Interactive comment on "The effects of different environmental factors on biochemical composition of particulate organic matters in Gwangyang Bay, South Korea" *by* Jang Han Lee et al.

Dr. Yun

misunyun@pusan.ac.kr

General Comments The manuscript presents the seasonal variation of biochemical composition of POM in Bay. The author shows the major controlling factor for them based on statistical analysis. Overall, I found the paper to be sound and believe that it contains valuable data in understanding the characteristics of POM and their contribution to coastal ecosystem as basic food source. I think that the paper is worthy of publication for BGS after minor revisions are made, while there are a few areas that need improvement.

Major comment and corrections

1. Page 12, Line 258-278: The author showed δ13C value and carbon to nitrogen ratio in surface, in order to find the origin of POM. I think that the contribution of benthic microalgae to POM could be large and significant, since the study area is located in coastal area and extremely turbid condition related to freshwater input or tidal cycles or wind. Therefore, many amounts of benthic microalgae could be included to POM through the resuspension, especially during high river input. Indeed, Table 3 shows the lower 13C value in August.

2. Pages 13-14, Line 301-304: For the criteria of their moral ratios among dissolved inorganic nutrients, I wonder could it be applied in coastal area. I think that the status of nutrient limitation in phytoplankton could be different between open oceans and coastal area.

3. Page 15, Line 335-344: As the author discussed, I think that the composition of phytoplankton assemblages and species could be closely related to seasonal variation of biochemical composition. High nitrogen supply during river-input increased season could lead to different phytoplankton composition. For example, the large sized phytoplankton (such as diatom) could be thrived in that condition, since the large phytoplankton could grow best and dominate under eutrophic condition. According to Fernandez et al. (1994), the carbon allocation into different biochemical pools were different depending on dominant phytoplankton group. For example, the carbon allocation into lipids was higher under the dominance of flagellates, whereas the lower lipid synthesis was observed in the dominance of diatoms. Therefore, the seasonally different phytoplankton composition related to nutrient input could affect to the different biochemical composition in the region.

4. In figure 3, the author shows positive relationship between river input and protein composition. However, I didn't find the positive relationship between them, based on comparison with table 2 and figure 2. For example, the protein composition in August

was lowest, although the rive input was considerably high. In addition, the protein composition from October in 2012 to April in 2013 was higher than that in August, even though the lower river inputs were recorded.

Minor corrections

1. Pages 8-9, Line 175-186: The position of some sentences needs to be corrected. For example, the results about irradiance and chl-a are shown in Table 1 (it is explained in line 178-186). The results for rainfall and river-input are indicated in former position (in line 175-178), although they are shown in Table 2.

2. Page 9, Line 195-197: The author found that there were no significant differences in spatial distribution of POM. However, the protein composition in station 2A (is closest to the River) might be higher than in station 4 and 5, since there is the large effect of river-input on the biochemical composition in this study.