

Clim. Past Discuss., referee comment RC2
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Comment on cp-2022-15

Anonymous Referee #2

Referee comment on "Compilation of Southern Ocean sea-ice records covering the last glacial-interglacial cycle (12–130 ka)" by Matthew Chadwick et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-15-RC2>, 2022

Chadwick et al. present a valuable paper on the sea ice evolution around Antarctica, based on diatom records from a variety of previous publications. The paper is generally well written, though there are a few points that need clarifying, in my opinion. I recommend publications after these points have been addressed.

Major comments:

- Using diatoms as sea ice proxies: given that diatoms reproduce in the spring/summer, I am wondering how one the main reconstructed variable from the proxy records is winter sea-ice concentration? I think it would be good to explain this in more detail in the methodology to understand the reasoning behind this notion.
- There is a general confusion with how many records are in this compilation. The abstract says 24 sediment cores (+ one ice core). The Materials and Methods section says 28 sea-ice proxy records from 24 sediment cores [71], but later [75] refers to 27 sea-ice proxy records. Table 1 lists 24 sediment cores and one ice core, totalling 25 records. So which one is it? Please make this as clear as possible for the frustrated reader.
- How comparable are the quantitative and qualitative reconstructions? With the NaCl in the ice core, would higher values not indicate more open water rather than more sea ice?

Minor comments:

[lines 26-30]: sea ice is also a crucial habitat for Antarctic organisms, add this information to the paragraph[30-35]: model simulations struggle with the internal variability (stochastic nature) of the sea ice system

[40] linked to

[74] data ARE – data = plural

[326] 'heavy sea ice' – please clarify