# Interactive comment on "A detailed radiostratigraphic data set for the central East Antarctic Plateau spanning the last half million years" *by* Marie G. P. Cavitte et al.

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Cavitte et al. present an interesting study and make available a complete set of radar data around Dome C, Antarctica that are valuable to the community. Many details are provided in the manuscript, which seemed valuable to include with the data release. Most of my comments are minor, and the work raised a few questions. I expect these are all straightforward to address and it would be up to the authors how to incorporate any structural changes in the manuscript. I enjoyed reading the manuscript and it is a big credit to the authors for making all of these data available.

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Overall questions:

I am not very familiar with the standards for data release that may have been put out by the AntArchitecture program in order to facilitate bringing together different data sets in the future, but is the main piece that is new that these data are now available, or that they have been processed in a way that allows them to be used all together? Or, it seems likely both. Does the way that these data are archived follow a standard that was either established by previous data contributions, or does this set one that future archival efforts should follow? What are the ways that ensure that these data can be used together with other data sets in order to advance the goal of assembling a continent-scale radiostratigraphy? Perhaps this is not the paper to describe the protocols and how fields are archived, but given the focus on contributing to AntArchitecture, it would be interesting to mention.

The point in the discussion about tracing the same IRH in radar data from different systems may be worth mentioning earlier. It could even be that this discussion and Fig 8 make sense to move up in the manuscript when the data are being discussed, since what is discussed strikes me as more of a statement of the reality of the problem. The discussion section also includes multiple different points and it could be worth using sub-sections or considering to restructure some of that text elsewhere in the manuscript.

Given it's prominence in the figures, how accurate are the Zwally et al. (2012) drainage divides? I assume these are from ICESat data, but one version used ERS, and regardless there would be higher resolution data products from which to designate the divide. Would this matter? Does the divide appear where it is expected from the LDC survey?

The title mentions "last half million years" but the deepest layer is ~700 kyr. Is it preferred to exclude credit for these deepest layers in the compilation because they are dated only with the age model? In that case the title should reflect the past 350 ka - I didn't follow why half a million was referred to in the title.

Minor points:

- Line 40: Perhaps also indicate that accessibility is an issue to radar-data collection in Antarctica (not just size – though of course that is the major challenge)

- Line 43: It would be worth being consistent with how AntArchitecture is referred to, as the manuscript uses "AntArchitecture project", "program", "community", and "action group", yet I think nearly all of these uses refer to the same. Perhaps "action group" is best since that is how it is referred to on the SCAR page. Would it be appropriate to cite the white paper or link to AntArchitecture page?

- Line 45-48: "potentially reducing the lack of unique solutions, a persistent problem until now . . ., as well as solving the problem of modeling 3D data in simple 1-D or 2-D models. . ." – I would suggest revising this sentence as it isn't completely clear what is being stated. And, my read of this is to say that a continent-scale radar data set would in itself help to constrain parameter values and would facilitate solving 3-D problems that are better than 1-D or 2-D problems. I may not be understanding the point but I would caution that radar data are one part of the problem, and the ability to use them to solve an inverse problem or constrain a 3-D model and get a robust solution depends on the problem as it is set up (not only including the data). Unfortunately, a 3-D radiostratigraphy won't on it's own make all ice-sheet problems well posed.

- Line 48: Perhaps indicate here that Cavitte et al. 2020 is the citation to the data set as it otherwise could read like part of this work was already published elsewhere in a manuscript

- Line 50: I think "the umbrella" could be cut since these projects were not necessarily connected

- Line 55: This may just be American English usage, but I use "farther" when referring to physical distance ("further" for figurative distance)

- Page 5: I wasn't sure why there was a footnote for Holschuh et al. (2014), seems like

that goes more naturally with the table

Figure 1: It took me a moment to see the black lines well outside of the grid indicating the locations of the HiCARS prior to 2016. Since the grid is on, perhaps make those a different color? Or, swap blue and black since those lines in a tight grid will stand out?

Figure 3: I wasn't sure of the need for the Landmark software interface to be included in the figure, especially since the font is too small to read for the tracing settings. Given that this is proprietary software, what is the message to the reader about the value of this interface? Would it be just as informative to share the figure without the Landmark panel view?

- Line 173 and previous: May be better to write out two-way travel time in this case, or perhaps use "TWTT"? Or, "twtt"? Is there a convention?

- Should Equation 3 have "twt" or "twtt"?

- Line 184: What does "applied equally" mean in this sentence?

- Line 230: Perhaps use "and" instead of ";" between references

- Line 267: Are the ages archived with the radar data set? Is there a way to update the data archive in the future if different ages are considered more realistic)?

Figure 4: Is this figure here just to show where the IRHs fall with respect to climate cycles, or is there any information about the distribution over time and why these layers can be detected by the radars that relates to climate? I wasn't quite sure why this figure was included (though it is interesting to see)

- Line 281: "Leysinger" was dropped from "Leysinger Vieli" for 2018 reference, and same issue in the reference list

And, on this line I did not find that "This effect is obvious, even visually. . ." – I don't see the influence of basal processes here (?)

- Line 284: "fall into nulls" seemed like awkward phrasing, but perhaps I am not familiar with this language. In either case, if there is a way reword that could help make the point more clear

- Lines 301-309: I think there may be an unintended simplification of the goals for Antarctica in relation to what has been achieved for Greenland. For Greenland, it is a huge advantage to have significant coverage from the same system. Antarctica has the challenge of being bigger, more remote, and the existing data sets have been collected for decades using many different systems. I didn't think that came across in this paragraph so would suggest revising to make it more clear how radiostratigraphy generation for Greenland and Antarctica compare.

- Line 307: When "previously rare" is mentioned, I wasn't sure if it was meant for 3-D cases or for continent-scale cases? The citations refer to very different types of work (and many other examples could fit into this by my read, so perhaps use "e.g.") and the statement isn't correct that radar data themselves are rarely available for modeling efforts, but of course most of the surveys are local – but models have been integrating these data for decades, and different problems can be tackled as the radar data sets become more spatially extensive. It may be worth elaborating slightly here, or possibly deleting this point as I don't find that it adds much as a single sentence. The authors can decide what is best.

- Line 318: Should be "confirm", but I would suggest "corroborate" – there is still dependence on age models