

Clim. Past Discuss., referee comment RC2  
<https://doi.org/10.5194/cp-2022-95-RC2>, 2023  
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## Comment on cp-2022-95

Anonymous Referee #2

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Referee comment on "An age scale for new climate records from Sherman Island, West Antarctica" by Isobel Rowell et al., Clim. Past Discuss.,  
<https://doi.org/10.5194/cp-2022-95-RC2>, 2023

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### General Comments:

There are a couple of areas within the manuscript where I felt lost and needed to read Rowell et al, 2022, for context. These areas are discussed in the Specific Comments below. If these areas are addressed, it will make the manuscript much more accessible to readers unfamiliar with Rowell et al, 2022, and help the manuscript achieve a "stand-alone" status.

With minor revisions, this paper will be an important contribution to the *Ice core science at the three poles* special issue.

### Specific Comments:

35: Without the context from Rowell et al, 2022, it is not clear why WACSWAIN would choose to drill at Sherman Island to investigate the WAIS during the LIG if there is high risk of no LIG ice at the site. A sentence (or two) further explaining why Sherman Island was chosen as the site to investigate the LIG will help the reader understand the scientific context for drilling at Sherman Island.

35: Without context from Rowell et al., 2022, it is not clear why the RAID was chosen for the drilling. All that is needed here is some of the context that is contained in Rowell et al., 2022, such as ...high risk of not finding LIG ice at Sherman Island... the RAID was used, as opposed to a conventional ice core drill, to obtain a lower resolution water isotope record from the site which would indicate the ice age at the bedrock and give a first indication of the climate signal at Sherman Island... the RAID will save on logistics... etc..

40: The first sentence in the last paragraph talks about the "last few centuries" whereas the previous paragraph focuses on the LIG. I believe I understand your overall point – a reliable age scale is needed for the core – but the last paragraph could use some rewording to make it fit better within the context of all of the previous text up to that point.

60: It would be good to include a reference regarding "sulfur (S) isotope analysis to differentiate between background and volcanic samples".

## Technical Corrections:

30: The word "in" is not needed in the sentence that reads, "the Abbott Ice Shelf in between continental Antarctica and Thurston Island".

45: The acronym for RAID is defined earlier in the text (at 30). Instead of "Sherman Island Rapid Access Isotope Drill (RAID) field campaign", it can simply say "Sherman Island RAID field campaign".

55: The title of this section is "SI:RAID age scale development". It will help the reader if "SI:RAID" is defined somewhere. The first sentence of this section could be changed from "The Sherman Island RAID age scale" to "The Sherman Island RAID (SI:RAID) age scale" to give a reader a clear understanding of what is meant by "SI:RAID".

65: Up to this point in the text, Sherman Island has not been assigned the acronym "SI". So, in the second sentence, it is clearer if "20 m long SI ice core (SI:Core)" is changed to "20 m long Sherman Island ice core (SI:Core)".

70: In some places throughout the text "sea salt" is used and in other places "sea-salt" is used.

105: In the first sentence, include the word "Island" after "Sherman".

110: It seems like the first paragraph (both sentences) "It became clear during....dating of the deeper samples" should be in the previous section, and section 3.03 should begin with the sentence/paragraph "The records of chemical species were closely...".

110: Suggest rewording the second sentence to: "We use the flank-flow depth/age model to guide us in dating the deeper samples."

130: The authors are asked to double-check their stated values in the text for  $R_m$  and  $R_t$ . I think the values stated in the text are mismatched. I believe  $R_m$  should be 0.038 and not 1.78, and  $R_t$  should be 1.78 and not 0.038.

170: Incorrect use of "an". Should read "we use a depth/age model".

175: Should be either "Under these assumptions..." or "Under this assumption".

200: Delete the first occurrence of the word "were" in the following sentence "Peaks present in some species in RAID data were which were not identified in the Core". Sentence should read, "Peaks present in some species in RAID data which were not identified in the Core"

210: It looks like the word "Table" is missing in "...added to the average uncertainty at the two adjacent ties (2)". Should it read "...added to the average uncertainty at the two adjacent ties (Table 2)".

225: Suggest rewording sentence to "The model was used to estimate the age of the ice towards the bed at the RAID drilling site; however, in the lowest 13 meters, model outputs are meaningless."

265: Previously in the text it is written as "S isotope" rather than "S-isotope".

300: "IC" is defined anywhere in the text. Could use "chemistry data" to be consistent with Section 2 of the manuscript.

300: Most previous places in the text it is written as "S isotope" rather than "S-isotope".

305: "SI" isn't defined anywhere else in text. Suggest rewriting sentence to "The records contained in the existing Sherman Island data"

310: "SI" isn't defined anywhere else in text. Suggest rewriting sentence to "The Sherman Island ice core was drilled by DT."

325: The Basen et al., 2012, reference is to a discussion paper. Is there a corresponding final paper to reference? If not, a reference to a published, non-discussion paper should be used in lieu of this one.

340: The stated reference is to a pre-print. Printed manuscript reference is: Crick, L., Burke, A., Hutchison, W., Kohno, M., Moore, K. A., Savarino, J., Doyle, E. A., Mahony, S., Kipfstuhl, S., Rae, J. W. B., Steele, R. C. J., Sparks, R. S. J., and Wolff, E. W.: New insights into the  $\approx 74$  ka Toba eruption from sulfur isotopes of polar ice cores, *Climate of the Past*, 17, 2119–2137, <https://doi.org/10.5194/cp-17-2119-2021>, 2021.