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Climate of the Past Discussions

Interactive comment on "Glacial history of Inglefield Land, north Greenland from combined in-situ ^{10}Be and ^{14}C exposure dating" *by* Anne Sofie Søndergaard et al.

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The start of the model at 45 ka is based on the two studies cited in the text (Larsen et al., 2018; Søndergaard et al., 2019) from northeast and northwest Greenland. In these studies, radiocarbon ages of marine molluscs show that the GrIS in the study areas was behind its present day position during MIS3, starting as early as c. 42 cal. ka BP.

We have tried different model runs, including letting the initial concentration being at saturation (starting the model at 55-60 ka), but due to the short half-life of 14C, any concentration build-up prior to our constrained period only result in a very small increase in the final present-day concentration (c. 5%). It is therefore not exposure prior

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to 45 ka, that is the main reason for the remaining “inheritance”.

We are therefore unable to explain the excess 14C in our sample from the known glacial history, which we also state in the paper:

“However, as we only have one data point and the simulation is incapable of fully reaching the measured concentration we cannot make any firm conclusions on the timing of prior exposure of the sample and the implications for the ice sheet history.”

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