**The Cryosphere
Discussions**

Interactive
Comment

Interactive comment on "Present-day mass changes for the Greenland ice sheet and their interaction with bedrock adjustment" *by* M. Olaizola et al.

S.J. Marshall (Editor)

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Dear Drs Olaizola, van de Wal, Helsen and de Boer:

Sorry for the delay handling this as AE; just returned from a few weeks offgrid on Ellesmere. I have opted to send this out for re-review. From my initial read of the revised text, I appreciate the strengthened isostatic/Earth modelling and Table 2, which nicely summarizes the results and the clear, strong conclusions with respect to your results vs. those of Wu et al. (2010).

I have one substantial concern though, perhaps resulting from my own lack of understanding - I need to work through Helsen et al. (2012). But to my read, there is

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something odd about the mass balance model implementation here: not the 'steady state' model but the imposition of dSMB/dT. You relate this to the lapse rate in Eq.(1), as a perturbation to elevation, but I cannot see how this captures the temperature sensitivity of SMB. Does ELA stay fixed with respect to the choice of b_abl vs. b_acc? It does not seem direct that dT should equate to an instantaneous 'effective elevation change'. Could this instead be implemented through a change in ELA, using the modern calibrated values of a,b (SMB gradients) but allowing ELA to vary in time? Maybe this works better than my intuition suggests, but one or two plots of the SMB fields and (e.g.) mean SMB vs. time would help to assure the reader that this is producing reasonable spatial-temporal flucuations of SMB.

Interactive comment on The Cryosphere Discuss., 5, 3455, 2011.

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