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Climate of the Past Discussions

Interactive comment on "The 8.2 ka cooling event related to extensive melting of the Greenland Ice Sheet" *by* H. Ebbesen et al.

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Ebbesen et al. use a range of radiocarbon-dated proxy archives to study the spatiotemporal pattern of environmental change around Greenland c. 9-6 kcal BP, with a focus on the '8.2 k event'. However, they fail to correct for local ocean reservoir offsets, resulting in age-models off by up to some centuries. Additionally, they neglect the considerable chronological uncertainties in their age-depth models. We would thus like to point out some chronological issues in their manuscript.

Firstly, details on calibration procedures are missing. In Table 1, the impression is given that 400 years were subtracted from ^{14}C dates in order to correct for a global ocean reservoir effect. What was done however (rightly), is that the raw dates were calibrated using the marine calibration curve Marine04 (this curve has the global marine offset integrated).

However, measurements of known age pre-bomb shells archived in the Marine Reservoir Correction Database (http://intcal.qub.ac.uk/marine/) indicate a considerable additional local reservoir effect around Greenland. Estimates for this extra offset range from -32 to 260 ^{14}C years, giving a mean additional reservoir effect (ΔR) of 137$\pm$64 ^{14}C yr for the entire region. The region of coastal West-Greenland has a ΔR of 135$\pm$69 yr, similar to that further south along the west coast of 129$\pm$84 yr. The southeast coast has a somewhat higher ΔR of 162$\pm$27 yr. These additional reservoir effects should be taken into account, and will result in c. 100-240 yr younger calibrated ages for the different cores.

The calibrated ages have considerable uncertainties (c. 180-450 yr at 95%) and these become even larger taking into account the local reservoir corrections (total c. 270-590 yr) without even considering changes in these reservoir corrections over time. The authors neglect these uncertainties. However, the identified proxy events could move forward and backward by centuries, which is relevant given that they aim at studying a centennial-scale event. What would happen to the age-depth models if different point estimates would have been chosen from the calibrated ranges?

Finally, two of the studied cores have a very low dating resolution (two ^{14}C dates over 8000 yr) for the analysis of centennial-scale events. We would suggest to aim at much more densely dated proxy archives, and leave the low-resolution dated archives out of this study since they cannot provide a reliable chronology for the event.

Details:
The calibrated ranges of core DA00-06 seem wrong (calibration of the ^{14}C ages with

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either Marine04 or IntCal04 does not lead to the calibrated ranges quoted in Table 1).
The reference to Lloyd et al. 2005 seems to be missing.
Core PO243-451 has a ^{14}C date of plant material; was this calibrated using the terrestrial or the marine calibration curve?

Interactive comment on Clim. Past Discuss., 4, 1219, 2008.