

Response to reviewer:

Thank you for reviewing this manuscript again. The proposed suggestions have been made to the test, with the answers to questions included below.

Line 94: Is the -25 C shipping container a stand-alone container that is somehow always kept at the specific temperature? Or is the container once the core is transported from the island to the subsequent transportation?

This is a standard dual-compressor reefer shipping container. The temperature is set and then monitored throughout the voyage.

This section has been expanded to provide more detail about the shipping, and to confirm that the temperature was maintained during transport.

Lines 101-102: Were the cores cut into the discrete samples in the field or in the lab?

In the lab. The following added for clarification:

“Subsequent sub-sampling of the cores was undertaken in the -25°C cold laboratories.”

Section 2.6: While I understand wanting to place this section within the methods, it makes more sense to first describe the age scale and then describe the uncertainty. The current format describes the uncertainty before the age scale, which makes the reader then scramble to try to find the age scale. (Granted, the age scale is in the subsequent section, but it is still necessary to describe the age scale first).

As suggested, this section has now been removed. The text regarding uncertainty bars is only relevant for figure 6 and has been included in the caption.

The section about age-uncertainty has been moved to section 4 and the statistical significance sentence moved to section 2.2.

Line 167: Do you perhaps mean November to December (2 months of a summer peak) rather than December to November? Or is the dash really a minus sign and therefore you are examining the difference between the December concentrations and the November concentrations? (Which is highly unlikely as you are looking at seasons rather than specific months).

Yes, I meant November-December (referring to the two summer months). This has been updated.

Lines 260-277, lines 380-385: Line 263 suggests the possibility of a cold bias throughout ERA5, while lines 276-277 suggests the possibility of a warm bias in ERA5 “between 0.52 to 0.67 °C at this location”. Are you suggesting that both of these biases occur simultaneously? For example, a cold bias for all temperatures except for between 0.52 and 0.67 C on the island? If so, this reasoning needs to be expanded. In lines 260-277 I was proposing two possible scenarios to explain the discrepancy between ERA5 temperature and visible melt. Lines 380-385 suggest that the warm bias is an increase of 0.52 to 0.67 °C rather than between these two temperatures. Please clarify.

The text has been updated to clarify that the data indicates that ERA5 is warm biased at this site.

Line 343: Change “sites” to “site’s”

Corrected.

Lines 362-363: Although Thomas et al., 2021 is cited here, more explanation needs to be included in this paragraph regarding the “previous estimate”. How was the previous estimate calculated? If the previous estimate is from the P-E from ERA5 then evaluating ERA5 becomes circular reasoning throughout the entire paper.

This was based on the Herron and Langway densification model using the measure density profile. This section has now been expanded to include a more detailed description.

Lines 450-455 are speculative and can be reduced to one to two sentences to minimize the speculation.

Sentences combined to reduce speculation.