

## ***Interactive comment on “On the recent contribution of the Greenland ice sheet to sea level change” by M. van den Broeke et al.***

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This paper presents an update of the Rignot's papers evaluating the recent SMB and iceberg discharge changes over the Greenland ice sheet using "state of the art" tools. It is not really innovative but this analysis covers the last years not included in the Rignot's papers and explains and analyses the recent changes in SMB. The discussion over the mass overturning rate is also particularly interesting. Therefore, it certainly deserves to be accepted for publication in TC. The paper is very well written and is ready to be published like this. I support most of the remarks from reviewer #1 and in particular the impact of using inhomogeneous forcings (ERA-40 vs ERA-Int) on the RACMO outputs.

As explained in Fettweis et al. (2013), MAR forced by ERA-40 (over 1980-1999) overestimates precipitation (+30 GT/yr  $\sim$  +5%) in respect to MAR forced by ERA-Interim

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because the ERA-40 based high atmosphere is too wet than ERA-Interim as a result of biases found in the ERA-40 humidity scheme and corrected afterwards in ERA-Interim. However, this anomaly is homogeneous over the whole integration domain explaining why there are not locally significant discrepancies between both forcing. I think that these 5 % are included in the error bar used here. Therefore, it should be good to add a sentence pointing to this issue in the text.

ref: Fettweis, X., Franco, B., Tedesco, M., van Angelen, J. H., Lenaerts, J. T. M., van den Broeke, M. R., and Gallée, H.: Estimating the Greenland ice sheet surface mass balance contribution to future sea level rise using the regional atmospheric climate model MAR, *The Cryosphere*, 7, 469-489, doi:10.5194/tc-7-469-2013, 2013.

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Interactive comment on *The Cryosphere Discuss.*, doi:10.5194/tc-2016-123, 2016.

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