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Interactive comment on “Greenland ice sheet surface mass balance: evaluating simulations and making projections with regional climate models” by J. G. L. Rae et al.

Anonymous Referee #1

Received and published: 11 July 2012

This is an excellent, original and generally well-presented study that significantly advances the science through an effective comparison of Greenland Ice Sheet surface mass balance simulations and projections based on several different regional climate models: the first comparative study of its kind. This paper should be of considerable use to the burgeoning SMB modelling community as well as being of wider interest to Greenland climate scientists and glaciologists. I have very few criticisms but please note the following points.

p.2062, line 10 please add the following reference:

Hanna, E., Huybrechts, P., Cappelen, J., Steffen, K., Bales, R.C., Burgess, E.W., Mc-

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Connell, J.R., Steffensen, J. P., van den Broeke, M., Wake, L., Bigg, G.R., Griffiths, M. and Savas, D. (2011). Greenland Ice Sheet surface mass balance 1870 to 2010 based on Twentieth Century Reanalysis, and links with global climate forcing. *Journal of Geophysical Research - Atmospheres*, 116, D24121, doi:10.1029/2011JD016387.

p.2062, line 26 "but a surface energy balance model is more physically satisfactory": this is true but it also has many more demands regarding the range and amount of necessary climate data (which are not all widely/reliably available for the whole of Greenland) required as input - should add a sentence along these lines.

p.2070, line 18: "albedo and little melt along the GrIS margins (not shown)." In fact I believe this is shown in Fig. 6(e) - please clarify.

Interactive comment on The Cryosphere Discuss., 6, 2059, 2012.

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