Package 'processCFSR'

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Abstract

Tools to download CFSR datasets from drfuka.org service and convert them to SWAT and WGN Excel Macro inputs format[1]. Also, It allows to plot and analyse anomalies between weather stations and CFSR data.

Contents

1 Function "processSamplePoints"

This function allows user to download CFSR datasets and cut them based on the start and end dates defined in the CSV input file. CSV file with the id's, coordinates (Lat and Long) and start and end dates of the points to be downloaded. See `extdata/SamplePoints.csv` as an example file.

This function adds rows with `NA` values where missing data.

```
> CSVFile = system.file("extdata", "SamplePoints.csv", package = "processCFSR")
> tmpDir = tempdir()
> processSamplePoints(CSVFile, tmpDir)
```

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[1]For more information about these formats, please refer to SWAT Model webpage

2 Function "convertCFSRTo"

Function to convert CFSR datasets downloaded by using `processSamplePoints` function to either SWAT Model or WGN Excel Macro input files format.

`CSVspath` is the folder path where stored all the CSV files downloaded by using `processSamplePoints` function. See `extdata/CFSRData.csv` as an example file.

If `format` is not defined, the CFSR datasets are converted to SWAT Model input files format. Two possible options to be defined `"SWAT"` or `"WGN"`. If either `inputStartDate` or `inputStartDate` are not defined, the start date or end date are read from the input files.

In the `CSVspath` folder it will be created another folder named either SWAT or WGN with all the created TXT files that are ready to enter to SWAT Model or WGN Excel Macro.

This function adds rows with -99 values where missing data. Start and end dates have to be defined with format `"m/d/Y"`.

```
> convertCFSRTo(CSVspath, format = "SWAT", inputStartDate = FALSE, inputEndDate = FALSE)
```

3 Class "CFSRStationData"

Objects with this class store CFSR and Station data to be computed by `getAnomalies` function. Each pair of values must refer to the same day.

Objects can be created by calls of the form `new("CFSRStationData", CFSR, Station)`.

```
> library("processCFSR")
> a = new("CFSRStationData", CFSR = 1:10, Station = 11:20)
> a
An object of class "CFSRStationData"
Slot "CFSR":
 [1]  1  2  3  4  5  6  7  8  9 10

Slot "Station":
 [1] 11 12 13 14 15 16 17 18 19 20
```

4 Class "CFSRStationDataExtra"

Objects with this class store CFSR, Station and Anomalies data to be showed on a plot by `plotCFSRStation` function.

Objects can be created by calls of the form `new("CFSRStationDataExtra", CFSR, Station, Anomaly)`.

```
> CFSR = 1:10
> Station = 11:20
> Anomaly = Station - CFSR
> a = new("CFSRStationDataExtra", CFSR = CFSR, Station = Station, Anomaly = Anomaly)
> a

An object of class "CFSRStationDataExtra"
Slot "Anomaly":
 [1] 10 10 10 10 10 10 10 10 10 10

Slot "CFSR":
 [1]  1  2  3  4  5  6  7  8  9 10

Slot "Station":
 [1] 11 12 13 14 15 16 17 18 19 20
```

5   Data "CFSRStationSampleData"

Sample dataset of precipitation to be used in the function `getAnomalies` and
then plot it by using `plotCFSRStation`. A data frame with 10748 observations
on the following 2 variables:

```
> data(SampleData)
> CFSR = CFSRStationSampleData$CFSR
> Station = CFSRStationSampleData$Station
> CFSRStationSampleData[1:10,]

          CFSR Station
1  0.000930495     0.0
2  2.729177077     0.7
3  0.858852149     0.1
4  0.410304912     0.0
5  0.171583345     3.6
6  2.670799831     1.2
7  0.000000000     0.0
8  0.002791485     0.0
9  0.047045840     0.0
10 0.087826793     0.0
```

6   Method "getAnomalies"

This method calculates the anomalies (deltas) subtracting CFSR values from
weather station values. It removes all the pairs of data with any NA value.

```
> a = new("CFSRStationData", CFSR = 1:10, Station = 11:20)
> b = getAnomalies(a)
> b

An object of class "CFSRStationDataExtra"
Slot "Anomaly":
 [1] 10 10 10 10 10 10 10 10 10 10

Slot "CFSR":
 [1]  1  2  3  4  5  6  7  8  9 10

Slot "Station":
 [1] 11 12 13 14 15 16 17 18 19 20
```

7   Method "plotCFSRStation"

This method plots the anomalies (deltas) which were obtained subtracting CFSR values from weather station values. A scatter diagram and histogram of anomalies are showed on the plot for the variable defined as an input.

```
> data(SampleData)
> CFSR = CFSRStationSampleData$CFSR
> Station = CFSRStationSampleData$Station
> a = new("CFSRStationData", CFSR = CFSR, Station = Station)
> b = getAnomalies(a)
```
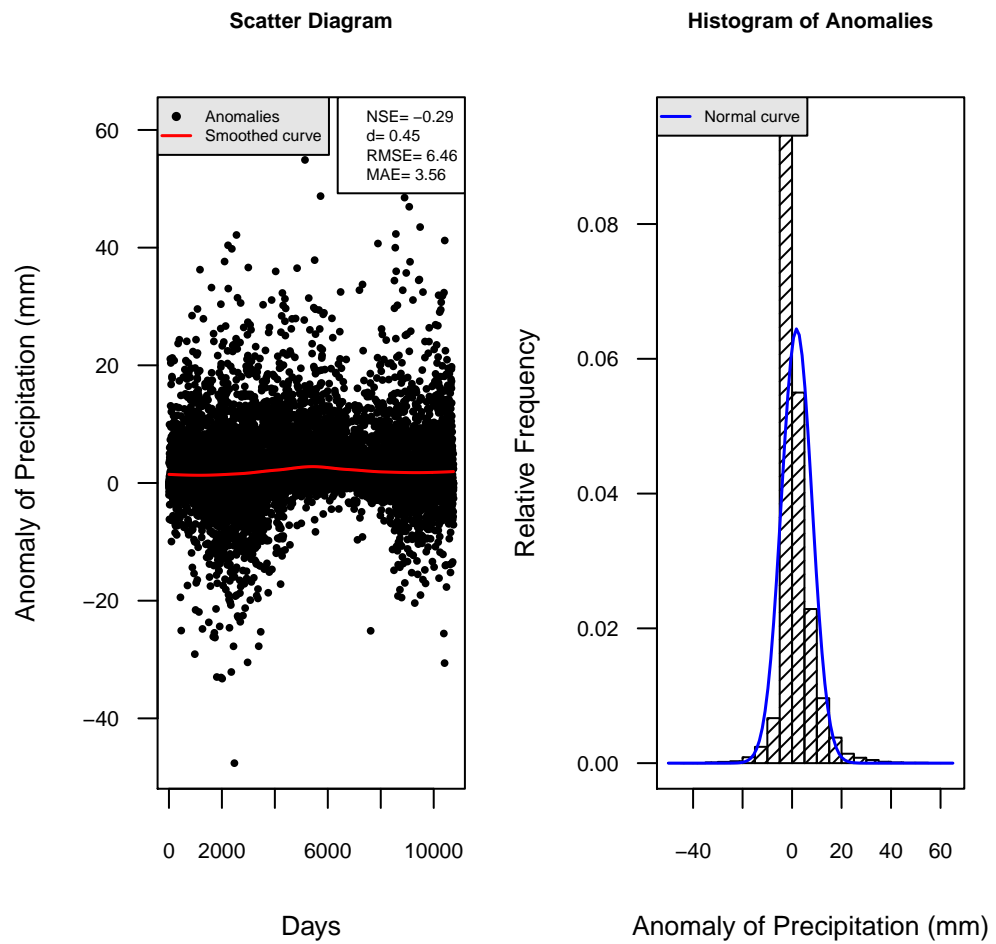
```
> plotCFSRStation(b, variable = "PCP")
```


Figure 1: Plot of anomalies between CFSR and weather station precipitation data