

## ***Interactive comment on “Short-term changes of the mesozooplankton community and copepod gut pigment in the Chukchi Sea in autumn” by K. Matsuno et al.***

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### General comments

This study aims at: (1) describing the mesozooplankton community of the shallow Chukchi Sea at the start of the autumn season and (2) assessing grazing impact of the main copepodite stage of the shelf copepod *Calanus glacialis*, an Arctic endemic and dominant player in the zooplankton communities of the Arctic Ocean and surrounding seas. An interesting aspect of this work, and complementary studies (Nishino et al 2015, Yokoi et al 2015), is the opportunity to document some effects of turbulences induced by strong wind events on the plankton community during the transition pe-

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riod following the ice-free season of high biological productivity and the overwintering season.

The data presented in this work are novel and provide useful information on the reactivity of zooplankton to a quick surge in algal food due to turbulence at a time when the photic layer is generally depleted in nutrients. Such work should improve our understanding of the functioning of the Chukchi Sea ecosystem and help foresee potential responses of the lower trophic levels to increased wind-induced turbulence expected under climate warming in this region, and similar arctic ecosystems affected by sea-ice reduction.

The structure and length of the paper are appropriate. However, the English language used is limited and impairs comprehension of several of the sentences. I suggest the authors to seek contribution from a scientist fluent in English that could help in proofreading the entire document. After such revision and the consideration of some other minor changes listed above, I think that this interesting work should be published in BG.

### Specific comments

#### Title

Could it better reflect the changes related to the strong wind event that occurred during the fieldwork? On the other hand, I understand that the chosen title fits with that of a companion paper addressing the case of microplankton community during the same field campaign.

#### Abstract

The abstract is too wordy. The content could be synthesized, and multiple uses of words limited. A lot of results reported but few conclusions in comparison.

Line 6: Change “high-frequent” to “high-frequency”, here and elsewhere in the text.

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Line 12: “dominant” and not “most dominated”

Line 20: If you decide to keep this part add the value of the C:Chl a ratio, although I don't think that this is necessary to mention in the abstract the assumption of this ratio in the calculation of the estimate.

Introduction

More emphasis should be put on *Calanus glacialis* in the Introduction since it is clearly the dominant species in terms of biomass and one focus of the study with the gut content analysis. My suggestion is to move one paragraph on this species from the Discussion to the Introduction

Line 6. Mesozooplankton are secondary producers everywhere. This trivial statement can be removed.

Line 11: “dominate” and not “dominated”

Line 13: Maybe “origin” would be better here than “formation”

Materials and methods

Page 6, line 6: replace “with” by “of”

Page 6, line 8: replace “with” by “to”

Results

For section 3.1, I am not sure that “Hydrography” is the right title since chl a, a biological feature, is described there also.

Description of vertical distribution of chl a (Figure 2c) could be relevant for the study.

Section 3.3 on *Calanus glacialis* I would start by describing population structure instead of DVM right away. Swap the paragraphs.

Detail the composition of the population by giving the percentage of other stages than

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CV. Mention that the young copepodites abundances are underestimated due to the coarse mesh net used.

Page 8, line 16: “their population” by “the population”

Discussion

Page 9, line 8: Greater spatial and temporal change than what? I did not get the meaning of the sentence. It should be clarified. In fact, the whole paragraph needs to be rewritten as it's difficult to differentiate what's comes from this study and what are Matsuno et al (2012) findings.

The structure of the sentences should be simpler and more direct. Most sentences should start simply with the subject for sake of clarity.

As an example: “Comparing the above characteristics by Matsuno et al. (2012), the zooplankton abundance of this study was nearly half (mean: 34 059 ind.m<sup>-2</sup>), there was a low abundance of small copepod *Pseudocalanus* spp. and cyclopoid copepods, and no occurrence of Arctic copepod *Metridia longa* was remarkable (Table 1).” could well be: “Total zooplankton abundance in this study was approximately half (mean: 34 059 ind.m<sup>-2</sup>) the abundance reported by Matsuno et al. (2012) on the Chukchi shelf (mean: 75 683 ind.m<sup>-2</sup>), with low abundance of small copepods (*Pseudocalanus* spp. and cyclopoids) and the remarkable absence of the Arctic copepod *Metridia longa*.”

Page 10, line 5: Again, this sentence is not clear. What does the addition of holoplankton mean?

Page 10, line 8-11: “Benthic barnacle adults released their larvae when they met phytoplankton blooms (Crisp, 1962; Clare and Walker, 1986), and their larvae spent two to three weeks at water columns and then settled (Herz, 1933).” If this is usual behaviour on the part of adult barnacles, present tense should be used. Furthermore, replace “at water columns” by “in the water column”.

Page 10, line 17: replace “several limited” by “a few”

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Page 10, line 18: this issue has been already addressed in the previous paragraph.

#### Section 4.2 Population structure of *Calanus glacialis*

The first paragraph belongs to the Introduction section. It's a description of the status and life cycle of this important arctic shelf copepod, which is a focus of the work.

Page 13, line 9-11. What is the value measured by Tande and Bamstedt (1985)? Why make this comparison with the situation in the Barents Sea in spring-summer if it's not interpreted further. Wouldn't it be more relevant to try a comparison with grazing impacts estimated by Campbell et al (2009) for roughly the same region? At least conclusions of this study should be better addressed in the present work.

Page 13, line 18. Change "proportion" for "potential contribution"

#### Conclusion

Page 14, line 3. In fact, grazing impacts was only estimated for the dominant stage of *C. glacialis*, excluding other dominant copepods such as *Pseudocalanus*. The sentence should be changed accordingly.

Page 14, line 12. This conclusion is rather trivial. We certainly could not expect meta-zoan plankton demography to respond so fast to a short surge in phytoplankton stock. However, it would be particularly interesting to speculate on the cumulative effects of late summer-early autumn strong winds in a region more and more impacted by the reduction in sea ice cover. Could some zooplankton benefit from an extension of the primary production season with more turbulence and later freeze-up of the Chukchi Sea?

#### Tables

Table 2. Some information given in the legend for the calculations should be moved to the Materials and methods section.

Figure 1. No need to mention in the legend that the depth contours are superimposed

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since it's obvious.

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