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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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In the paleoclimate record, rarely an event has received as much attention as the so-called "8.2 ka event". Perhaps it has received it due to the fact that it constitutes the largest climate excursion in the Holocene section of most Greenland Ice δ^{18}O-records (Jensen *et al*., 2001) that depict otherwise a rather "boring Holocene", as often said a few years ago. However, if Greenland oxygen isotope records show little variability during the Holocene, it is not at all the case of most other paleoclimate records, both continental and oceanic. On the contrary, most records from the North Atlantic and surrounding lands often show relatively large amplitude Holocene oscillations, to the point that any oscillation linked to the 8.2 ka "cold" event itself, is equivocally found in sequences that are overall climatologically "noisy". The present paper, based on

magnetic susceptibility and foraminiferal analysis of five cores raised from the shelf, off western Greenland, may illustrate one of these "noisy", poorly conclusive records, with respect to the 8.2 event *per se*. Unfortunately, the authors provide data for two cores only (DA04-31P and -41P) with an uneven resolution. In the first core, the resolution seems indeed too low to convincingly document any short climatic pulse such as the 8.2 ka event. Nonetheless, the authors conclude from their data set at enhanced melting, during the critical time frame, thus at some "warming" rather than "cooling". This seems not totally incompatible with findings from Long and others (2006), who concluded at being "unable, based on the data presented in this paper, to resolve a distinct ice sheet margin response to the [...] 8.2 event in Disko Bugt", $i.e.$, in the ice margin area close to the offshore records of the present study. In a similar fashion, ice core records from Arctic Canada, in particular that of the Agassiz Ice Cap ($e.g.$, Vinther *et al*., 2008), lack any clear 8.2 ka event. In contradiction, the same authors note that "annual layer thicknesses are increasing with depth during the period from 7 to 8.5 ka" in the Renland ice core, east of Greenland. One would be tempted to conclude that the response of the Greenland Ice Sheet, to short climate oscillations (either linked to atmospheric or surface ocean temperature forcings) could well be opposite or at least uneven in its east vs. west margins, as well as at high altitude vs. low altitude, as it seems to be the case under the present global warming stress ($e.g.$, Thomas *et al*., 2008).

My conclusion, when reading this paper, was that it does not provide enough information to ascertain the paleoceanographic scenario put forth. I also consider that the title goes beyond the actual content and that it should be reformulated. I thus consider that the title goes beyond its actual content and that it should be reformulated. "Extensive melting of the western Greenland ice margin during the 8.2 ka event" would better fit the content. Nevertheless, a comment from Ebbesen *et al*. may help understanding why the eastern North Atlantic sector may have recorded more clearly the cool/cold paleoclimate pulse at *ca*. 8.2 ka, than the western sector: "the 8200 cooling event has only been found as a spike in areas of the North Atlantic directly influenced by the

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North Atlantic Current, but not in those areas mainly influenced by the East and West Greenland Current or by the Baffin-Labrador Current system. These currents are all characterised by the presence of a low-salinity, cold surface water layer and are often ice-loaded, which may exclude recording of a cooling event as observed elsewhere in the North Atlantic."

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