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Climate of the Past Discussions

Interactive comment on "Holocene dynamics in the Bering Strait inflow to the Arctic and the Beaufort Gyre circulation based on sedimentary records from the Chukchi Sea" *by* Masanobu Yamamoto et al.

Anonymous Referee #1

Received and published: 9 June 2017

This paper deals with sediment cores from the Chukchi Sea and uses XRD mineralogy to study variability of the Beaufort Gyre and Pacific inflow into the Arctic Ocean during the Holocene.

This submission is a revised version of an earlier manuscript published in Climate of the Past Discussions.

One of the main comments on the original manuscript was the over-interpretation of results and linkage to Atlantic teleconnections. This component is toned down here,

which has improved the manuscript.

Several other reviewers' comments from the original remain, however, unaddressed so some are repeated here.

This study provides a wealth of new data and new insights on the Chukchi Sea in the Holocene. I can recommend publication of this manuscript, provided the authors address the following comments and suggestions for revision.

Problems with C/I and (C+K)/I as proxies for Bering Strait inflow: - how solid is this proxy, if it does not show any difference (in core 5JPC, Figure 3B) between the Holocene and the last glacial when the strait was closed? - The records from the three cores show very little agreement for these proxies. Again, what does this mean for the proxy? It does not seem a convincing record of Bering inflow.

Page 9. Lines 206-210. The top of core 01A-GC is assumed to be of modern age, because the authors write that sterols and IP25 show a decreasing trend in the top 10 cm (Stein et al 2017). This is a very poor indicator of recovery of the top sediments. Looking at the data in Stein et al 2017, the statement is not even accurate. The variability in the top 10 cm is of the same order of magnitude as deeper in the core. I suggest that this is removed (lines 206-210) and that it is acknowledged that the core top age is uncertain. There are no Pb210 dates, or a surface core to correlate with.

There should be a table with radiocarbon dates and paleointensity datums (depth, age, reference). It would summarize the information spread out over pages 9-10 and shown in Figure 3. I suggest bringing back Table 1 from the original submission, adding the magnetic datums, and addressing the original reviewer comments to this version.

Divide section 3 in subsections: e.g. 3.1 Coring and Sampling, 3.2 Chronology, 3.3 XRD Mineralogy

Figure 2 - From Panel E, one can see that there should be a data point with a CK/I ratio around 2.0 at about 63°N. This is not visible in Panel B. Check this carefully, as there

may be others? - At some sites, there are too many data points for this type of plot. An example: In Panel A, at the Mackenzie delta there are a lot of yellow dots, but they are covering up green ones as well. Either, make inserts for those areas, or make the dots smaller? - Panel E. The regression lines in CK/I and C/I vs latitude do not extend further south than 65N. Correct this or explain why.

Figure 3. What do the crosses represent? Radiocarbon dates, paleointensity datums? Please specify. Add them all to a table (perhaps supplementary).

Figure 3. Rather than showing “D” for dolomite rich layers, please show the actual dolomite data. Also, add to the methods how dolomite was quantified (lines 250-260), and add the data to the supplementary tables.

Figure 3B. Please make it possible to distinguish between samples from the piston core vs trigger core by using different symbols.

Figure 4B. Same comment. Around 4000 cal yrs BP, there seem to be two data points for the same age. Is one JPC and one TC? The difference in their C/I values are large. Does this illustrate the uncertainty of the method?

Page 22 line 515. Correct “brassicasterol”.

Page 23 line 538. Add citation to Jakobsson et al 2017 Climate of the Past (this same special issue).

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