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Nonlinear Processes in Geophysics
Discussions

Interactive comment on "Seasonal statistical-dynamical prediction of the North Atlantic Oscillation by probabilistic post-processing" *by* André Düsterhus

Anonymous Referee #3

Received and published: 14 November 2019

I agree with the general comments of both Reviewer 1 and Reviewer 2: the methodology is relatively straightforward and the text is well structured and easy to follow. While I found the use of the Earth Mover's Distance interesting, I support Reviewer 1 comments on using the CRPS. The reason for this being that if one is to introduce a new methodology, it is easier to demonstrate its usefulness by using the tools of the trade that people are already familiar with. Using such score will make it easier to compare with other post-processing attempts and might improve the chances that the methodology will be adopted.

Also, I found the terminology used to refer to the different forecast quite confusing. For

one, the author uses model to refer to the output of the dynamical forecast whereas really the 3 sets of predictions are actually models, albeit just different types of models. I would replace "model" with either dynamical model or the name of the forecast system (or something along those lines) throughout the text and in table 1. I would also suggest changing the name predictor model to something else, just to avoid the repetition with the word prediction (which comes up a lot) and to differentiate with the actual predictors (e.g. on line 147: "to the predictor prediction"). Maybe it can be changed to statistically-based, or something along those lines. And not refer to the combined model as a hybrid model or statistical-dynamical model, as in the introduction? Although referring to it as the combined model is ok and doesn't lead to confusion in this case.

Introduction

I think the manuscript would benefit from a short paragraph on the skill of climate models at predicting the NAO. At the moment, there is only 1/2 a sentence on this. In particular, they should mention that Scaife et al. (2014) do find skill at predicting the winter NAO with a different forecast system.

Methodology

I would mention the equivalent resolution of the atmosphere and ocean model in either km or degree. I would guess many readers won't know what T63 and/or T0.4 correspond to. I would also specify the components used to initialize the model as well as the observational dataset used to verify the predictions.

Section 3.4

It took me a while to understand what was meant by "To estimate the post-processed variable field", as all the discussion up until that point was about computing the NAO. I would add an introductory sentence to help the reader transition from the NAO to the meteorological variables we actually care about (tas, pr, ...).

And I'm with Referee 1 on equation 5: I don't quite understand what is happening here.

Minor points

Line 31: an dynamical -> a dynamical

Line 52-54: "The skill is ..." I don't understand this sentence. Please reformulate

Line 70: " Each predictor predicts statistically..." That's a bit awkward. You should reformulate.

Line 81" a clearer signal as -> a clearer signal than

Line 106: By this approach -> With this approach

Line 120: in contrast towards -> with respect to

Line 126: "but in case one of the two is better than the combined prediction, the latter beats in nearly all cases the one remaining". Isn't this what we would expect? If we are to average two models in a 3rd one and #1 is the best, I would expect that #3 would be #2.

Line 140: "are hardly existing". Please reformulate.

Line 143: "Towards the model prediction" I don't know what you mean here.

Line 148: In comparison to the predictor prediction... significantly decreased in their hindcast skill." Please reformulate this sentence.

Line 159: "In the comparison between.. can be explained by the statistical model." I don't understand what the author is trying to say here.

Line 181: "a too high weight -> too high of a weight

Line 187: "We have seen that ... in different ways" Do you mean that they provide a different perspective?

Line 193: "Also, unlike ... in a consistent way". Please rephrase.

Line 196: "As each year... To prevent this other references," I don't understand this.

Line 203: cannot anymore drive -> cannot drive

Line 205: The used evaluation -> The evaluation

Figures

I would combined Figures 2, 3 and 4 into Figure 2a, b, c. Also, I would put the x-axis range from -2.5 to 2.5.

The legend in most figure is quite difficult to read.

Figures 2-5: I would remove the [ ] when there are not units.

Figure 2: I would make the individual members more visible.

Figure 4: I would display the obs in black, as it is the reference.

Figure 5: I see no dark green in the figure, despite what the caption says. Also, I would pick different colors to differentiate between the different models: light blue and dark blue makes it difficult to see what's going on.

Figure 6: The font on the colorbar is way too small. Also, I would change the range of the color for columns 2 and 3.

Figure 7: The font on the colorbar is also way too small.

Scaife, A. A., et al. (2014), Skillful longrange prediction of European and North American winters, Geophys. Res. Lett., 41, 2514–2519, doi:10.1002/2014GL059637.

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