Clim. Past Discuss., 9, C2328–C2329, 2013
www.clim-past-discuss.net/9/C2328/2013/

Climate of the Past Discussions

Interactive comment on "Water mass evolution of the Greenland Sea since lateglacial times" *by* M. M. Telesiński et al.

J. Müller (Referee)

juliane.mueller@awi.de

Received and published: 17 October 2013

This paper by Telesinski et al. provides valuable information on late glacial to Holocene water mass characteristics in the Greenland Sea - a crucial though only poorly studied area in the subpolar North Atlantic. The authors present foraminifer, stable isotope, subsurface temperature, and IRD records of four sediment cores from the Greenland Sea and compare and discuss their results with published data sets in an adequate manner. The reconstructions mainly support existing assumptions about the deglacial (freshwater driven) and Holocene (insolation driven) palaeoceanographic evolution in the study area and the authors identify solar forcing and Atlantic Water advection as the main drivers for the temporal and spatial development. Some more decisive interpretations of the data, however, would certainly improve the paper. Further, the discussion

of the deglacial development could benefit from the consideration of the role that sea ice plays in the Greenland Sea - in particular since the impact of sea ice is already highlighted in the introductory part of the paper. The authors, for example, relate the deglacial (HS1) d18O and d13C minima to enormous freshwater discharge events (i.e. glacial lake outbursts). In this context, the role of sea ice (as a further freshwater supplier) should be addressed, which could also help with the interpretation of the duration of light d18O intervals. Considering the HS1 AMOC slow-down, McManus et al. 2004 (Nature) or Ritz et al. 2013 (Nat. Geoscience) could be cited. Though the authors acknowledge the dating problem it would be helpful for the reader if, for example, the LGM time/depth interval is defined more clearly (e.g. by the use of colour bars in the figures). Finally, I recommend that the data is made available e.g. by providing a link to the PANGAEA data repository.

Minor issues: - correction of typos and re-phrasing of sometimes too colloquial wording (e.g. page 5051, line 20) - studies by Bert Rudels should be acknowledged in the description of the oceanographic setting in the study area - the so-called 'Odden ice tongue' could be considered as this phenomenon probably impacted on core site PS1878 palaeoceanography - consistent use of either ka or kyr - Page 5040, line 3: Denmark Strait not Danish Strait - Page 5046, line 16: if these low d13C values are not related to sea ice/stratification provide other possibilities - Page 5046, line 23: IRD and foraminifer peaks in core PS1906 seem to be a bit out of phase - Page 5047, lines 13-17: how about an enhanced sea ice export from the Arctic? - Page 5051, line 19 and below: here, the papers by Fahl & Stein, 2012 (EPSL) and Not & Hillaire-Marcel, 2012 (Nat. Communications) linking Younger Dryas freshwater forcing and enhanced formation of sea ice in the Arctic (and export through Fram Strait) should be cited - Page 5055, line 7-8: provide explanation/reference for enhanced inflow of polar water into the Greenland Sea during AMOC intensification - Figs 2-4: I assume that the light grey shadings indicate HS1? explain in figure captions

Interactive comment on Clim. Past Discuss., 9, 5037, 2013.