

## ***Interactive comment on “Late Weichselian and Holocene paleoceanography of Storfjordrenna, southern Svalbard” by M. ŁÄËcka et al.***

**Anonymous Referee #1**

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M. Łacka Late Wieschelian Svalbard A carefully done study, using conventional methods in stratigraphy, micropaleo, C14 dating etc. Several major points must be addressed, specific comments are listed by page and line below. The main point is moderate revision is needed in which a convincing case is made for the significance of the paper for deglacial & Holocene paleoceanography not only for the Barents Sea Svalbard region, but for the eastern Arctic where AW flows into. Other comments – Wollenburg did excellent paleoceanographic and paleobiological studies of the last 15 ka, in the Barents Sea region, using forams and other proxies. Her records must be cited and I think plotted against the new records. – There is no reason given why the O18 is not corrected for sea level ice volume of vital effects. But in fact Fig 8 does correct. – The sections of the paper are fairly straightforward and descriptive, and perhaps redundant. What is missing is a critical discussion of why this new core

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is so important given all the previous studies. For example, warm productive periods during H-events have been proposed – what about these? Mid depth warming in the Arctic during glacial periods is also proposed due to Halocline changes. Does this deglacial record support this? How fast are ocean temperature changes compared to let’s say the Greenland ice core records of the YD? Decadal? How do deglacial ocean changes compare to those Spielhagen and others have shown for the last century in Fram Strat? Does sea level rise affect the regional oceanography? – Figure 7 compares IRD to GISP ice core. What about other sediment proxies? What about other papers on the YD from the Barents Sea-Svalbard region? The current paper would be an ideal place to review the paleoceanography of the deglacial Holocene from this region, especially the YD, which is complex and the subject of many papers. – Figure 8. What are the key messages to derived from this isotope figure? – I have trouble seeing significance in the low IRD measurements in Fig. 9 and the huge norcrossi increase without comparable IRD. Perhaps Polyak and Solheim overestimated norcorssi as a direct sea ice proxy. Much more sophisticated sea ice proxies have been used, some including other foram species [ie not norcrossi]. Moreover there is a large literature on the Neoglacial in these high latitudes, I would expect this Fig 9 to address neoglacial climate and ice activity from the study region. So I think this part of the study on IRD & sea ice is in need of revision or omission, it is simply not that strong an argument. Specific comments Page 4 Svalbard/Barents Sea Ice Sheet – there must be a slash or hyphen after Svalbard Page 4-5 AW = Atlantic Water, this is convention. ArW = Arctic water is too similar and other terms are used/preferred PW=polar water, surface etc. Also page 6 “Surface water” is used, but it is confusing because it does not designate an origin of the water mass. Plus SW is abbreviated in caption but not here in text. Page 6. Brine-enriched [lwer case ‘b’] Page 7 Percentages... delete extra “p” Page 10 The lithological description is important but perhaps too long for the main text, can it go in appendix/supplement? Also it is really a geochronological section , not simply litho description. Page 11 line 10. THE benthic... – add “The” Page 12. Isn’t *Buccella frigida* spelled with two “c’s” ? Page 12

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general. This foram sequences seems really common and important in post glacial deglacial deposits of the N hemisphere. Not just northern Europe. Perhaps point this out with references. Page 15 references to the Agassiz out flow need updating. Rayburn et al. 2012, Cronin et al. 2012 in St Lawrence Valley, Murton & Tarasov & Peltier, in MacKenzie, Spielhagen in the Arctic, etc. Page 16 line 5 , first part of sentence is incorrect grammar, line 6 glaciomarine spelling, Line 17line 12 should it be Mid-Holocene ?? Page 20 line 13 Rasmussen WHO noted[note which noted], line 20 until today [not until present days], 21 sea-ice hyphenate when used as adjective Page 20 and elsewhere. Will the reader be confused if several geographic terms are used to refer to the study region: ie., Edgøya area – which is not identified in Figure 1 map, Storfjordrenna. Please label all place names and ocean currents and water masses that are mentioned in the text in the figures. Page 35 caption, What about the core NP94-51 located in the inset map? Page 43 caption. English is awkward, rewrite, “may indicate seasonal sea-ice cover” [delete “the”].

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/10/C1231/2014/cpd-10-C1231-2014-supplement.pdf>

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