We sincerely thank reviewer #1 for the thoughtful and positive review and the helpful comments. These helped to improve the quality of our manuscript and are considered in the revised version. Below we respond to each of the questions and statements made by reviewer #1, the original comments are given in normal letters, our answers are in bold/italic.

General comments

Export production and the subsequent remineralization of organic matter does consume oxygen. Higher productivity has no effect on oxygen consumption. This is indeed merely a semantic question, but I would urge the authors to edit the text accordingly.

***We agree with this comment and have modified the manuscript throughout in changing "primary productivity" to "export production" /"remineralisation" where appropriate.***

One additional parameter that could be accounted for enhanced oxygen depletion at mid-depth during warm intervals has been overlooked, to my opinion. The temperature- dependent remineralization rate (e.g. Matsumoto, 07 (GRL), Kwon et al., 09 (NatGeo)) would concentrate oxygen consumption in shallow/intermediate waters during warm intervals, thereby "deoxygenating" the subsurface waters ventilating the core sites without necessarily changing ventilation rates. I would like the authors to briefly discuss this alternative positive feedback, which is certainly not inconsistent with the data presented here.

***We thank the reviewer for this comment as we indeed overlooked the influences of temperature-dependent remineralization in our discussion. We added this in the revised manuscript.***

Just out of curiosity – the kasten core shows more expanded sections than the piston core (e.g. Fig. 4), which comes as a surprise to me. Do the authors have any insight as to why this may be? How does this observation influence the inferred sedimentation rates shown in Fig. 5?

***The kasten corer consists of 5.5 m long rectangular box elements with 30 cm edge length and the used weight was 3.5 tons. It penetrates under gravitational forcing. For the piston corer a weight of 1.5 tons was used. This device uses plastic liners with 90 mm diameter and has a piston inside to cause suction in the core pipe (Gersonde, 2012). As both cores penetrated nearly the same sediment sequences (see echosound data p. 245 in Gersonde, 2012) the differences in sediment recovery result from the different coring gears. The***

***kasten core most likely documents the in-situ sediment and it is less prone to sediment compaction as the volume of sediment in the core with respect to wall friction is probably maximized.***

Detailed comment

p. 2469, l. l.7 and throughout the text – Jaccard & Galbraith, 2012 (not 2011).

***We apologize for this oversight, in this case we used the online first publication date used in the article header as of 18 December 2011. We will correct to the print version date (February 2012) in the revised manuscript.***

p. 2470, l.17 – replace partly by episodically

***We agree and have corrected the revised text.***

p. 2470, l. 24 – the acronym OMZ has been introduced previously (i.e. p. 2469, l. 9). Once introduced, please use the acronym throughout the remainder of the text.

***We agree and have changed the manuscript accordingly.***

p. 2474, l. 25/p. 2479, l. 12/p. 2482, l. 11/27. Isn't a "laminae couplet" deposited annually, technically defined as a varve?

***We agree with reviewer #1. We replaced "laminae couplet" with "varve" after we defined it as such in Sect. 4.3.***

p. 2477, l. 13 – are nearly identical instead of nearly similar

***We agree with this comment and have revised the text.***

p. 2478, l. 16 – "rather reflecting the autumn/winter sedimentation".

**We agree and revised accordingly.**

p. 2483, l. 15 – does this imply that the plateau- tuning method may be inadequate to establish regional-scale age models, at least for the North Pacific?

***The plateau-tuning method to us seems well enough established to deduce regional planktic reservoir ages and absolutely dated age models (Sarnthein et al., 2007; Sarnthein et al., 2013), especially for sediment cores without any significant sedimentological markers (e.g. varves, dated ash layers). The only 14C plateau that is covered by the laminated section is***

***the Bølling plateau. The differences between our reservoir ages and those of Sarnthein et al (2013) could be evidence for high spatial and temporal variability of surface reservoir ages. For further studies, it would indeed be important in our opinion to compare a plateau-tuned age model on our sediment records with the laminae counts.***

p. 2483, l. 23-24. This is a very important finding. Most previous observations describing the link between export production and oxygen-depletion were based on proxies, which preservation was highly dependent on oxygen-level (or better said on the oxygen exposure time). The Si/Ti ratio and by inference opal concentrations are not primarily driven by changing sedimentary redox conditions. As such, this observation provides a robust, independent link between export production and oxygen-depletion. This being said, the observation that Si/Ti values are lower during the EAC is a bit of a stretch. I agree that the values are lower at the beginning of the EAC, but on average, I do not think that they are significantly different.

***We thank reviewer #1 for the clarification of this aspect, which might not be sufficiently brought to the readers' attention in the manuscript. We have changed the according text part in the revised version to make the reader better aware of the preservation/redox aspect of the Si/Ti proxy. We have rephrased "lower Si/Ti ratios" as the differences are indeed small. However, so are the changes in the NGRIP record during that particular time interval and the admittedly insufficiently-resolved SST data temperature changes in the Bering Sea were also relatively minor (e.g. compared to the Younger Dryas, see Fig. 10). Further, thin, laminated sections still occur during the EAC. It seems that the Bering Sea at this time is finely balanced between the lower productivity during colder intervals and higher productivity during warmer phases.***

p. 2490, l. 19-23. I'm surprised that the sedimentary carbonate content increases in the laminated intervals of the core. Carbonate production may well have increased during warm intervals, but would have been poorly preserved under oxygen-poor/DIC-rich conditions. What if the increased Ca/Ti and Si/Ti ratios in laminated intervals were primarily driven by decreasing detritic (i.e. Ti) supply to the core site? Do the authors have supporting evidence (i.e. %CaCO3, foram abundance) to support enhanced carbonate deposition? What are the MARs showing? In general, it would be desirable to have a few discrete measurements of CaCO3 and biogenic opal/diatom counts to support the XRF data.

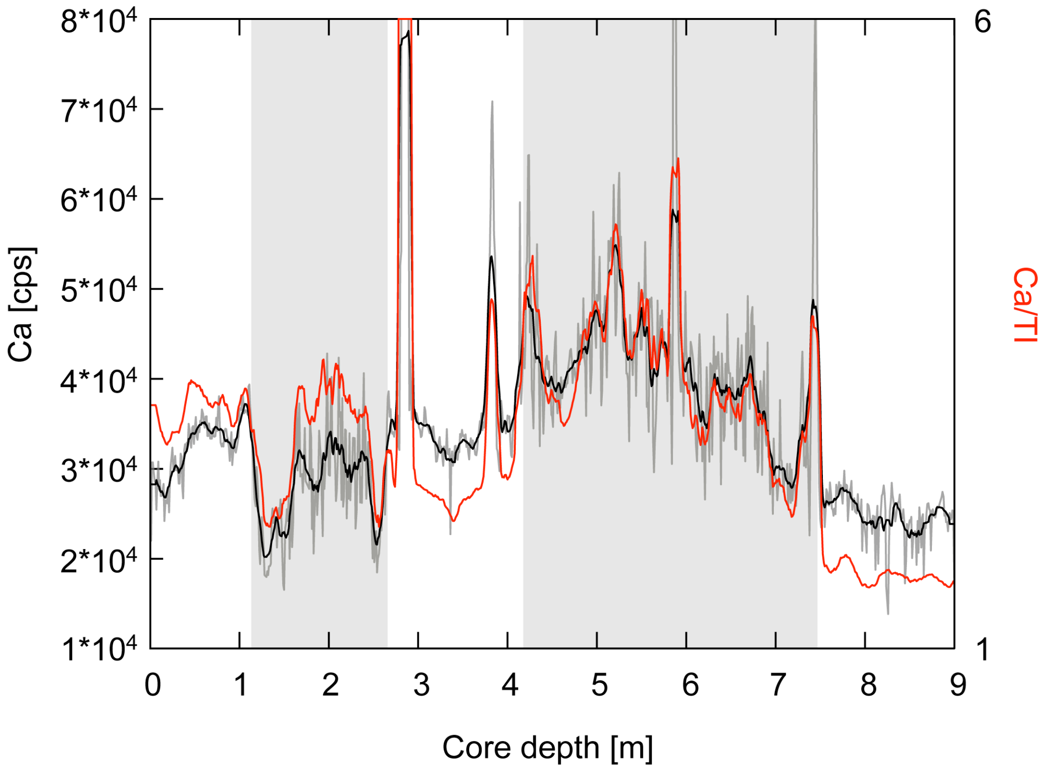
***CaCO3 data from nearby core PC23A (Fig. 3 in Khim et al., 2010) and the western Bering Sea (Fig. 5 in Riethdorf et al., 2013) show high contents during the Bølling-Allerød and the early Holocene. The paper of Khim et al (2010) also clearly shows higher biogenic opal contents in laminated sediments from the last deglaciation. To show higher carbonate deposition during the last deglaciation we will present an additional figure with MAR data of biogenic components in the revised supplement. We also would like to point out that a complementary study with detailed diatom counts from core SO202-18 is currently finalized by another lead author.***

p. 2492, l. 14. Zheng et al., 2000 (not 2006).

***This was corrected in the revised text.***

Fig. 6. While I fully agree that the Ca counts are primarily driven by changes in sedimentary biogenic carbonate concentrations, wouldn't the Ca/Al or Ca/Ti be more specifically related to the biogenic fraction of Ca (similar to the Si/Ti ratio to reconstruct biogenic opal) and provide an even more precise correlation tool? The authors have followed this strategy in the suppl. Figure. Why do not plot Ca/Ti instead of Ca counts in Fig. 6?

***We used the Ca counts following the approach of Max et al., 2012 to reconstruct an initial age model. These authors did this for sediment core from the western Bering Sea and the North West Pacific (Fig. 2 in Max et al., 2012). However, the Ca/Ti ratios look similar to the Ca count data. For comparison see the figure below where Ca counts plotted in black and Ca/Ti ratios plotted in red of SO202-18-3 are shown (both 11 pt running mean). The anoxic sequences are shaded.***

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