mean: Mean temperature.
- P: Atmospheric pressure.
- gamma: Psychrometric constant.
- delta: Slope of vapor pressure curve.
- e_s: Saturation vapor pressure.
- e_a: Actual vapor pressure.
- Ra: Extraterrestrial radiation.
- Rso: Clear sky solar radiation.
- Rs: Solar radiation.
- Rns: Net shortwave radiation.
- Rnl: Net longwave radiation.
- Rn: Net radiation.

References

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- Córdova, M., Carrillo-Rojas, G., Crespo, P., Wilcox, B., and Célleri, R. (2015). Evaluation of the Penman-Monteith (FAO 56 PM) method for calculating reference evapotranspiration using limited data. *Mountain Research and Development*, 35(3), 230-239.
- Debnath, S., Adamala, S., and Raghuvanshi, N. S. (2015). Sensitivity analysis of FAO-56 Penman-Monteith method for different agro-ecological regions of India. *Environmental Processes*, 2, 689-704.

Examples

```
{  
calculateET0(T_max = 25, T_min = 15, Latitude = 45,  
altitude = 100, RH_min = 20,  
RH_max = 80, u2 = 2, n = 10, J = 150)  
}
```

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