

The Cryosphere Discuss., referee comment RC2
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Comment on tc-2021-266

Anonymous Referee #2

Referee comment on "High-resolution subglacial topography around Dome Fuji, Antarctica, based on ground-based radar surveys over 30 years" by Shun Tsutaki et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-266-RC2>, 2021

Review of "High-resolution subglacial topography around Dome Fuji, Antarctica, based on ground-based radar surveys conducted over 30 years" by M.J. Wolovick et al.

22 November 2021

Summary

This MS describes a new grid of ice thickness and subglacial topography in the vicinity of Dome Fuji in East Antarctica. The underlying data and their strengths and limitations are summarized, the details of the gridding are discussed and an evaluation of the output is performed against existing datasets.

The MS is mostly what it claims to be, which is refreshing, although no significant geophysical insight is gained into the Dome Fuji region beyond the subglacial topography that is presented. This limits the long-term value and reach of the MS, but the MS is thorough in its analysis of these data and in the clear application of necessary corrections (e.g., firn). The authors make a convincing argument that multi-element ground-based Yagi antennas are a reasonable alternative to SAR focusing. Separately, MS is well structured and visualized, but contains within several presentation decisions that raise concerns, outlined below.

Comments

Data availability. It's not clear to me if the raw radargrams or lat/lon/thickness data are already available. If not, they ought to be. Otherwise, it implies proprietary data used herein are simply remaining so, which is not a great look in 2021. Along the same lines, the draft grid ought to be available publicly upon submission for review. This may not be required by TCD, but it is increasingly recognized as good practice and is required by some Copernicus journals. In my view, the authors should, at a minimum, point to a public repository with *both* the JARE lat/lon/thickness data and the grid. Prior to publication.

What is NDF? It is never defined other than its location. I'd have assumed it meant "North Dome Fuji", but that doesn't make sense geographically based on its location. Further, it is inconsistently identified in the figures. Shows up in some, not others.

274-277: It's not clear to me why deep ice in subglacial troughs is subject to "complex ice flow" but that it is not the case for to subglacial ridges? See, e.g., Bell et al. (2011, Science, <https://www.science.org/doi/10.1126/science.1200109>) on the Gamburtsev Mountains.

Figure 3a: Given the contour lines shown, why not also use a discrete color bar? Little is gained from the continuous color bar, as features are not distinguishable between e.g., 2800 and 2825 m thickness at this scale.

Figure 4: Was "H" defined prior to mention in this x-axis? I assume it denotes ice thickness, following convention, but it would be good to clarify if in fact it wasn't defined.

15: Degrees/minutes/seconds are archaic. Please present station coordinates in decimal degrees instead.

17: How close to the pressure-melting point?

25: What is "it"?

33: not yet identified

47: What is "solid" smoothing?

75-77: The mean annual temperature and accumulation rate presented here and in Figure S2 do not appear to add much to the discussion in the MS.

106: thicker ice to be detected

165, 166: bounce -> reflect

237-239: BedMachine Antarctica's supplement makes clear that streamline diffusion, not

mass conservation, is used to interpolate data in the slow-flowing interior of Antarctica, including the Dome Fuji region.