

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 #3

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General comments:

Manuscript submitted by prof. Masanobu Yamamoto with co-authors focuses on solving important problems of the Beaufort Gyre and the Bering Strait Inflow (BSI) functioning during the Holocene. The text contains a detailed overview of the problem of water masses exchange between the North Atlantic, the Arctic and the North Pacific. To solve the problem of the Holocene history of the BSI and the Beaufort Gyre circulation, the authors used a relatively simple approach: study of the Quartz/Feldspar and chlorite/illite ratios along the sections of two well-studied cores. The authors attributed

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the higher content of Quartz with amplification intensity of the Beaufort Gyre, and the higher content of chlorite with an enhanced activity of the BSI. Theoretically, the observed reducing of degradable feldspars down the section can be explained by their diagenetic transformation to mica and/or clay minerals; however, this mechanism does not considered by the authors. Probably, the authors have neglected the possibility of diagenetic destruction of Feldspar because they have proved a clear pattern of increasing Q/Fs ratio in the surface sediments toward the North American provenance (Fig.2). If possible, it would be interesting to see the results of semi-quantitative calculation of quartz and feldspar (not only Q/Fs ratio) in the form of a table. I believe that the model of the Beaufort Gyre and BSI evolution, which is based on the minerals distribution along the Holocene section, interesting and may be published after minor corrections.

Specific comments:

p.7 (row 145-147): you must take into account important papers of M.Wahsner et al (1999, Boreas, 28) and C. Viscosi-Shirley et al., (2003, Continental Shelf Research, 23);

p. 7 (row 148-150): why you don't use data on the dolomite distribution, which is a clear indicator of the Canadian Arctic source and can be used as a reliable evidence of the Beaufort Gyre circulation? It would be interesting to see the correlation between Q/Fs and dolomite;

p. 7 (row 155-158): It would be nice to add at least a little information about the geology of the source areas. Why (which?) bedrocks in North American margin contain more quartz, whereas in Siberian margin – more feldspar?

p. 12 (row 272): did you detect dolomite in the bulk sediments (or in smear-slides)?

p. 13 (row 294): it is better to add information about the direction of decreasing: “A consistent upward decrease in the Q/F ratio.”

Technical comments:

p. 43, Fig 3B: check color of legend for CK/I

p. 44, Fig 4B: Different color in line of C/I distribution and in C/I legend

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