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Climate of the Past Discussions

Interactive comment on "Northward advection of Atlantic water in the eastern Nordic Seas over the last 3000 yr: a coccolith investigation of volume transport and surface water changes" *by* C. V. Dylmer et al.

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The paper addresses a(paleo)oceanographic issue of global importance, i.e. warm water transport into the Arctic, which certainly should belong to the priority field within the scope of CP. Moreover, the paper is innovative in using coccolith proxies as a tool to reconstruct late Holocene fluctuations in the advection of Atlantic water (AW)masses into the Arctic Basin. A major and substantial conclusion is the overall increase of AW volume flow since 3000 cal. yrs BP. Argumentation to achieve this overall conclusion is firmly based on the data presented, although in detail more clarification is recom-

mended (e.g. NAO linkage, see below). Within the latter context some improvement is also required as far as (missing) citations are concerned. The title clearly reflects the contents of this contribution, but the Abstract could be shortened and more concise. The overall presentation, however, is well structured, and figures are clear and illustrative. Apart from a few minor linguistic irregularities, the language is generally fluent and acceptable.

My comments in detail are the following: *) some extremely relevant and important (for the discussion) references missing, i.e. D'Andrea et al. 2012, Geology, doi:10.1130/G33365.1 and Kinnard et al. (2011), Nature doi:10.1038/nature10581 dealing with Svalbard Little Ice Age climate and Arctic sea ice, respectively. The former paper reports a mild LIA summer climate (18 & 19 century)which is attributed to enhanced WSC activity after AD 1600 (see present data !). Much of the same evidence is presented in the other paper dealing with Arctic sea ice (past 1450 yrs). *) Linkage to NAO patterns Line 371-375 refers to "...late Holocene trend towards positive NAO..." , referring, amongst others, to the SEESAW (not seAsaw) pattern observed west of Greenland (Seidenkrantz). This late Holocene pattern includes also the NAO- mode, whereas generally the trend from Mid Holocene to late Holocene suggests an increase of NAO- circulation patterns (e.g. Jessen et al. J. Quat Sc. 2011) after 2000-3000 BP. Moreover, it seems that subpolar gyre warming (warm water to the north !)and a tendency to a negative NAO / northwest Europe LIA climate may be coupled (see e.g. Andresen et al. 2012, The Holocene; Miettinen et al. 2011, Clim Dyn.). Within this context it should be mentioned that under these conditions the track of Atlantic extratropical cyclones diverges either towards the south (Mediterranean) or north (Barents Sea, Svalbard). For instance, during one of the severest NW European winters of the past 250 years, 1962-63, the climate of Arctic Norway was relatively mild. *) in this context it is interesting and relevant to pay some more attention to the C. pelagicus curve of Fig. 4, which shows a prominent low during the Medieval Climate Anomaly (better now than previously used Medieval Warm Period)in core HH11-134-BC, with an abrupt increase at about 1200 AD, whereas at the same time a marked decrease is

observed in case of core JM09-KA11-GC. These interesting and differing trends need some (extra) discussion !

In summary, a somewhat more differentiated discussion with regard to possible NAO linkages appears appropriate, with the Abstract to be shortened.

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