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## ***Interactive comment on “Size distribution of particles and zooplankton across the shelf-basin system in Southeast Beaufort Sea: combined results from an Underwater Vision Profiler and vertical net tows” by A. Forest et al.***

**A. Forest et al.**

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(Authors) We thank Referee #2 for his/her advices and overall positive comments. However, we disagree when he/she mentions that our manuscript is not original in its approach. In fact, our work is the first attempt to compare UVP-5 data with zooplankton net tow measurements, and one of the few zooplankton imaging studies for the Arctic Ocean. Hence, it is vital to first proceed to a critical evaluation of the differences and similarities among datasets before thinking about modeling. This was our goal in the present manuscript, which indeed provides a calibrated conversion factor to estimate

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the bulk biomass of copepod in Arctic waters with the UVP5. Hence, we incorporated all the appropriate changes in the revised manuscript as follows:

p 11413, line 28: "This algorithm was used..." which algorithm?

(Authors) This is related to the sentence just before: "The training set for ZooScan consisted of 2100 validated vignettes of random objects (including detritus)". Hence, we changed the words "This algorithm" by "The training set algorithm".

p 11414, line 1: how stats are obtained (original training set, cross-valid. on original training set? separate test set?)

(Authors) These percentages come from the comparison between machine-predicted recognition (Zooprocess software) and manually validated classifications of copepods and appendicularians within the original training set (2100 vignettes). We added this precision in the text.

p 11420, line 11. No maximum concentration of particles that could come from fluvial sediments... It would be nice here to connect with meteorological conditions in the area during the last weeks/months for a more complete explanation. A little bit is provided on p 11422, lines 17-20, but would be useful higher in the discussion.

(Authors) Yes, we agree. We move the sentences on environmental conditions at the beginning of the paragraph and we added an additional sentence on the river plume variability. We think that discussing the general sea ice, wind, and river plume conditions is sufficient in the context of our study focused on zooplankton dynamics.

p 11424, line 23: total copepods 2-5 times higher for net tows than for UVP. This is an example where conversion factors, transfer functions, models would be nice to better assemble the whole dataset.

(Authors) This section of the discussion presents our interpretation of the discrepancies and similarities between the UVP5, ZooScan and net tow data. As mentioned above, we think that – as a first step – it is crucial to critically evaluate the relationships between

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the various datasets before thinking about modeling (parameterizing) any trophic processes. In fact, we provide a calibrated conversion factor to evaluate with confidence the bulk copepod biomass with the UVP5 in Arctic waters (Fig. 11). We argue that this is a good example for what can be achieved with the present dataset. Indeed, the next step could be to make use of our findings to build a size-structured food web models, or to estimate any “transfer functions”, but this would be an entire separate work. We prefer to remain concise and “direct to the point” in the present manuscript, instead of assembling additional material.

Tables 2-4: too much data... consider a graph instead, maybe.

(Authors) The tables 2-4 present the abundance and biovolume of zooplankton groups (absolute and relative) according to each methodology. This is a critical piece of information and it is actually impossible to transform this entire information into graphs (e.g. area chart with lines, or several pie charts). We would lose too much detail on the less frequent and rare groups that contribute to zooplankton biodiversity from both a relative and absolute perspective. We argue that the exhaustive information presented in these 3 tables is coherent, self-explanatory and contribute to the robustness of our comparisons.

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Interactive comment on Biogeosciences Discuss., 8, 11405, 2011.

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