

Response to referee 2 comments.

Below we detail how we have responded to the referees' comments. In addition we provide, as a supplement a highlighted copy of the revised text to show where changes have been made. We are very grateful to the referees for their thorough, careful and constructive comments and suggestions.

Title: Since the data set also contains ice thickness and surface elevation, shouldn't the title reflect that as e.g. "A new geometric dataset for Greenland"?

Possibly. However, the new surface DEM is not described at all in the paper and is used for the purpose of deriving the bed so we prefer to keep the title as is as it better reflects the vast majority of the material presented. In addition, the surface Dem will be published in a separate article.

4831.1 Should add "the third power of the surface elevation gradient and .." at the beginning of the line to add this other important dependence.

Well yes, but see reply above: we discuss here the bed DEM not the surface. For example, we do not go into details of the accuracy assessment of the surface DEM.

4831.5 Should be ".. genesis *of* landforms .."

Done.

4831.28 Should be "release of the product."

There is more than one product that we provide.

4833.5 and .6 It may not be clear to the reader what Level 2 and Level 1b refer to, could the authors clarify with additional information.

Agreed. Have removed these technical terms.

4833.25 Could add that this is also an airborne instrument. The heading of 2.1 makes that clear, but all other 2.1.? subsections indicate it again explicitly.

Done.

4834.11 There seems to be something wrong with this sentence. Maybe missing an "and"? "It was operated by the NASA Jet Propulsion Laboratory (JPL) on an Air Greenland Twin Otter *and* as an IPY deployment on the NASA Twin Otter."

Fixed error.

4834.21 A lot of information about Antarctica here. Should add something specific for Greenland and/or remove the Antarctic information for the context of this paper.

The instrument has been deployed more extensively in Antarctica. We include a single sentence on this.

4835.25 Should be ".. i.e. as far *as* the maximum .."

Done.

4842.7 I think this geoid referencing deserves some more explanations and weight in this section. If I understand well, the former 2001 data set has not been referenced to the geoid. Nevertheless, many former ice sheet modelling studies have directly used the 2001 data set without correction (e.g. SeaRISE). The authors should indicate here what magnitude the geoid correction has and where it is most important. Also clarify e.g. in the caption what has been done for Fig 4. Are both data sets corrected for geoid or not?

Made this clear in the text and added a sentence about its magnitude over Greenland.

4842.14 Maybe "The data includes features which were not visible in previous compilations as well as *it improves* the representation of features previously observed."

Rephrased.

4848.29 Reference Fahnestock et al. should be corrected. "High geothermal heat *flow*, basal melt, and the origin of rapid ice *flow* in Central Greenland"

Done.

Figures:

C2774

Many labels are too small and hardly legible, especially the color bar and tick labels but also x-axis and y-axis labels in Figs. 2, 4 and 6. This should be changed.

Agreed. Labels made larger.

Fig.2: Maybe "Elevation relative to sea level (m)" is a better label here. Same in Figure Reference surface for plots has been made explicit in captions.