The Cryosphere

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Interactive comment on "The modelled surface mass balance of the Antarctic Peninsula at 5.5 km horizontal resolution" *by* J. M. van Wessem et al.

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We thank G Heinemann for the short comment. We agree that the hydrostatic balance is one of the main limitations of the current model-setup. In the cited manuscripts (Lenaerts et al. 2014, Van Wessem et al. 2015) it is noted how well the near-surface climate is simulated by the model, in support of the model performance and our current usage of the model. Furthermore, the additional citation, Cassano et al. 2000, as used in both Van Wessem et al. 2015 as the current manuscript, notes that up to a resolution of approximately 5 km, there is no clear need of removing the hydrostatic assumption.

We think that this is indeed likely the furthest that we can go in increasing the resolution: if ever we would like to move towards resolutions of $\sim$1 km, our model is likely not

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effective anymore. Furthermore, the higher the resolution used, the more important small-scale processes become, necessitating the use of non-hydrostatic physics as well (which is important for (mainly) these small-scale processes).

As of now, we are confident in the performance of RACMO at this resolution (5.5km). Nevertheless, as emphasized in both papers, non-hydrostatics would further improve the output at this and higher resolutions. We hope to perform non-hydrostatic climate runs in the future.

Interactive comment on The Cryosphere Discuss., 9, 5097, 2015.

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