

# ***Interactive comment on “Midlatitude atmospheric circulation responses under 1.5 °C and 2.0 °C warming and implications for regional impacts” by Camille Li et al.***

## **Anonymous Referee #2**

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### General comments

This paper provides a summary of the global midlatitude circulation changes under 1.5°C and 2.0°C of warming compared to pre-industrial conditions using a multi-model ensemble of AMIP-type simulations. They focus on the winter season, and discuss various aspects of the midlatitude circulation and their influence on regional precipitation.

The experiment is well-designed with clear goals, and the authors are well-aware of limitations of the experiment.

The paper is well written and organized, and is worthy of publication after very minor revisions, although I am not quite sure if ESD is the best venue for this manuscript

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considering its focus being the atmosphere, rather than interactions among earth system components as emphasized in ESD's aims and scope.

The paper is important and useful because of its rather unique focus on the near-term, limited warming scenarios. The circulation features are carefully observed and compared to numerous previous studies, which also benefit the readers. I also found the supplementary materials useful.

Minor comments/questions

L115 closing parenthesis is missing? "(Fig.1)"

L139 There are two equations that define the factor "f" in Sansom et al. (2013). I believe that you are referring to their equation (9), and the other equation (10) is not applicable to this case. Please include a specific reference to the equation to clarify your analysis method and for the readers to find relevant information more easily.

L247 I do not understand what is meant by this sentence "the influence of these anthropogenic radiative forcings is changing relative to the influence of surface warming." Could you rewrite it?

L322-323 "At low levels, the multi-model mean exhibits stronger westerlies over the continent in both warming experiments,"

Although the author states "in both warming experiments", I do not see stronger westerlies over the continent in 1.5°C warming (Fig.12a)

L334-335 It is better to mention in the main text that Fig.14c is based on one model (CanAM4). Also, does the authors see similar behaviors (stronger shift of the 95th percentile than the mean/median) in all the models? I wonder why this particular model is selected, and the results from the other models are not mentioned (unlike the previous discussion on temperature gradient, in which the authors show an example from ECHAM6.3 in a figure and other models are summarized in tables).

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L340 the word "increases" after Iceland is not needed "There is a slight increase over Iceland increases and a slight decrease over the Azores"

L371 the word "show" is not needed "the members with the weakest u250 responses yield show drying"

Fig.2 Caption r is missing in the word "response" "Multi-model mean response of winter"

Figs. 12, 14, 15, 16 Please add tick labels for latitudes and longitudes in these regional maps that have black-line contours, which make it hard to recognize geographical features drawn with gray lines. The labels may also be useful for figures 10 and 13 although they do not have black-line contours.

Figure S1 Why precipitation biases are not shown? It is one of the main variables analyzed.

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