Documentation for storm_duration

This function calculates the number of n-day storms in a daily time series, given a threshold, and determines their seasonality (which season has the largest number of events).

Step 1. Make sure that the information is stored in a dataframe myt with 2 columns: months and precipitation per day.

In this example. Delete columns 1 and 3.

Day	Month	Year	Precip
1	Jan	1980	0.1
2	Jan	1980	0.2
3	Jan	1980	0.3
4	Jan	1980	0.4
5	Jan	1980	0.1
…	…	…	…
1	Jun	1980	0.1
2	Jun	1980	0.2
3	Jun	1980	0.3
4	Jun	1980	0.3
5	Jun	1980	0.4
6	Jun	1980	0.3
7	Jun	1980	0.1
8	Jun	1980	0.3
9	Jun	1980	0.3
10	Jun	1980	0.2
11	Jun	1980	0.1
…			
25	Sep	1980	0.1
26	Sep	1980	0.2
27	Sep	1980	0.2
28	Sep	1980	0.3
29	Sep	1980	0.2
30	Sep	1980	0.1

Step 2. Define durations of the storm (durations), the threshold (thresh, value above which the recorded precipitation is considered part of a storm), the vector with the names of the months (months_name, 12 elements) and the vector with all the months of the time series (months_loc, 365 elements)

In this example.

thresh <- 1 *in millimetres*
durations <- 3 *this means that the function will find the number of 3-day storms*
months_name <- month.abb (this is a built-in function)
months_loc <- Column 2

Step 3. Converts all values equal or below the threshold to NA.

Row	Month	Precip
1	Jan	**NA**
2	Jan	0.2
3	Jan	0.3
4	Jan	0.4
5	Jan	**NA**
	…	…
151	Jun	**NA**
152	Jun	0.2
153	Jun	0.3
154	Jun	0.3
155	Jun	0.4
156	Jun	0.3
157	Jun	**NA**
158	Jun	0.3
159	Jun	0.3
160	Jun	0.2
161	Jun	**NA**
244	Sep	**NA**
245	Sep	0.2
246	Sep	0.2
247	Sep	0.3
248	Sep	0.2
249	Sep	**NA**

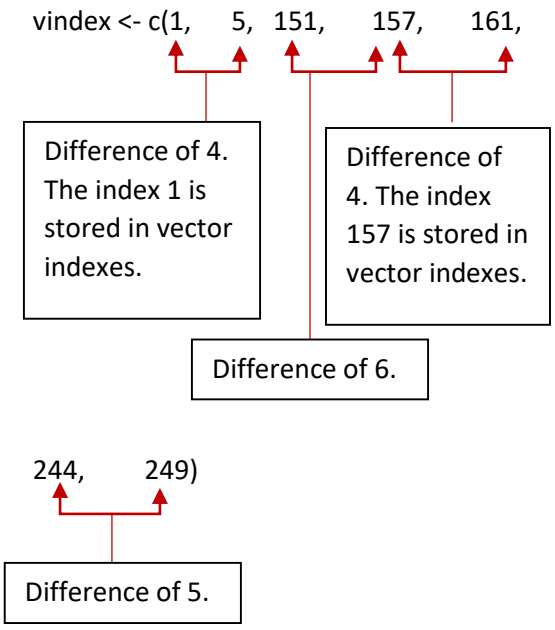
Step 4. Finds the rows where there is a NA, and saves those values in a vector vindex.

vindex <- c(1,5,151,157,161,244,249)

Step 5. Use of function index_events to find the index of the day when the n-day storms begin. Arguments of the function are vindex and the duration of the storm.

The function calculates de difference between each element of the vector. A difference of n+1 means that there is an n-day duration storm. Stores the indexes of the rows that mark the beginning of the storm in the vector indexes.

In this example. Looking for 3-day storms, so the function only stores the indexes with a difference of 4 (not more, not less).



indexes <- c(1,157)

Step 6. Uses function num_events_season.

6a) Associates the indexes to the month where the event is occurring, and saves the names of the months in a vector called seasonal.

Row	Month	Precip
1	Jan	**NA**
151	Jun	**NA**

seasonal <- c("Jan", "Jun").

6b) Counts how many winter months (elements 12, 1 and 2 of vector months_name) are in vector seasonal.

DJF <- sum(seasonal == months_name[12]) +
sum(seasonal == months_name[1]) +
sum(seasonal == months_name[2])
DJF <- 0 + 1 + 0
DJF <- 1

6c) Counts how many spring months (elements 3, 4 and 5 of vector months_name) are in vector seasonal.

DJF <- sum(seasonal == months_name[3]) +
sum(seasonal == months_name[4]) +
sum(seasonal == months_name[5])
DJF <- 0 + 0 + 0
DJF <- 0

6d) Counts how many summer months (elements 6, 7 and 8 of vector months_name) are in vector seasonal.

DJF <- sum(seasonal == months_name[6]) +
sum(seasonal == months_name[7]) +
sum(seasonal == months_name[8])
DJF <- 1 + 0 + 0
DJF <- 1

6e) Ídem for autumn months.

ACTUAL CALCULATIONS. Performs steps 5 and 6 for all storm durations, and stores the results in matrix matrix_results.

Step 7. Displays totals

"For a 3-day storm, there is 1 event in DJF, 0 in MAM, 1 in JJA and 0 in SON".

Step 8. Creates a plot of season vs number of n-day events, for all n durations.