

## ***Interactive comment on “A note on the influence of atmospheric model resolution in coupled climate–ice-sheet simulations” by Marcus Löffverström and Johan Liakka***

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You mention in the introduction how horizontal diffusion does not only influence horizontal motions, but may also impact vertical transport and convection. I wonder how important resolving convection adequately is for building/removing an ice sheet. It would be informative if you more specifically related resolution dependent dynamics/physics with possible shortcomings in building/removing the ice sheets.

In your method section, you describe that present day non-glaciated areas are prescribed with modern day vegetation cover. Do you think this assumption is valid? Do you think it may have a large influence on the simulations?

You present the smoothed topography as a reason why some areas are warmer when the resolution is lower. After that, areas that are colder with respect to the T85 case are pointed out with no explanation why they may be colder.

The tropical and midlatitude precipitation fields are well covered in the text, but there is not much mentioning of precipitation over the ice sheets. It is also hard to see the difference of this field between different resolutions, since the colors starts at 200 mm/yr. A possible solution would be to make a non-linear color scale to better resolve the low-precipitation areas (such as the ice sheets).

"The ice sheets forming under the high resolution atmospheric climatology (T85; panel 3a) are in close resemblance with the target extent (indicated by solid contours; Kleman et al., 2013). There is essentially only too much ice extending along the Siberian Arctic coast." Why is there too much ice extending there? Because it is very cold, because the precipitation is very high, or maybe a combination of both?

"However, the T21 resolution only has "functional support", which means that boundary conditions are provided but the model climate has not been tuned to the same standard as the other resolutions (the resolution dependent tuning parameters are broadly the same as in the T42 case)." How is the 1850-present climate in this low resolution as it is not tuned? Was there any attempt made to tune it? If no, why not?

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Discussion paper

