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Interactive comment on “Seasonal and spatial comparisons of phytoplankton growth and mortality rates due to microzooplankton grazing in the northern South China Sea” by B. Chen et al.

Anonymous Referee #2

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Seasonal and spatial comparisons of phytoplankton growth and mortality rates due to microzooplankton grazing in the northern South China Sea Chen et al.

Dear Colleagues: Dilution technique is the most accepted method to measure phytoplankton growth and mortality simultaneously. While Calbet and Landry (2004) pointed out that microzooplankton grazing loss accounted for more than half of the daily primary production globally, any systematic patterns have not been evident for the microzooplankton grazing on phytoplankton. The authors demonstrated the seasonal (winter vs. summer) and spatial (coastal to oceanic) changes in phytoplankton growth and mortality using the dilution technique in the northern South China Sea where the chlorophyll

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gradients was shown. Since microzooplankton grazing loss of primary production is still unpredictable process of energy flow in pelagic food web. I believe that the manuscript contributes this field and such kind of topic would be major interest for the readers of Biogeoscience. The manuscript would be recommended for Biogeoscience if the authors could revise the following issues:

General comments 1. The authors should mention more clearly the answers to the three hypotheses in Results and Discussion sections. It's bit difficult to figure out the answers throughout the current manuscript. 2. As mentioned in Introduction, the authors want to find a systematic pattern of microzooplankton grazing on primary production. Although they demonstrated the comparison of many variables among the three domains, between the two seasons and between the two depths, it might be difficult for the readers to understand what is the systematic pattern. It would be nice to show phytoplankton growth, microzooplankton grazing and their ratios along the environmental gradients using ANOVA and/or correlation, even though the systematic pattern was not found in the present study.

Specific comments Introduction P16008, L15 More description might be needed for the three hypotheses on the scientific background. The readers might be confused why primary production is variable among the sites and seasons but microzooplankton grazing is steady-state in the hypotheses.

Materials and methods P16008, L24 Normal Niskin or X-Niskin? P16009, L4 Mesozooplankton are excluded from the seawaters? If not, the authors should mention the potential effects of mesozooplankton grazing on phytoplankton community because small copepods would appear abundantly in the subtropical sites.

Results P16012, L13 Between summer “and” winter P16013, L3-L5 and L10-L13 It is not clear which domain the authors mentioned here. P160013, L15 A decreasing trend of “surface” or “DCM” m from shelf to basin waters in summer? P16013, L22 The percentages of daily primary production consumed by microzooplankton (m/ μ o)

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are different from those shown in Figure 6. They are the values in summer? P16014, L3-L7 Please indicate the results using table.

Discussion P16014, L18 to P16015, L18 It would be very kind for the readers if the previous and present estimates using dilution technique (i.e. phytoplankton growth and mortality) are listed in table. P16017, L9 It is not clear what the authors want to mention. Could they revise this phrase? P16017, L26 to P16018, L13 The authors describe the grazing control of phytoplankton biomass instead of bottom-up forces, using the hypotheses suggested by Marra and Barber (2005) and Behrenfeld (2010). It is one of possible explanations but it is better to show more direct evidence from the present results.

Figures and Tables Table 1 The numbers without parentheses for SST, SSNO₃, MLD and DCM are mean, median or the others?

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9, C8486–C8488, 2013

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