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Nonlinear Processes in Geophysics
Discussions
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Interactive comment on "A Parallel Hybrid Intelligence Algorithm for Solving Conditional Nonlinear Optimal Perturbation to Identify Optimal Precursors of North Atlantic Oscillation" *by* Bin Mu et al.

Anonymous Referee #2

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In this study, authors propose a hybrid algorithm to identify atmospheric perturbation that could result in an extreme NAO event in the foreseeable future. The technique is demonstrated using CESM simulation. The performance of the algorithm as well as of the CESM simulation is enhanced with the help of MPI and CUDA tools. The authors' original contribution, however, is not clear. The language used in the text is not up to the standard required for publication. Overall, the study merits publication and further scrutiny by broader audience after following revisions.

page 3, line 1-2 : 'However, as the hypothetical height in geoscience, geopotential

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Discussion paper

height is often used in ideal models'. Not true! It is used many complex models as well as observational analysis. It is not clear to me how is this relevant to current discussion.

page 3, line 1-25 : Please clearly state your original contribution and differentiate it from previous works.

page 3-4, section 2 : Please add simulation details and describe the data in terms of variables used, their frequency etc. It would be better to explain these rather than describing CESM and its components. It is not clear to me how was the atmospheric model forced at the surface.

page 5, line 1: Does NAOI stands for NAO index?

page 5, line 10: Please state what m and n are?

page 6, line 8-18 : Please provide more discussion on why is it alright to use the same constraint (equation 5) as the one used for identifying sensitive areas for tropical cyclones.

page 7, line 7-8 : It is not very clear how was the original winter sample generated. Also on page 11, line 9.

page 8, line 25 : correct 'iter_max'

page 9, line 6 : CAM component doesn't simulate or prognose ocean variations

page 9, line 27 : 'asynchronous streams are overlapped calculation with data transmission'. It doesn't look like a correct usage.

page 17, line 19-22 : incorrect figure reference; Figure 4 instead of Figure 10

page 18, line 1 : parallelized is more commonly used in this context.

page 18 line 2 : '...the time of communication between nodes makes the increase of the CESM runtime '. Please correct the usage

page 19, line 15 : change 'ADJ-based' to adjoint based

page 21, line 2 : either remove or replace 'observably' by significantly

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