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Interactive comment on "Bottom-up and top-down controls on picoplankton in the East China Sea" *by* C. Guo et al.

Anonymous Referee #2

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General comments

This manuscript used two sets of sampling data collected in August 2009 (summer) and January 2010 (winter). These authors discussed the spatial distribution of three picophytoplankton groups (Prochlorococcus, Synechococcus and picoeukaryotes) in both seasons, measured growth rate and grazing morality using dilution experiments among picophtoplankton population, then looked for the controlling mechanism of these variations and evaluated both the bottom-up and top-down controls in microbial food web of different marine environments in both seasons. First, I was so confused with the concept of "bottom-up control and top-down control". When one system was amended with full resources such as organic carbon or nutrients (temperature and salinity generally excluded) and one of the components increased, we can say that the component

is mainly under "bottom-up control". And if no other component responded, the component may be more under "top-down control". However, if the gross (intrinsic) growth rate was stimulated by the amendment (μ0/μn), the bottom-up control was effective. Here I would like to emphasize, the top-down and bottom-up controls are a matter of relative importance in pelagic ecosystem. We can evaluate the relative importance just by comparing intrinsic growth rates, grazing rates, and net growth rates within a range of environmental parameters (such as nutrient supplies) varying temporally or spatially. At this point, I feel that data presentation in the present manuscript is insufficient to discuss this issue and also does not give a proper reason to justify both the bottom-up and top-down controls in regulating the trophic transfer in microbial food web of different marine ecosystem in different seasons. Next, the data were insufficient for meaningful statistical analysis such as table 6, which included seasonal, spatial, and depth variations, and many results or discussions in this manuscript did not have sound statistic support to, for examples, distribution trend of picophyplankton from inshore to off shore , therefore a clear conclusion about significant seasonal or spatial pattern of picophytoplankton was impossible. I believe that the average abundance of picoplankton (over top 150 m) was inappropriate to discuss "the horizontal distribution of piccoplankton", because diverse environmental condition exists in the upper water column, for example, the depth of plum is about 10 m. Therefore, the average abundance could not represent the true distribution pattern of picophytoplankton in a pelagic ecosystem affected by different water masses. I believe that the major consumer of picophytoplankton is nanoflagellate, not microzooplankton. The authors cited many Landary's papers to support their viewpoint, but they must realize that Landary's results were acquired with dilution experiment, therefore with the consumers including not only micozooplankton, as believed by these authors, but also nanozooplankton. I suggest the authors must rewrite these parts in the manuscript. The three water systems were defined in the manuscript, but the standard of water system in the text (p 8207 L 24-p 8208 L4) was not consistent with that in table 1. Please check and give a reasonable standard. Lastly, many mistakes and erroneous values were found in the

manuscript. The authors should carefully check their manuscript before submitting it to journal.

Special comments Title: " picoplankton" or "picophytoplankton"ïij§ If it is picophytoplankton, please replace picoplankton with picophytoplankton throughout the manuscript. P 8204 L 9-10: Based on Table 5, the average growth rate should be 0.36, 0.81, 0.85. P 8204 L 16-17: Based on Table 5, protest grazing consumed should be 112%, 79%, 74% P8205 L3-8: This paragraph is neither major result nor conclusion, and should be deleted from the Abstract. P8206 L5-18: the major consumer of picoplankton is nanoflagellaye not microzooplankton. P8208 L4: add the model and manufacturer of CTD P 8210 L10: the authors did not show the incubation time in method of dilution experiment. P 8211 L3: The hydrographic patterns in both seasons were similar, increasing from inshoe to offshore, not contrasting. P 8211 L15: the nutrient unit should be μmoleL-1 not μg L-1, check the text and table 1 P 8211 L26: "the range of Chl a is 0.07-35.3μg L-1", but ranging from 0 to 1μg L-1 in fig. 2I. P 8212 L15: I believe that the horizontal distribution pattern of picoplankton abundance is better represented by surface data than by the average abundance. The statistical analysis was also done with surface data. P 8212 L20-21: "but much higher in Kurshio than in transitional in winter", this result was not confirmed with proper statistical test. The similar situation occurred throughout the manuscript, please check and correct. P 8212 L26: Results of Spearman's rank correlation and stepwise regression analyses on Pro were different, how do you explainïij§ P 8213 L9: 2.1 should be 13.8 P 8213 L11-12: 6.4 and 29 folds should be 18.2 and 2.8. P 8213 L20: decreased by 2-3 times (ïij§) please check P 8213 L21: 5.2 and 9.8 should be 4.4 and 6.1 P8213 L28: Is temperature bottom-up factorïij§ P8214 L15: 84% should be 112% P8214 L28: 0.82 should be 0.83 P8216 L22: "microzooplankton consumed 10.05 in coastal region", this value was not found in Table 9 b. P 8217 L8-14: In this paragraph, the hydrographic condition in summer and winter was described. In reality, the hydrographic condition is very different from the description with different water currents intruding into the East China Sea in both seasons, respectively. Not only Kuroshio and fresh water from Yangtze

River intruded into ECS. P 8217 L23-26: If the ability of Pro to utilize nutrient is significantly weaker than other picophytoplankton, why they are abundant in very oligotrophic environment. P 8218 L17-20: In the East China Sea, Syn distributes in intermediate nutrient environment. Please give a statistical support to this conclusion. P 8219 L4-5: 0.89, 0.9 should be 0.81. 0.85 P 8219 L10-11: "growth rates were higher in summer than in winter". This phenomenon does not occur in Pro and the result could not be supported by statistical analysis. P 8219 L15-19: There was no statistical support to the decrease trend of growth rate from inshore to offshore What relationship between growth rate and nutrient or salinity should be shown. P8219 L26-28: and P8220 L1-4: "the negative correlation between grazing morality and salinity". This result is not only to show a spatial variation but also to include the seasonal and depth variations. This result was not ideal to explain the spatial distribution. P8220 L6-14: I believe that the major consumer of picophytoplankton is nanoflagellate not microzooplankton. P8220 L14-18: "Spearman's correlation in table 6". The analysis included the seasonal, spatial, and depth variations, therefore I would not accept the explanation about seasonal variation of grazing rate based on the analysis result in table 6. P8220 L22: 84%, 78%, 73% should be 115%, 79%, 74%. P8221 L2-3: I do not know how these authors calculate these ratios P8221-P222: "The top-down control on picoplankton by microzooplankton grazing in ECS". I could not accept this conclusion, because the slopes of Syn and Peuk between growth and grazing rates were 0.87 and 0.56, respectively, and sometime μ0/μn <1 these data confirmed the bottom-up control of picoplankton abundance in the East China Sea. P8221 L17-28 and P8222 L1-6 : the seasonal variation of morality and m/μ in the three piciphytoplankton communities showed a similar pattern (summer>winter), but the relationship between abundance and morality was significantly different (different correlation coefficient in Fig. 8). These authors explained this phenomenon to be resulted from "different potential mechanism of top-down control", but the different grazing pressure among the three picophtoplnkton was not observed in the change of grazing morality of nanoflagellate on picoplankton. P8222 L6-25 : growth rate and grazing rate were higher at surface than at the DCM, Please provide

statistical analysis to support the conclusion. P8223 L2-3: Do salinity and temperature belong to the bottom-up factorsïij§ P 8223-224: In summary, many of the authors' conclusions were neither in Discussion nor Result section, such as " microzooplankton consumed an average . . .. . ." or " relative strength. . ..(L3-9)" . I suggest the authors to rewrite the summary, based on the conclusion of manuscript.

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