

Interactive comment on “Atlantic Water advection vs glacier dynamics in northern Spitsbergen since early deglaciation” by Martin Bartels et al.

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Dear authors,

Your manuscript presents interesting new multiproxy record of paleoceanographic changes from the northern Svalbard shelf area. This is an important contribution adding a valuable new palaeoclimate data point in a remote area. The observed changes since deglaciation matches well with our study in Storfjordrenna. For instance, in your manuscript (page 12, lines 21-31) you suggest that the observed coarsening of the sediment during Allerød interstadial might be connected to the deposition of finer fraction directly in the vicinity of the glacier due to particles flocculation. According to Lacka et al. (2015) the sediment deposition during deglaciation of Storfjordrenna occurred due to suspension settling from sediment-laden plumes and ice-rafting debris

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visible as bimodal composition of grain-size distribution. It seems that for the same period you also observed similar sediment composition, with domination of silt-clay fraction and large contribution of IRD (Fig. 3). During Younger Dryas you report the temporarily reduced sea-ice cover and maximum amounts of IRD in Woodfjorden (page 13, lines 19-36). Contrary conditions were observed in southern Svalbard (Lacka et al., 2015) for the onset of Younger Dryas, with perennial sea-ice coverage leading to decreased ice-rafting. It would be interesting to compare those data. On page 14, lines 2-5 you have also noticed the shift from relatively stable to unstable conditions during YD and you refer to study after Bakke et al. (2009) and Pearce et al. (2013), however we have observed similar unstable oceanographic conditions also in the southern Svalbard area (Lacka et al., 2015). We have concluded that YD was not uniformly cold and that at least a number of warmer spells occurred on southern Svalbard. During Holocene Thermal Maximum you have noticed that the iceberg production remained low (page 16, lines 26-29), however at around 9 ka BP and 8.8 ka BP IRD percentages increased. The same elevated values were observed in southern Svalbard (Lacka et al., 2015) during this period. We have explained it as minor cooling, leading to seasonal sea ice formation and beach sediment transport by shore ice. The last suggestion concerns the weaker influx of AW during late Holocene and its deeper position in the water column of Woodfjorden (page 19, lines 14-16). According to our record (Lacka et al., 2015) after 3.7 ka BP AW in Storfjordrenna was only sporadically present at the surface.

I hope you will find those comments useful. The paper I refer to is: Lacka, M., Zajączkowski, M., Forwick, M., Szczucinski, W.: Late Weichselian and Holocene paleoceanography of Storfjordrenna, southern Svalbard, *Climate of the Past*, 11, 587–603, 2015

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