We thank the reviewers for their constructive comments on this manuscript. In the response below, we address the comments made by Referee #2 and explain the changes we have made to the manuscript. Reviewer comments are in *black italics*, and our responses are in red.

RC2 (Anonymous Referee #2)

This paper discusses the formation process of subglacial topography using existing data from Bedmachine and acquired RES data. It suggests that the formation period of flat surfaces was before the formation of West Antarctic Ice Sheet, and suggests that the direction of ice flow is influenced by pre-glacial topography. It is an interesting study that provides insights into the process of ice sheet formation and the formation of subglacial landscape. It fits within the scope of the journal and is judged as publication.

> We thank the reviewer for their positive comments.

There is a need to describe deeper into the correction for rebound. I think that the GIA model adopts a 2D structure of the Earth, but is it correct to understand that the parameters follow Paxman et al. (2021)?

> To describe the rebound correction in more detail, we have amended the sentence at Line 233: "To do so, we used a model that accounts for the isostatic response to the complete unloading of the Antarctic Ice Sheet (Paxman et al., 2022)", which now reads:
> "To do so, we adopted a recent calculation of the isostatic response to the complete unloading of the Antarctic Ice Sheet, computed using a flexed elastic plate model with a laterally variable effective elastic thickness of the lithosphere (Paxman et al., 2022a). The effective elastic thickness in this model exhibits relatively low values of 10-20km in the Evans-Rutford region (Swain and Kirby, 2021)."

In this case, the rebound values should vary by the model adopted, but how much variance is there? I would like that variance to be documented in Table 1.
Additionally, could the choice of Earth's structure significantly influence the results of the isostatic rebound elevation distribution and impact the discussion?

> We have added a paragraph at the end of the Results section (3.3. Hypsometry) in order to clarify this:
> "The uncertainty in the rebounded elevations of the surfaces ranges from 42 m to 100 m (Paxman et al., 2022b). However, given that effective elastic thickness varies over relatively long wavelengths (> 100 km) in this region (Swain and Kirby, 2021), the surfaces will be near-equally affected by any uncertainty. Therefore, the uncertainty could have a minor effect (10s of m) on the elevation of the hypsometric peaks, but would not diffuse the peaks. The low effective elastic thicknesses used in the isostatic rebound calculation for the Evans-Rutford region (Paxman et al., 2022b) have been reported in multiple studies (Jordan et al., 2010, Chen et al., 2018, Swain and Kirby, 2021), and are at the lower end of the range used by Paxman et al. (2022b) to generate uncertainties. Therefore, we consider these uncertainties to be maximum values for this region."

Specific and technical comments

Please cite the software used for creating the maps.

> Maps were created using QGIS and the authors' own material, in some cases specifically Quantarctica, which has been cited in the figure caption of Figure 1. It is not journal policy to cite software used when the material used has been created solely by the authors.

Line 118: Please remove the comma between subglacial and processes.

> The comma between subglacial and processes has been removed here.

Specify Marine Byrd Land in Figure 3.

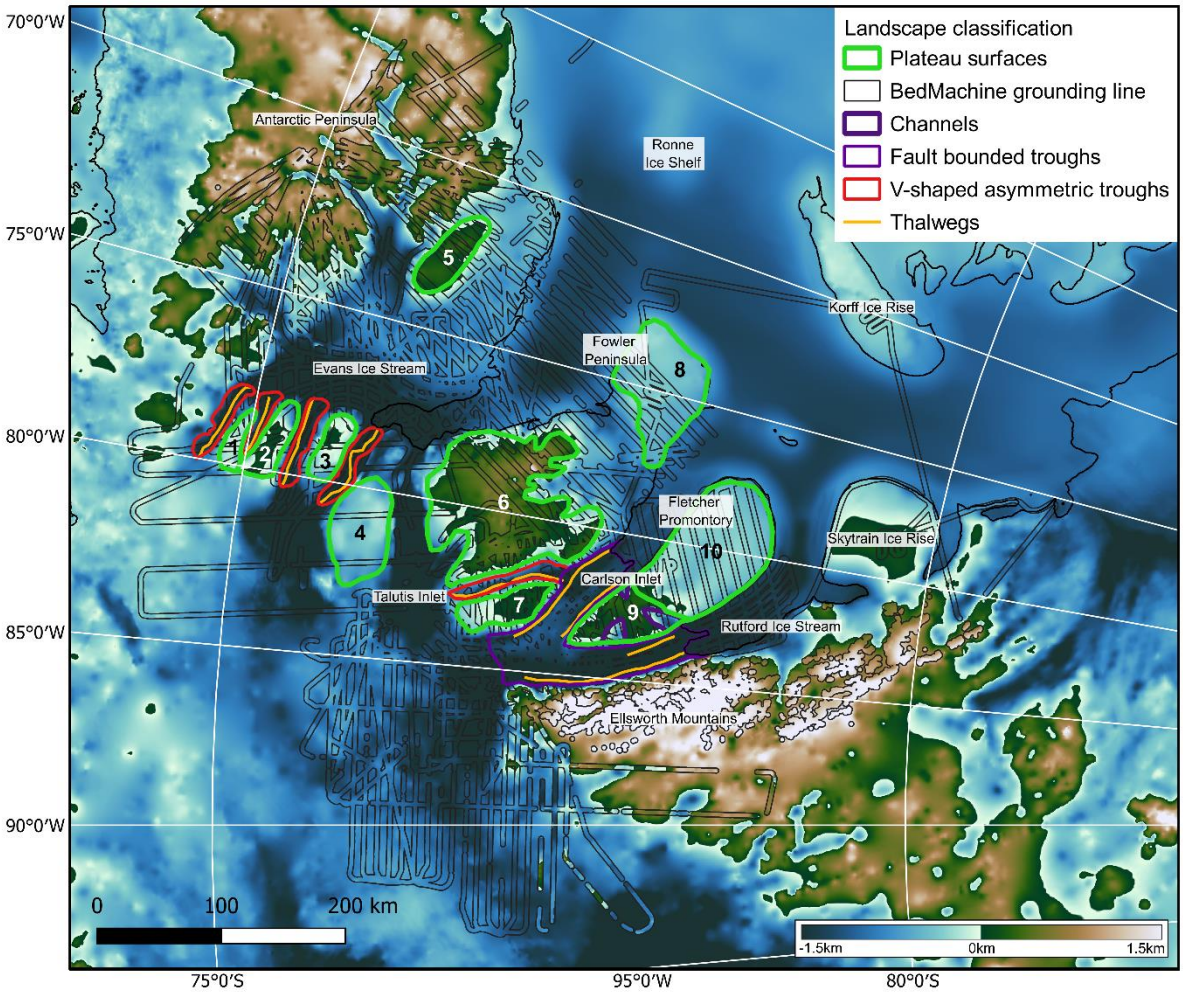
> We have realised that the figure caption here has an error, as Marie Byrd Land is for the majority not visible in the figure. Therefore, we have amended "West Antarctic Rift System-Marie Byrd Land" to "West Antarctic Rift System" in the figure caption.

Line 186: An explanation of the abbreviation of TORUS has already appeared.

> Thank you for spotting this; we have removed "(Targeting ice stream Onset Regions and Under ice Systems)" from the sentence.

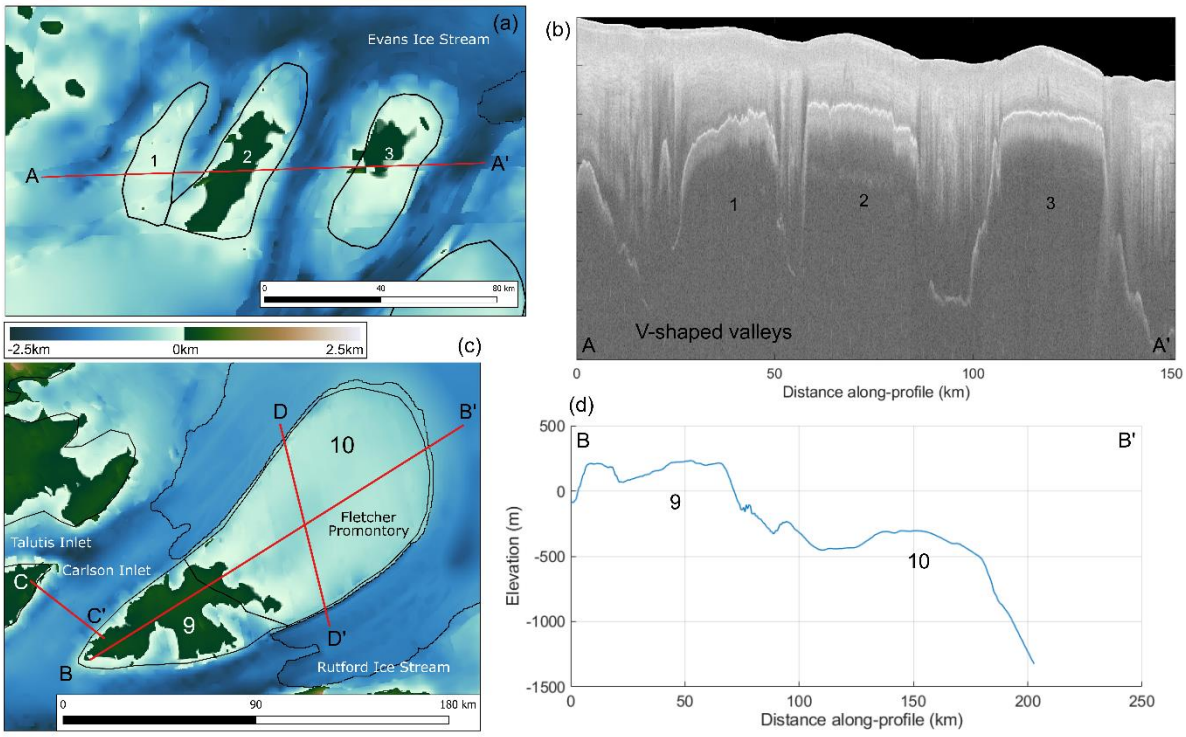
Adding a map to Figure 5 that makes it easier to identify flat surfaces (by narrowing down the elevations for coloring and enlarging the region) would make it clearer for the readers.

> We have edited Figure 5 in order to highlight the flat surfaces: the colour scale is now limited to -1500 m to 1500 m, which highlights the elevations of the surfaces in relation to the surrounding subglacial topography. The sentence "The colour scale saturates at -1.5 km and 1.5 km, in order to highlight the elevations of the surfaces in relation to the surrounding topography" has been added to the figure caption. The new figure would look like this:



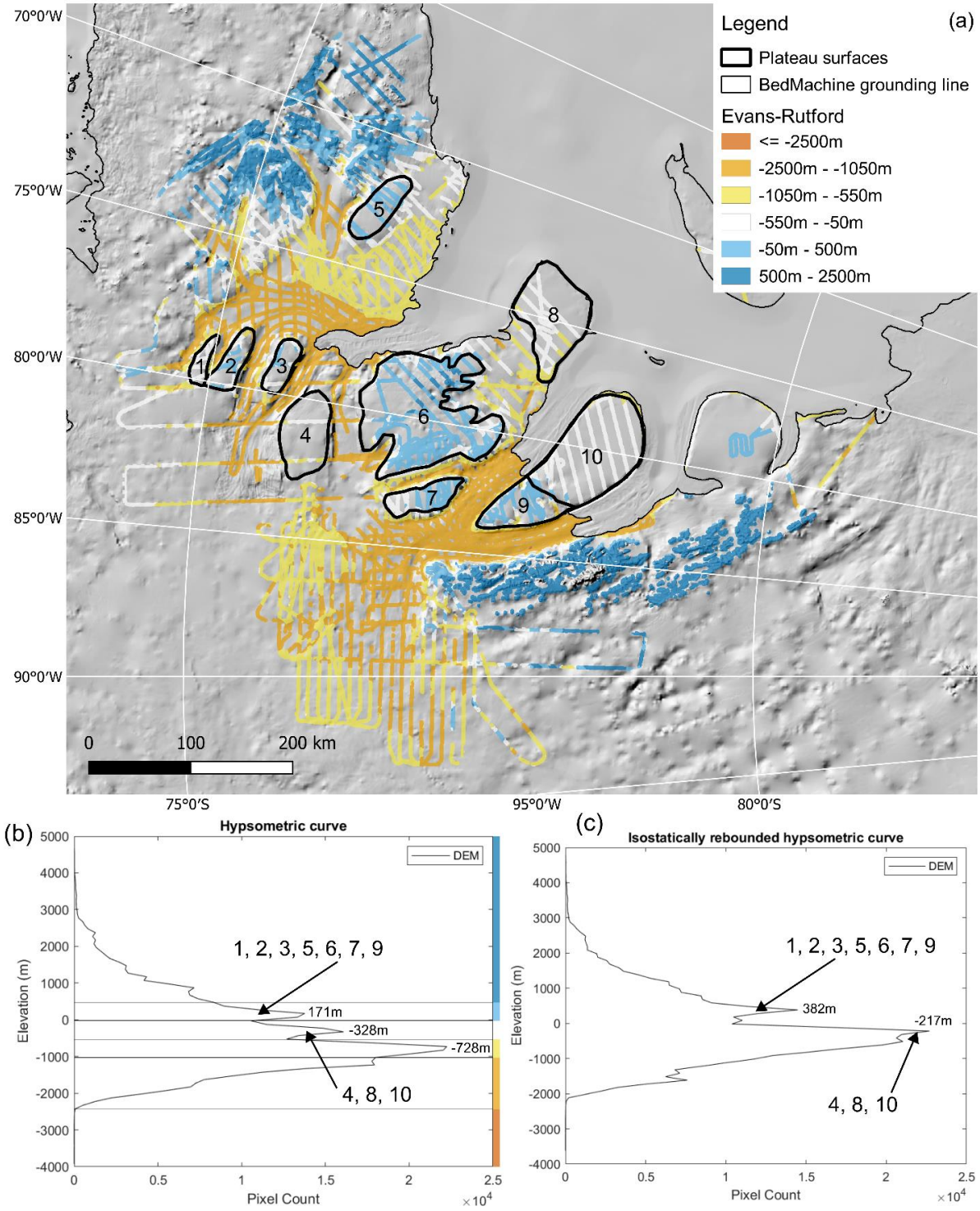
In Figure 6, please arrange the map first and the cross-section afterwards, e.g., moving position A to B, and B to A.

The positioning of the panels in Figure 6 has now been changed (panel a swapped with panel b, and panel c swapped with panel d). The figure caption and corresponding references to the figure in the text have also been changed, now reading: "**Figure 6:** (a) Profile line (A-A', displayed in red) over plateau surfaces 1-3. (b) Radargram illustrating plateau surfaces 1-3 along profile A-A'. (c) Profile line (B-B', displayed in red) over the Fletcher Promontory, plateau surfaces 9 and 10. Profile lines C-C' and D-D' illustrate the locations of radargrams in Figures 7 and 9. (d) Interpolated elevations from BedMachine subglacial topography data (Morlighem et al., 2020) along profile B-B'. BedMachine data were used for this profile as there were no directly overflown flightlines from the GRADES-IMAGE RES survey." The new figure would look like this:



For Figure 8c, indicate which flat surfaces correspond to which peaks.

Figure 8c now includes the numbers of the surfaces included within the hypsometric peaks. The new figure would look like this:



In lines L282-L286, including V-shaped valley and Talutis Inlet on the map would make it easier for readers to follow.

These labels have been added to Figure 6, see above response for visualisation of the new figure.