

Interactive comment on “Rapid changes in ice core gas records – Part 2: Understanding the rapid rise in atmospheric CO₂ at the onset of the Bølling/Allerød” by P. Köhler et al.

Anonymous Referee #2

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The synthetic atmospheric history is very helpful in clarifying the situation. One can immediately see the difference between the E = 60 and E = 400 yr cases, nominally representing NGRIP and EDC.

If the filter is an accurate representation of the EDC record's smoothing then the Greenland and EDC data should differ in their slopes by the same amount, or greater, as the synthetic test. I say greater because the interhemispheric gradient may have been larger during the warm period, which would increase the slope of Greenland data relative to Antarctic data in ways unrelated to the issue at hand. As the authors point out, looking at the slopes should reduce the sensitivity to dating errors. Of course it

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does not eliminate the problem altogether as errors in dating can change the apparent slopes.

In fact, from looking at this plot it is clear to me that the difference in slopes between Greenland and EDC data are in fact LESS than the difference in slopes in the synthetic test. It might even be said that there is very little difference between the slopes of Greenland and EDC data once the interhemispheric gradient change is accounted for. This is most clear in the decline of methane concentration into the Younger Dryas, but it also seems to be the case for the Bølling.

Thus it is even clearer than before that the filter is too wide, and thus the estimate of atmospheric CO₂ concentration increase at the Bølling is too large. This error is fundamental and cannot be allowed to enter the published literature.

For this reason and the many others cited in my original review, this paper is unsuitable for publication in CP.

Interactive comment on Clim. Past Discuss., 6, 1473, 2010.

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