General comments: The objective of this study is to analyze the trends on hydroclimatic data of Mediterranean catchments and research the indicators explaining these trends. The work is complete because it presents both the results of the trend tests, but it also makes the link between the different factors that can explain the significant trends. Minor revisions are proposed to improve the readability of the document and to provide some additional information that has been processed a bit quickly.

Thanks for this positive feedback about this work.

Specific comments:

L2 : replace “bassins” with “basins”

Changed

L69 : replace “Claussius-Clapeyron” with “Clausius-Clapeyron”

Changed

L153 ...Is the minimum duration of 20 years of data a bit limited for doing trend tests?

Yes but that is only for a few basins, when the median record length is 45 years.

L174 : Can you explain the difference between “actual” et “reference evaporation”.

We made clearer in the text that reference evapotranspiration is computed from SAFRAN variables and actual evapotranspiration is simulated by the ISBA land surface model. Both variables are available in the SIM reanalysis over France.

Reference evapotranspiration is defined as the rate of evapotranspiration, only influenced by the atmospheric conditions, from a crop surface actively growing, completely shading the ground, well-watered, with a uniform crop height of 0.12 m, a fixed surface resistance of 70 s m−1 and an albedo of 0.23 (Allen et al.1998). In SIM, the reference evapotranspiration (ET0) is computed with the Penman-Monteith (FAO-PM) (Allen et al.1998).

Actual evapotranspiration is the quantity of water that is actually removed from the land surface due to the processes of evaporation and transpiration. It is simulated by the ISBA land surface scheme.

L177 : replace “20008” with “2008”

Changed

L273 : In Figure 2, is it possible to present symbols of size proportional to the significance of the test (different threshold of p-value), Moreover specify the

difference between "Precipitation" and "Rainfall" (and there is only one in the legend of the figure).

The two other reviewers also asked to represent the magnitude of the trends in the subplots. We believe it is a bunch of information to display to have both the pvalues and the magnitude of the detected trends (the sen slope values) and would require doubling the number of figures. We choose here to add on the trend detection plots the magnitude of the detected trends.

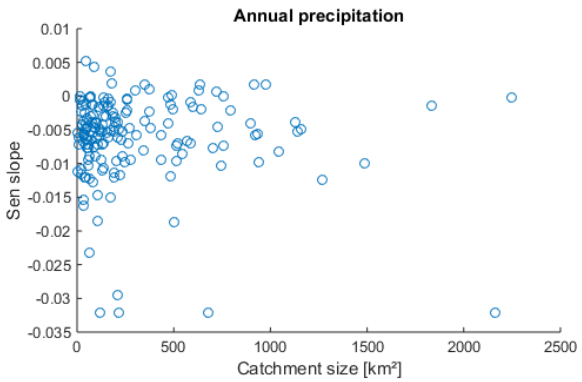
We added precipitation (rainfall+snowfall) and rainfall in the figure caption.

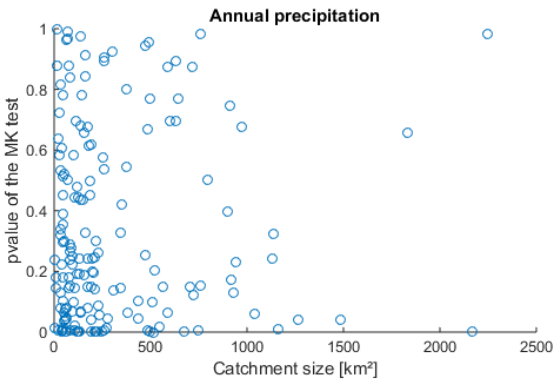
L273 : “From figure 2, it can...“L285 : Decrease in soil moisture for the surface and the root zone layers are due to a modelisation. It is not an observed trend. This should be clarified in the text,

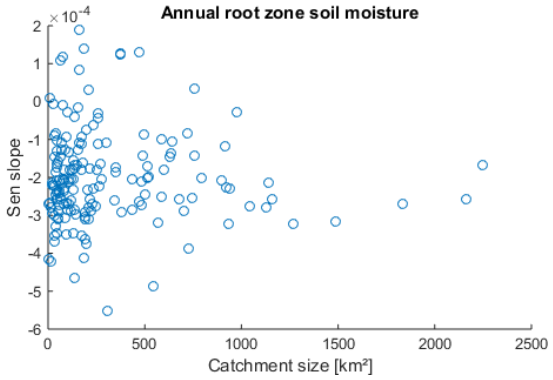
We agree, we added at the end of section 4.1: “Yet, it must be stressed here that the soil moisture in the present study is not observed but simulated from the ISBA land surface model”

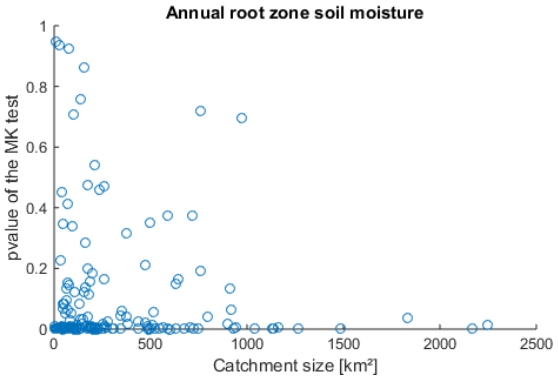
Question: Are trends based on spatial averages on the basins have the same significance? Is there a relationship between the calculated p-values on the trends of data averaged over each basin and the basin area? Same question for flows. One might think that the larger the basin the more the trend is "regional" and therefore less subject to sampling and therefore more significant.

This is an interesting question, whether if we detect more trends when several SIM grid cells are averaged over large areas, in the case of large basins. We did the test for two variables, precipitation and root zone soil moisture, and we plotted for both variables the pvalues of the MK test and the Sen slope values against basin size. As shown in the figure below, there is no obvious relationship with basin size, and a quick check revealed similar results are obtained for the other variables.









L313 : a more detailed explanation would be helpful,

We added: “As noted in the method section, a declustering approach has been implemented to avoid introducing in the samples an autocorrelation signal due to several consecutive threshold exceedances belonging to the same event.”

L319 : FDR results are analysed but not presented. In general on paragraph 4.2 : a synthetic table of values is needed or a boxplot to have an idea of Sen slope values, p-values, magnitude and number of event average.

We added a table (see below) summarizing for each variable tested the number of significant (local) trends, their sign, and the regional significance of the trends detected. In addition, as mentioned above, we added on the plots the magnitude of the trends detected. We believe these additional results give a better picture of all the analyses performed.

	Variable	Positive trends	Negative trends	Regional significance
Climatic variables	Mean precipitation	0	56	Yes (28 basins)
	Mean rainfall	1	49	Yes (20 basins)
	Frequency of dry days	46	2	Yes (9 basins)
	Mean temperature	166	0	Yes (165 basins)
	Mean surface soil moisture	1	132	Yes (129 basins)
	Mean root zone soil moisture	1	132	Yes (129 basins)
	Mean actual evapotranspiration	169	0	Yes (169 basins)
	Mean reference evapotranspiration	136	0	Yes (131 basins)
Flood events	Number of floods above the 95th percentile	0	67	Yes (40 basins)
	Number of floods above the 99th percentile	1	45	Yes (7 basins)
	Flood magnitudes above the 95th percentile	4	3	No
	Flood magnitudes above the 99th percentile	16	5	No
Climatic variables associated with flood events	Cumulative precipitation during floods above the 95th percentile	36	6	Yes (16 basins)
	Cumulative precipitation during floods above the 99th percentile	34	3	Yes (5 basins)
	Antecedent wetness conditions for floods above the 95th percentile	10	40	Yes (11 basins)
	Antecedent wetness conditions for floods above the 95th percentile	6	24	Yes (14 basins)

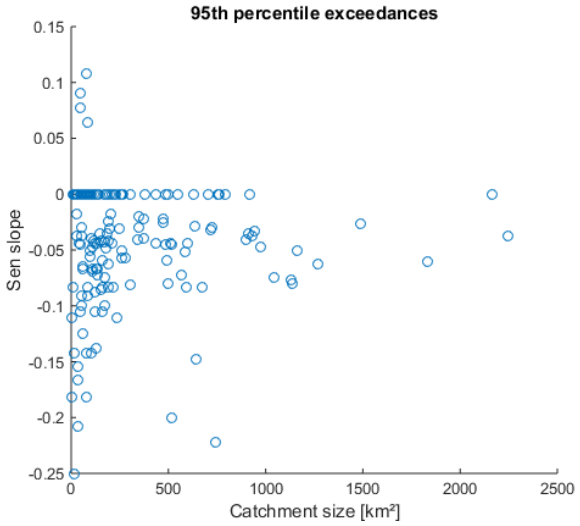
L343 : Are the relative changes presented only for significative cases ?

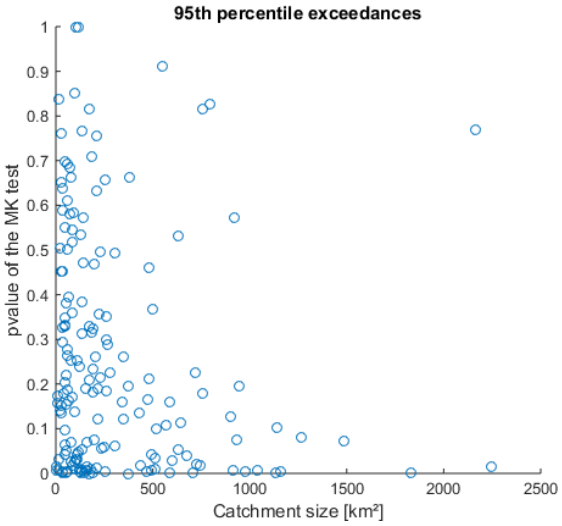
Yes, the relative changes are only presented for the significant trends. We added this information in the figure caption. We also noticed an error in the figure (see also the response to Reviewer 1) and provided a modified figure in the revised manuscript, now with the correct data plotted.

L352 : these results can be related with the significativity of test on larger basin ? In this part, no flood trends means no trend for significant test ?

Yes, we report only the trends that are significant at the 10% level. This is consistent throughout the paper.

As shown on the figure above, there is no evidence that trends are more often significant for larger basins for climatic drivers. For flood trends, the results are similar as shown by the figure below with the trends in the number of events above the 95^{th} percentile.





L373-L387 : 34-36 basins present an increase of precipitation associated with floods.40 basin present a decrease in antecedent soil moisture conditions. But is it the same basins. In general, in this part or in conclusion, it would be interesting to synthesize the number of basins affected by different configurations between increase, equality or decrease (significant) of rainfall, soil moisture, flood ...

As noted below in the same paragraph, there are not necessary the same basins since “for 12 catchments an increase of event rainfall is detected when for the same catchments a decrease in the annual number of events above the 95th percentile is reported”.

We agree about the need of a summarizing table. As noted earlier, we added a table summarizing all the results.

L389 : replace “4.3“ with “4.4”

Changed