

Interactive comment on “The LGM surface climate and atmospheric circulation over East Asia and the North Pacific in the PMIP2 coupled model simulations” by W. Yanase and A. Abe-Ouchi

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We would like to thank the reviewer for several suggestions and comments. The reviewer discussed four points on our manuscript.

(1) Figure

Following your comment, we will try to redraw the small figures by reducing the shading. We will use the shading only for the positive/negative extremes, or use the light shading only for positive (or negative) value.

(2) AGCM and CGCM

As you pointed out, the dynamical and thermal response of the ocean and its feedback

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on the atmosphere is interesting topic, although we are not focusing on the detailed dynamics in the present study. We are now writing another paper on the sensitivity experiment for several factors associated with the climate change in this region. We will briefly describe the related result here. Firstly, the dynamical response of the ocean and its feedback does not seem to be essential for the change of atmospheric circulation over the North Pacific but only intensify the anomaly. Secondly, the thermal response of the ocean and its feedback seems to be important for the SLP anomaly in winter, while it seems to be less important in summer. We will submit the detailed results soon. It should also be noted that, in previous AGCM simulations, the prescribed SST distribution is estimated from the LGM proxy records. Therefore, the feedback could be potentially included in such experiments. We will briefly discuss these points in the revised version.

(3) SLP in summer and winter

Although the ice-sheet forcing exists in both summer and winter, the dynamics is expected to be different. For example, the response of atmosphere over the North Atlantic is different between summer and winter in LGM experiment: The negative anomaly of SLP is remarkable in winter because the mechanical forcing on the lee-side of the Laurentide ice-sheet only occurs in the strong westerly flow in winter. It should also be noted that the albedo effect of the ice-sheet is expected to be dominant in summer due to the large insolation. This is also based on our sensitivity experiments, which is to be submitted as another paper. We consider that both anomalies of SLP over the North Pacific in summer and winter are negative incidentally. Therefore, we believe that it is meaningful to show the anomaly of SLP in summer and winter separately.

(4) Water budget We agree your comment: the evaporation simply reinforces the transport effect over land but cancels part of the transport effect over the eastern N. Pacific. This is what we meant. We just used the phrases "positive feedback" and "negative feedback" to describe the dynamics you explained. Since the word "feedback" could be misleading as you pointed out, we will remove the word in the explanation.

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