We thank Referee #2 for the new feedbacks. Please find below a detailed point-to-point reply to the Referee's comments.

1 General comments

Thank you for addressing all my comments so thoroughly and providing additional explanations where necessary! I particularly think that the modified/new last part of the results now provides a nice application and synthesis of the trends in atmospheric predictors and circulations to better understand the observed changes in precipitation. I only have a few minor suggestions, which should be considered before the publication of this manuscript.

2 Minor comments (line numbers refer to revised manuscript)

- *L12-14: "... we show that winter Atlantic circulations (zonal flows) tend to be shifted northward and they become more similar to known Atlantic circulations. Mediterranean circulations tend to become more stationary, more similar to known Mediterranean circulations and associated with stronger centers of action in autumn..." – I know by now that you refer to previous studies when talking about the "Atlantic circulations" and the "Mediterranean circulations". But these two terms sound a bit strange when reading them for the first time in the abstract without any further explanation. Could you briefly describe the patterns when mentioning them in the abstract? "Atlantic circulation" sounds very unspecific, as there is always circulation there. Maybe you can write something like "the Atlantic circulation pattern dominated by a trough over the UK" (and likewise a description for the Mediterranean circulation pattern).*

  ⇒ Thanks, we have added a sentence in the abstract to better introduce these terms.

- *L16: Change to "... we show that these changes..."*

  ⇒ Done, thanks.

- *L49: Rather "... have pointed out the link..."? (this also appears at other locations in the manuscript)*

  ⇒ Done, thanks.

- *L66/379: "... responsibility of LSC changes..." sounds a bit strange to me. Maybe write something like "... role of LSC changes..."?*

  ⇒ Done, thanks.

- *L105-106: Of course, I know what you mean with "... mainly affected by precipitation coming from the Atlantic...", but I would still change the wording here a bit. It is rather the moisture brought in from the Atlantic, while the precipitation is probably formed later, also in interaction with the orography.*

  ⇒ You're right, moiture is more relevant than precipitation here, as orography plays a leading role in triggering precipitation.

- *L123: Maybe write "... where Adj ranges the set of adjacent 4 grid points... " that it becomes clear you only talk about the two grid points in meridional and zonal direction, respectively (at least this is how I understand it from your manuscript).*

  ⇒ *Adj* actually refers to every pair of adjacent grid points in the eastern and northern direction in the domain. Let's say that i, j, and k are three consecutive grid points at the same latitude. We consider two pairs: (i,j) and (j,k). We do the same in the longitudinal direction. In the paper, we have clarified that we refer to gradients in the eastern and northern direction.

- *L245-247: I apologize but I think I still don't fully understand one aspect in Fig. 5. You write that the lines show the 5-year-running-mean anomalies with respect to the 2006-2010 average. Does this mean that, for instance, the ERA20C line (red) shows the anomaly with respect to the 2006-2010 value of ERA20C? If so, why do all the lines at the end of the time series (2010) have the same value, while the dots between the different reanalysis products show large differences (which you discuss in lines 245-247)? Maybe you need to add a few words to clarify this in the caption.*

  ⇒ The anomaly with respect to the 2006-2010 is indeed represented in Fig.5 for each reanalysis. By definition, subtracting the 2006-2010 average value to a given reanalysis makes it centered around 0 in 2006-2010. As we do the same for every reanalysis according to their respective 2006-2010 value, every signal is centered around 0 in 2006-2010. The dots in 2010 simply show the differences in 2006-2010 values between reanalyses. For instance, if the MPD average of ERA5 is 300 m in 2006-2010 and the MPD of ERA20C is 280m in 2006-2010, the dot of ERA20C will be at -20 m and that of ERA5 will be at 0 as we arbitrary chose ERA5 as the reference. So the dots represent the translation applied to the signal to bring them together. We have clarified that Fig.5 represents time series anomalies according to their respective 2006-2010 average.

- *L352-354: "In summer and autumn, an opposite pattern is observed with a decreasing 500 hPa geopotential height over Northwestern Europe reaching further South in autumn, pointing to a reinforcing of Mediterranean circulations." – I don't understand how the Z500 changes in summer in Fig. 7 (bottom) can reinforce the Mediterranean circulation pattern shown in Fig. 2b. There is an increase in pressure over Central Europe and thus in between the centers of action of the Mediterranean circulation pattern – how can this intensify the cyclonic circulation centered west of the Iberian Peninsula?*

  ⇒ The larger increase in pressure during summer Mediterranean circulation indeed occurs in between the centers of action. However, the increase in pressure is larger over Central Europe–a region where high pressure anomalies are observed during Mediterranean circulations–than over the near Atlantic–a region where low pressure anomalies are observed during Mediterranean circulations. This reflects an increase in pressure gradient and a reinforcement of Mediterranean circulations. We have rewritten part of this paragraph to better highlight the observed differences in LSC changes between summer and autumn.

- *L389: I guess you want to refer to Fig. 6 here but not Fig. 7, right?*

  ⇒ You're right, thank you.

- *L432: I guess you mean "Fig. 13 right"?*

⇒ You're right, thank you.

- *L456: Change to "... became more frequent... "*

  ⇒ Done, thanks.

- *L463: I would rather write: "... the Mediterranean circulations becoming less pronounced and less closely reproduced in winter over the last 30 years... ". In the current form, it sounds more like the frequency of the Mediterranean circulation pattern changes, which, however, is not the case as (I think) you mention earlier in the manuscript.*

  ⇒ Done. Indeed it is a better formulation. Nevertheless, changes in Mediterranean circulations characteristics reflect in a way changes in the frequency of specific pattern within this atmospheric influence.

- *L467-471: It is very important and good that you write the paragraph about the limitations regarding the robustness of the trends. However, it sounds a bit unfortunate, as it kind of questions a large part of your study when written like this. Although you are right that we should not trust the trends too much, I still think your study shows how the atmospheric descriptors in combination with the patterns can (potentially) help to understand changes in precipitation. Maybe this will become even more important for studying future precipitation changes (as you briefly mention, but it could still be highlighted more explicitly that you could apply this method to precipitation changes in GCM projections). So I think you should briefly state this after this "limitation paragraph".*

  ⇒ Thanks for this comment. We have reorganized the last paragraph of the conclusions and we have more clearly exposed that our methodology could be applied to GCM outputs.

- *L472-473: Change to "... this evolution is partly relevant..."*

  ⇒ Done, thanks.

- *Fig. 13: I'm not so sure how helpful this figure is in its current form, as it's hard to disentangle the individual lines. Also, how exactly do you calculate the descriptor values at these individual days? For the celerity, you need two days, right? Do you just use the previous day for each date? Furthermore, when reading your text it seems to me that Fig. 13 is not crucial to understand the trends in extreme precipitation. So I guess you could think of omitting Fig. 13, but I guess it is a matter of taste and I'll leave it up to you to decide.*

  ⇒ It is indeed hard to disentangle the indivudual lines, but all we interpret from Fig.13 is the linear regressions applied to the different signals. The descriptor values shown here are based on the daily descriptor values computed from the beginning of the paper. For the celerity, Fig.13 indeed represents the TWS between the day of annual maximum of precipitation and the day before. We agree that Fig.13 is probably not the most important figure of the paper, but still it fuels the discussion on the role of LSC changes for extreme precipitation trends. We have then decided to keep this figure.