

Interactive comment on “Representing icebergs in the iLOVECLIM model (version 1.0) – a sensitivity study” by M. Bügelmayer et al.

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Dear reviewers,

Before answering your comments point by point, we would like to thank you for your understanding and time so far! Unfortunately, we had to re-do all the experiments due to a minor error in the orbital parameters that caused them to vary slightly over the years, instead of being fixed. Analysing the new experiments, we found that the main results do not differ from the submitted manuscript. Namely, the oceanic currents cause the bergs to stay close to the Greenland and North American coast, whereas the atmospheric forcing quickly distributes them further away from their calving sites, which strongly affects the lifetime of the icebergs. The wind-driven icebergs melt up to two years faster because they are quickly distributed into the warmer North Atlantic waters.

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Further, we find that local variations in the spatial distribution due to different iceberg sizes do not cause different climate states or Greenland ice sheet volume at the end of the model runs. This result is independent of the prevailing climate conditions (pre-industrial, warming or cooling climate). We thus conclude that local differences in the distribution of the icebergs' melt flux do not alter the prevailing Northern Hemisphere climate and ice sheet under equilibrated conditions and continuous supply of icebergs. Furthermore, our results suggest that the applied radiative forcing scenarios have a stronger impact on climate than the used initial size distribution of the icebergs. The only differences between the submitted and the new manuscript are found in the spread of the BIG-COM and BIG-ATM experiments that is now comparable to the distribution of the CTRL-COM / CTRL-ATM and SMALL-COM / SMALL-ATM runs. This change is due to a higher available calving flux in the new simulations, thus, there are more BIG bergs produced than in the previous runs.

Please find our answers to your comments in the pdf file with our answers in italic / red.

Kind regards Marianne Bügelmayer & Co-Authors

Please also note the supplement to this comment:

<http://www.geosci-model-dev-discuss.net/7/C2928/2015/gmdd-7-C2928-2015-supplement.pdf>

Interactive comment on Geosci. Model Dev. Discuss., 7, 4353, 2014.