

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

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C2124

General Comments:

RC: This manuscript aims to examine the results of Wu et al., (2010) who found simultaneous large rates of bedrock subsidence and ice sheet loss in the central portions of the Greenland Ice Sheet (GIS). The authors use a numerical model to determine the likelihood of these results and to examine the spatial distribution in subsidence from different loading scenarios. I am neither an ice sheet modeller nor an expert on iso-static rebound so I cannot comment directly on the model specifics that the authors have used. One shortcoming of the model is that it does not include outlet glaciers, but the authors point out that most of the large ones are in the South and would only cause an increase in bedrock uplift that is already found there. My only general comment for the manuscript is that the writing is a bit unorganized and repetitive. Many times in the text the authors describe the details of the Figures at a level that is not needed in the main body of the manuscript. An example is on pg. 3464 lines 8-9. These should be eliminated and instead the authors should just refer to the figure with a detailed caption outlining each of the line colors used. Other than this, I find this to be an interesting test of the results of Wu et al., (2010) and the manuscript should be published with minor revisions.

AC: Thanks to the anonymous referee for his suggestions to improve the manuscript. We re-organized the text avoiding unnecessary repetition of information, specially regarding the figure's description.

Specific Comments:

RC:Abstract - seems a bit detailed and thus, long. Perhaps it could be shortened to the main points. **AC:** We agree.

RC: 3459:5: 'result' instead of 'results'? **AC:** Changed

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RC: 3459:19: Awkward english: 'To avoid the positive. . .', better to say: To avoid infinite (or runaway) values for SMB, **AC: Changed**

RC: 3461:4: Doesn't the distribution of the load control the shape of the deformation? **AC: The deformation of the lithosphere is due to the load's distribution (q), but the shape of the deformation depends on different factors. For example, on the values of D which controls the radius of relative stiffness.**

RC:3461:16: spatial resolution of the applied load? **AC: Spatial resolution of the grid.**

RC:3462:1 Better to say: In order to analyze the amount of subsidence due to changes in ice thickness, we carried. . . **AC: Changed**

RC:3462:6 'over the last millennium using', rather than 'in the last millennium by' **AC: Changed**

RC:3463:25: comma after 'As such' **AC: Changed**

RC:3464:12: This is a consequence of more ablation - repetitive with previous line. **AC: Changed**

RC:3465:24: remove decimal point in 2.200 yrs. **AC: Changed**

RC:3467:6: Earth's not Earth, calculate not calculated **AC: Changed**

RC: 3467:7: Earth's not earth. **AC: Changed**
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RC: Table 1: define PD in the caption - it is in the text, but takes some digging to find the definition. **AC: Changed**

RC: Fig. 2: 'We present the last cycles wHere a new. . .' Also, there is no need to describe the figure in the main body of the text 3462:27-3463:3. Maybe it's just me, but I'm confused by the ice-related line being green and the land-related line being blue! It seems more intuitive for these colors to be switched - a minor point for sure. **AC: Changed**