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Interactive comment on “Links between CO₂, glaciation and water flow: reconciling the Cenozoic history of the Antarctic Circumpolar Current” by J.-B. Ladant et al.

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Dear Dr Ladant,

your contribution has been seen by two reviewers. The reviews are rather similar. They both acknowledge that the modeling method used is scientifically sound, and that the results are potentially of great interest. However, both reviewers also stress that the analysis of the model output is by far too brief. I strongly suggest that you expand the result section by adding a discussion about the physical link existing between the sea ice formation, the associated disturbances in the oceanic density patterns, and the strength of the ACC. This discussion must be accompanied by a clear related figure. I

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fully understand that part of this discussion can be found in Lefebvre et al. (2012), and that your paper is an extension of this previous study which was not considering ice sheets over Antarctica. However, the present contribution must be understandable by itself, without jumping back and forth in the published literature.

From my own reading, one point appears unclear to me. You prescribed ice sheet over Antarctica, but you did not mention how you prescribe it: how do you define the size and, most importantly, the shape of the ice sheet for the various simulations? It might be also interesting to discuss a bit more the importance (or not) of the presence of an ice sheet, compared to the previous study by Lefebvre et al. (2012) which was neglecting the role of continental ice.

In summary, I recommend you to consider all the reviewers questions and my own points when preparing the revised manuscript.

Looking forward to receiving your revised text.

Best regards.

Interactive comment on Clim. Past Discuss., 10, 2397, 2014.

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