Package: RainfallErosivityFactor (via r-universe)

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Type Package

Title The Rainfall-Runoff Erosivity Factor

Version 1.0.0

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Description Determination of rainfall-runoff erosivity factor.

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License GPL (>= 2)

NeedsCompilation no

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RainfallErosivityFactor-package

The Rainfall-Runoff Erosivity Factor

Description

Determination of rainfall-runoff erosivity factor

Details

Package:	RainfallErosivityFactor
Type:	Package
Version:	1.0.0
Date:	2024-04-22
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References

Wischmeier, W. & Smith, D. (1978). Predicting rainfall erosion losses: a guide to conservation planning. Agricultural Handbook No. 537. U.S. Department of Agriculture,Washington DC, USA.

Examples

```
# Example
library(RainfallErosivityFactor)
data(RainFallExample, package="RainfallErosivityFactor")
RFactor(RainFallExample,1,24,10,2)
```

RainFallExample *The Rainfall Example Data Set-Runoff Erosivity Factor*

Description

Data set for determination of rainfall runoff erosivity factor

Details

Data should be organized into notebooks or spreadsheets, where the first column being the date (dd/mm/yyyy), the second one, the hour column (hh:mm) and the third column the precipitation in mm. The dot (.) must be used as decimal separator.

The results of package is: Monthy value (Final rainfall sum, Total erosivity [EI30], Number erosive, Number non erosive, Total erosive sum, Total non erosive sum).Annual value (Final rainfall sum, Total erosivity [EI30], Number erosive, Number non erosive, Total erosive sum, Total non erosive sum). R factor (average total erosivity)

References

Wischmeier, W. & Smith, D. (1978). Predicting rainfall erosion losses: a guide to conservation planning. Agricultural Handbook No. 537. U.S. Department of Agriculture,Washington DC, USA.

RFactor *The Rainfall RFactor function- Computes Erosivity Factor*

Description

Function for determination of rainfall runoff erosivity factor.

Usage

```
RFactor(Data,initialmonth,months,registration,nyear)
```

Arguments

Data	Example data set
initialmonth	First month, data set
months	Total number of months of the data set
registration	Record of rainfall relative to 5 or 10 or 15 minute
nyear	Number Years relative to the size of the historical series

Details

follow the steps:

- 1st Step: Read the bank. This dataset has three columns, the first one is Date (dd/mm/yyyy), the second column is Time (hh:mm) and the third one is Rainfall (mm), in which each word is capitalized.
- 2nd Step: The break down of a long rainfall event. When accumulated precipitation was less than 1 mm in over 6 hours, the rainfall event is divided in two rainfall events.
- Note: Note for step 3, the calculations are performed for each rainfall event separately.
- 3rd Step: To obtain the I30 component, the sum of three consecutive rainfall were considered, with interval of 10 minutes. Subsequently, this value was expressed as rain intensity in millimeters per hour, referent to the interval of 30 minutes.
- 4th Step: I10 determination: recording-rain were in 10 minutes intervals. Then, the values were expressed as intensity of this interval in millimeters per hour.
- 5th Step: The unitary kinetic energy was calculated according to the equation developed by Wischmeier & Smith (1978), were E = 0.119 + 0.0873*Log I10 (MJ ha-1 mm-1).
- 6th Step: Multiplied the unitary kinetic energy (MJ ha^(-1) mm^(-1)) by its respective precipitation (mm) of the interval. Thus, the kinetic energy of the interval (MJ ha^(-1)) was determined.
- 7th Step: The sum of this kinetic energy of the interval was realized.
- 8th Step: Maximum value of I30 in the step 3rd was identified.
- 9th Step: EI30 determination was obtained by multiplication of 7th and 8th steps.
- 10th Step: Erosive rainfall must meet at least one of the three conditions: first, precipitation heigth greater than 10 mm; second, maximum I30 at least 24mm of rainfall fell in 15 minutes; and third, total kinetic energy greater than 3.6 MJ.
- 11th Step: In this package, was considered only the first condition.
- 12th Step: EI30 was computed only from erosive rainfall.
- 13th Step: Sum of erosive events in the specific month, was the monthly rainfall erosivity of such month.
- 14th Step: Sum of EI30 of each month, was the annual rainfall erosivity.
- 15th Step: Finally, the anual average rainfall erosivity was obtained for the period evaluated performing the sum of annual rainfall erosivity divided by number of years.
- Note: The sum of the EI30 values corresponds to rainfall erosivity, also called the R-Factor of the Universal Soil Loss Equation-USLE.

References

Wischmeier, W. & Smith, D. (1978). Predicting rainfall erosion losses: a guide to conservation planning. Agricultural Handbook No. 537. U.S. Department of Agriculture,Washington DC, USA.

Examples

```
# Example
library(RainfallErosivityFactor)
data(RainFallExample, package="RainfallErosivityFactor")
RFactor(RainFallExample,1,24,10,2)
```

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∗ **Erosivity index; R-Factor; Universal Soil Loss Equation-USLE**
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