

## ***Interactive comment on “Rapid waxing and waning of Beringian ice sheet reconcile glacial climate records from around North Pacific” by Zhongshi Zhang et al.***

**Zhongshi Zhang et al.**

zhongshi.zhang@uni.no

Received and published: 10 June 2020

Since the Laurentide-Eurasia-only ice sheet is the mainstream concept today, it not surprised to see that many reviewers suggest rejecting our paper. This mainstream concept has been established for two decades. Some reviewers here are the pioneer scientists who established the concept. We show our respects to all these pioneer scientists who involved the early debate of the Beringian ice sheet (BerIS), as we wrote in the acknowledgements.

However, it is a pity to see that the reviewers who suggest rejecting do not point out any mistakes in our logic arguments, but only challenge ice sheet modelling uncertainties

C1

or discuss controversial interpretations of direct evidence.

As we wrote in the paper, we use four steps to address the debate of ice sheet development during past glacial-interglacial cycles.

- 1) We review the paleoclimate climate records from around the North Pacific.
- 2) We validate our climate model (NorESM-L), and show it realistically simulates the climate responses caused by the Laurentide-Eurasia-only ice sheets.
- 3) We use the NorESM-ICE6G experimental flow to indicate that the Laurentide-Eurasian ice sheets alone cannot explain these paleoclimate records from around the North Pacific
- 4) We use the NorESM-BIOME4-PISM experimental flows to reveal that these climate records and glacial evidence across NE Siberia-Beringia are well reconciled, when the fast waxing and waning of the BerIS are involved.

It is not surprised to see many reviewers do not like the idea of the BerIS. However, if the reviewers believe that the existence of the BerIS is wrong, they should at least let us know why they think the Laurentide-Eurasia-only ice sheets can explain the temperature records from around the North Pacific. We agree with reviewers that ice sheet modelling unavoidably includes uncertainties, which should be further constrained in future, as we have discussed in the paper. However, these uncertainties do not influence the major conclusion in our current study.

In the open discussion, we ask reviewers the following crucial questions many times.

- 1) What forcing limits the growth of ice sheet over NE Siberia-Beringia, since the buildup of an ice-sheet there is not hampered by the absence of precipitation.
- 2) How to reconcile the temperature records from around the North Pacific within the Laurentide-Eurasia-only concept?

If the mainstream concept is right, these two questions should be answered easily.

C2

However, we do not see reviewers discuss anything about these two questions.

Before these two questions are well resolved in the Laurentide-Eurasia-only concept, should the possibility of the BerIS be rejected?

I really hope that the BerIS is not a forbidden topic, and further open discussions in future can bring new field-investigations across NE Siberia-Beringia, and new wills for carrying out high-resolution simulations in the region.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2020-38>, 2020.