bg-2019-405 Submitted on 04 Oct 2019

Benthic foraminifera as tracers of brine production in Storfjorden “sea ice factory”

Eleonora Fossile, Maria Pia Nardelli, Arbia Jouini, Bruno Lansard, Antonio Pusceddu, Davide Moccia, Elisabeth Michel, Olivier Péron, Hélène Howa, and Meryem Mojtahid

The ms submitted for publication in Biogeosciences Discussions describes the distributions and environmental relationship of benthic foraminiferal fauna for 7 stations from the N–S transect in Storfjorden. I consider this to be an interesting manuscript that represents a comprehensive benthic foraminiferal data and geochemical data. This manuscript will be of publishable quality once some revisions are made. The authors need to address each of the following points:

1. The paper is fairly well-written, but too long. The presentation of the results and discussions are very tedious and can be shortened considerably.
2. In Figure 1 (b), the longitudinal bathymetric profile should be redrawn to reflect the actual water depth. In particular, site MC3 is located at a deeper depth than sites MC1 and MC2 despite the shallowest water depth.
3. The agglutinated species composition (>150 microns) at site MC7 is similar to those of sites MC4 and MC5, but different from site MC6. The authors interpreted that the faunal similarity among sites might be caused by overflowing of the corrosive bottom water from the deep basin passing through the sills, but no explanations for the cause of faunal differences between site MC6 and others. (1) Is corrosive bottom water likely to overflow the basin without passing through site MC6, or flow out of the fjord through another path (e.g., channel)? (2) Another question arises about the possibility that basin species once carried outside the fjord have settled at the MC7 site. If so, a scenario overflowing from corrosive bottom water basins is no longer needed.
4. The authors conclude that Agglutinated/Calcareous (A/C) proxies are possibly useful for changes in past fjord BSW intensity and sea ice production. However, the past A/C in sediments do not always reflect the marine environment at that time because agglutinated tests are more fragile than calcareous ones in general and are less likely to be preserved as fossils. How do the authors think about this?
5. Other comments

(1) In text, references and captions “and” and “&” are mixed.
(2) In text, figures, Tables and captions “subsp.” is not required for “Elphidium excavatum subsp. clavatum”.
(3) line 88: Publication year of “Haarpaintner et al., 2001” should be 2001a, 2001b or 2001c.
(4) line 89: “Polyakov et al., 2012” is missing in References.
(5) line 108: “Fer, 2004” is missing in References.
(6) lines 109, 120: Publication year of “Skogseth et al., 2005” should be 2005a or 2005b.
(7) line 204: “Pielou Index (1975)” needs author name(s) in the bracket.
(8) line 434: “Rysgaard et al., 2011” is missing in References.
(9) lines 536, 841: “Schroder-Adams” should be “Schröder-Adams”.
(10) line 540: “Jennings et Helgadottir, 1994 ” should be “Jennings and Helgadottir, 1994 ”.
(11) line 662: Fer et al. (2004) is missing in the text.
(12) line 683: Haarpaintner et al. (2001c) is missing in the text.
(13) line 704: Hunt and Corliss. (1993) is missing in the text.
(14) line 750: Swap “Lloyd et al. (2007)” and “Lloyd (2006)”.
(15) lines 650, 660: Separate author’s name with “and”.
(16) Figure 4: In legend “Adercotryma glomerata” should be “Adercotryma glomeratum”, “Cribrostomoides crassimargo” should be “Labrospira crassimargo”.
(17) Figure S1: What does the difference in the color of the profile line at each sampling point indicate?
(18) Figure S4: For the taxonomy, SEM image of *Globocassidulina subglobosa* seems to be of *Cassidulina reniforme*.

NAME: Shungo Kawagata
AFFILIATION: Yokohama National University, Japan