

## ***Interactive comment on “Inter-hemispheric seasonal comparison of Polar Amplification using radiative forcing of quadrupling CO<sub>2</sub> experiment” by Fernanda Casagrande et al.***

### **Anonymous Referee #1**

Received and published: 9 October 2019

The authors analyzed the seasonality of polar amplification using CMIP5 coupled climate models and BESM to compare 4xCO<sub>2</sub> and piControl experiments. The results show that there is an asymmetry in the polar amplifications between the two hemispheres. I do believe that the scientific subject and aims of this paper are within the scope of ANGEOD and this paper is easy to read, but I also think that this specific paper could need a significant amount of new analysis and modeling work in order to appropriately address its hypotheses.

Major comments:

I am not sure whether this paper is a letter or an article. If it is a letter paper, I didn't see

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relatively interesting points worthy of publication on ANGEOD in the present version. If it is an article paper, I think it should include more analysis results. For example, it will be better to show the asymmetry in the seasonality of polar amplification in different hemispheres in observations. The authors cited many references and used a lot of 'suggest' to explain the figures. However, I think it may be better to give a direct evidence and make more figures to support them, e.g., L197 sea ice patterns and L237 plotting atmospheric heat transport in different models, etc.

Specific comments:

L40: You mentioned 'numerous scientific publications', but there is only one reference in the end of this sentence.

L42: suggest->suggested

L63: Please give explanations regarding why the performance of Arctic simulation is better.

L75: are also depended on-> depend on

L76: making -> which makes

L105: last -> latest

L158: 'with no so enhanced warming' is confusing. Please rephrase it.

L163: loses heat to -> heats

L174-L178: Why the authors mentioned the linkage between Arctic sea ice loss and mid-latitude weather? I think it is irrelevant to your topic.

L197: It may be better to have a spatial distribution of sea ice trends to support your hypothesis, see my major comments.

L209: last->latest

L247: It is difficult for me to link Fig.3 to deep convection. I think the authors should

give more evidences to support your conclusions. See my major comments.

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Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-106>, 2019.

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