

Dear Dr. William Roberts,

We express our gratitude to the editor and reviewers for their time and work in evaluating our paper a second time. We identify the significant modifications we made to the paper throughout the editing process. We have addressed the following points in particular:

- The abstract is expanded on to clarify specific concerns
- The introduction is shortened, and we clarified many aspects
- The Results section has had many aspects removed which weren't necessary for the points we were making, and we clarified the motivations for looking into specific topics to help give the paper a better narrative
- For the D&C we have cut, combined, and rearranged many aspects in order to have a more consistent and linear logic and to emphasize our findings more
- Additional non-public comments by the editor have been addressed in the new version of the manuscript

Please find the detailed responses to the reviewer's comments and suggestions below.

Jake Casselman, on behalf of the authors

Anonymous Referee #1

While I don't have any more scientific criticism, I find that the writing is still not terribly good. I also don't find it easy to grasp what are the main findings. I don't have time to describe all the problematic parts and to give specific suggestions. But I will give some specific comments focusing on "Abstract" and "Discussion and Conclusion" below.

Please bear in mind that writing in the main body may also need improving although I don't refer to it here.

Thanks for your many suggestions, we decided to go through all sections of the paper. We also put more emphasis on the significance of any description to avoid the feeling that we are simply listing aspects off.

I think the authors need to pay attention to good structures, central themes, flows, and story for all levels (the paper overall, sections, paragraphs, and sentences) in a scientific paper. So, while I could recommend "Acceptance", I think readers will not find the paper nice to read. For this reason, I am specifying "Major revision" to give the authors another chance to improve.

-Section 3

Cut down on anything that was not needed to make the read easier.

Thank you for your suggestion, we have removed anything that wasn't required to prove our conclusions.

1. Abstract and D&C - It's not clearly stated what the typical or expected ENSO teleconnection on the North Atlantic in Spring and Summer is. Then, it's not clearly described what is the modulation from TNA SSTA on the teleconnection is. What property of the TNA SSTA affects what property of the teleconnection? For example, is it warmer TNA SSTA produces a weaker ENSO teleconnection, or even changing the pattern of teleconnection?

Thank you for pointing this out. We have incorporated what would be expected from the ENSO influence in boreal summer into our introduction, explaining how it remains rather unclear. For the abstract, we also emphasized more on what the expected response may be.

2. D&C - It's not very organised at different levels. There are descriptions which follow another that may seem confusing, distracting or even contradictory.

a. First paragraph mentions modulation of the ENSO teleconnection by TNA SST, but doesn't describe what the modulation is (what is the modulation doing to the teleconnection in terms of patterns and strengths).

Thank you for pointing this out, we have added in further explanation which also helps to reconnect the conclusion with our abstract.

Walker cell, Gill response and PCD are then quickly mentioned, but it's not explained whether we should regard them a same interlinked process as far as modulation is concerned or not. In fact, the last sentence says "The PCD is salient for its ability to influence the NAE region via a Rossby wave train, and a potential pathway for the Atlantic to influence the NAE region," which makes me think this is not related to modulation of ENSO teleconnection, but a direct PCD teleconnection to the NAE region. Information/writing like this throughout the paper is confusing.

Thank you for your suggestion, we have rephrased the paragraph to better explain why we looked into the PCD, and also explained the interlinked processes in more detail.

b. Second paragraph starts by telling us Walker cell and PCD are highly correlated and increased understanding can be instrumental for improving seasonal prediction. But then PCD seems to be ignored in the rest of paragraph, and descriptions of Pacific and Atlantic interactions follow. Linear and nonlinear interactions are mentioned, but not described or explained.

Thank you for pointing this out, we have moved up the statement about the PCD and have rearranged the first and second paragraphs. We also removed any unnecessary aspects and were more succinct with our statements.

c. Third paragraph is suddenly a general description of models limitation on simulating tropical atmospheric interactions. The discussion may be useful somewhere in this section or elsewhere. But when I tried to follow summary of main findings in the first two paragraphs, this one suddenly appears like an unwanted distraction.

Thank you for pointing this out. We have moved it to the third last paragraph instead and changed the first half of the paragraph to improve the logical flow from paragraph 2 to 3, and to ensure its clear why they need to know this.

d. Fourth paragraph then mentions yet another factor Caribbean RWS. So now there are TNA SST, Walker cell, Gill response, PCD, and Carribbean RWS to keep tract of! Are they all important in your research and in this paper? Can you find a unifying factor between them? Or can you not only selectively report to us the most important thing you find? (and report the others in Appendix/Supplementary). The rest of the paragraph is also not clear or contradictory to the main finding. The Abstract and earlier in this section mention modulation of TNA on ENSO teleconnection, but now this paragraph concludes with "When examining the impact for Atlantic SSTAs to modulate of the extratropical response through using correlation shifts, we do not see a significant strengthening of the link between the Walker cell gradient and either EA or NAO in both boreal spring and summer." So is there a modulation by the Atlantic on the ENSO teleconnection or not!? If you are talking about two different things, you need to be much more careful and clearer in your writing. Like I already commented in the previous review, you need to be clear on what are teleconnections you focus on, what are modulating these teleconnections, what are the modulators, as well as what are the modulations. Then you can also describe the mechanisms for selected important modulations.

Thank you for bringing this to our attention. As we improved the first paragraph to include more description of the modulation, we were able to reduce this paragraph dramatically. This also helped in reducing the contradictory statements, as this paragraph (now third in updated manuscript) focuses more on the EA and NAO, while the relationship with the Walker cell and PCD and Caribbean RWS were in the first paragraph.

e. Fifth paragraph - First sentence talks about composite analysis, second sentence talks about tropical Atlantic to extratropics in spring, third sentence talks about Caribbean to Europe in summer, fourth sentence talks about model experiments - please don't jump around like that, your reviewer (readers will be too) is suffering.

The rest talks about role of Atlantic spring using the model experiments. But the last sentence is "This change between A and AP may help to explain why the Walker cell connection to the EA is not significantly influenced as the (AP-P) response in the North Atlantic does not overlap with the EA or NAO areas." Importantly, if the response is not in the EA and NAO areas, then why do you conclude there is a modulation by the Atlantic? Maybe you need to explain (again) what is the significance (meaning) of looking at AP-P.

Thank you for pointing these aspects out. As we reduced the length of the third paragraph (previously the fourth), we also combined many of the elements in the fifth into this new paragraph to help with the jumping around. To also help with the jumping nature, we preface the sentence for how it continues from the last.

f. Sixth paragraph - First sentence starts with saying extratropical response to the Atlantic forcing is REDUCED when forced together with the Pacific, and ends with the saying the tropical response is INTENSIFIED when forced alongside the Pacific. The next sentence then says it is unclear what causes the "nonlinearity". Firstly what/which "nonlinearity"? Are you calling the difference in extratropical and tropical responses "nonlinearity"? Secondly and importantly, why are we interested in tropical and extratropical Atlantic responses to Atlantic forcing? Don't you want to focus on responses to Pacific forcing, with and without Atlantic modulation? That's your study focus, it's even in your title! So, again, I don't think you have been clear in your writing (maybe even in your mind) on which teleconnection you focus on and what is/are modulating (meaning modifying) this teleconnection.

Thank you for your suggestions. Indeed, the tropical response intensified while the extratropical response reduced, which was the exact point we were trying to make. We were more explicit with this contradiction, as it was the barrier that caused us to not find the source. By nonlinear, throughout the paper we define it as if AP and A+P are different, as the responses do not linearly add. We have added this in brackets to remind the reader. As for your second point, this paragraph was always talking about the response to adding the Atlantic SSTAs to an ENSO event, and therefore we have tried to clarify this further.

For all limitations, we moved them to the end of the discussion for a more consistent discussion instead of having them scattered throughout.

Anonymous Referee #2

The authors have addressed my comments and the manuscript is suggested to be published after one minor correction.

Please delete the extra 'around' in Line 200.

Thanks for pointing this out, we have removed the extra 'around'.