

Clim. Past Discuss., author comment AC2
<https://doi.org/10.5194/cp-2021-107-AC2>, 2021
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Reply on RC2

Jacob Jones et al.

Author comment on "Sea ice changes in the southwest Pacific sector of the Southern Ocean during the last 140 000 years" by Jacob Jones et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-107-AC2>, 2021

RC2: We thank you for your time in reviewing our manuscript – your comments have been extremely helpful in refining our manuscript, and we sincerely appreciate your positive feedback.

Because of the number of co-authors working on this project, we have opted to create a comment tracking table for ease of discussion and in-text references to other related comments. We have copied and numbered each comment received in your review and have provided our collective response to each.

Please feel free to follow up for any required clarity.

Sincerely,

Jacob Jones

Comment #	Comment	Author's Response
RC2-1	sSST is sometimes written as SSST throughout the manuscript	Noted - we will standardize and update throughout the manuscript to SSST.

RC2-2

From this paper alone, it is not clear what the percentage changes in SIC (%wSIC) represents. Does a value of 40% indicate that the amount of sea-ice is 40% of modern sea-ice concentrations or some other reference point? Or does it indicate that only 40% of the region around the core site is covered by sea-ice at this time? Furthermore, does %wSIC give any indication about what thickness of sea-ice is present? A couple of sentences in the methods section clarifying what “%wSIC” is would address this issue.

Sea-ice concentration (SIC) is defined as the fraction of ocean area that is covered by sea ice. Sea-ice concentration thresholds are generally: 0-15% open ocean; 15-40% unconsolidated sea ice; >40% consolidated sea ice (Armand et al., 2005 and references therein; Hobbs et al., 2016). Therefore, a value of 40% indicates that 40% of the region over the core site was covered by sea ice during the winter at the considered time slice. These values represent a mean state integrated over the time period covered by the sample.

As requested, we will provide additional clarity on what wSIC is measuring more specifically.

RC2-3

Line 117-119: make it clear that these are modern(?) positions of sea ice extent and the subtropical/polar front.

Agreed – we will clarify that these are the modern positions of the sea-ice edge and fronts.

RC2-4

Line 235: what proportion of the overall numbers of frustules counted in each

For TAN96, the downcore proportion of diatoms included in the TF is >82%

sample are in the transfer function training set? If the number (percentage) is low (<60%?) in any sample, are the sSST and %wSIC values compromised?

(mean = 92%). The Sea Ice group accounts for <1% during interglacials, and up to ~7% during glacials.

For SO136-111, the downcore proportion of diatoms included in the TF is >79% (mean = 91%). The Sea Ice group accounts for <1% during interglacials, and up to ~4% during glacials.

No samples report using <60% of total identified specimens and therefore our SSST and WSIC estimates are not believed to have been compromised by low proportion of the TF diatom assemblages.

RC2-5

Line 308/309: is the Ferry et al (2015) data available for you to run through your transfer function?

The MAT has been applied on Ferry's data (core E27-23; Figure 1 included below). Results appear very similar to the published ones, especially in the timing of sea-ice changes. This was observed and published for core SO136-111 in Ferry et al., 2015.

Figure RC2-1 (attached as pdf): Winter sea ice concentration in E27-23 reconstructed through GAM (Ferry et al., 2015) in blue and through MAT (Crosta, unpublished data) in orange over the last 50 ka BP.

Please also note the supplement to this comment:

<https://cp.copernicus.org/preprints/cp-2021-107/cp-2021-107-AC2-supplement.pdf>