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Biogeosciences Discussions

Interactive comment on "Biogeochemical characteristics of suspended particulates at deep chlorophyll maximum layers in the East China Sea" *by* Qianqian Liu et al.

Qianqian Liu et al.

selvaraj@xmu.edu.cn

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Referee 1 (Prof. P.A. Meyers)

Referee 1: Liu and colleagues present the results of their study of the organic carbon and nitrogen contents in suspended particles collected around deep chlorophyll maximum layers in the East China Sea. They measured carbon and nitrogen concentrations and isotopic compositions of 36 samples collected from 7 cross-shelf transects and augmented these data with a suite of standard hydrographic measurements. These data allowed them to conclude that little land-derived organic matter contributes to the suspended particulate matter despite the proximity of the sampling locations to

the mouth of the Yangtze River. Instead, the organic matter freshly produced by phytoplankton. The authors attribute variations that they found in the carbon and nitrogen isotopic values of the organic matter to local differences in productivity rates and differences in the nitrate isotopic signatures of the major water masses in the area. The study seems to have been designed well, and the authors seem to have interpreted their results properly, but problems with the presentation make this contribution hard to read and appreciate. The English badly needs refining, and some additional details should be addressed.

Reply: Thank you very much for your appreciation on the overall performance of the research work that presented in our manuscript. We took the utmost care to refine our English in the revised version.

Referee 1: For a start, the second paragraph of the Introduction seems to be missing something (lines 27-32).

Reply: It seems that there is no connection between the last two sentences of the first paragraph and the first sentence of the second paragraph and therefore this part has been revised as follows:

It is known that stable isotopes (δ13C, δ15N) and molar C/N ratios of POM in estuarine and marine areas are representative of these values in primary production-derived OM and in that they are largely synthesized by phytoplankton (Gearing et al., 1984). Since phytoplankton is the main primary producer of marine OM, it should therefore be considered when studying the dynamics of POM in the marine water column.

The chlorophyll a (Chl a) in the sea water is often used as an index of phytoplankton biomass. The deep chlorophyll maximum (DCM) layer, which contributes significantly to the total biomass and primary production in the whole water column (Weston et al., 2005; Hanson et al., 2007; Sullivan et al., 2010), is approximately equal to the subsurface biomass maximum layer (e.g., Sharples et al., 2001; Ryabov et al., 2010).

Referee 1: After that, Section 3.1 on sample collection should include a tabulation of the 36 samples that shows their water depths and some of their hydrographic properties. This tabulation could be an appendix, but the information that it would contain should be available to interested readers.

Reply: Table S1 is included in the appendix in the revised version. Table S1 includes depth, chlorophyll fluorescence concentration, temperature, salinity and turbidity at the SPM sampling layer, as well as, depth and chlorophyll fluorescence concentration in the deep chlorophyll maximum layer.

Referee 1: Then, the explanation for higher δ13C and C/N values in surface sediments that phytoplankton (page 14, lines 10-16) seems out of place. This contribution is about POM, not sediments.

Reply: We agree with the comment from Referees 1 and 2, and thus this part has been deleted in the revision.

Referee 1: To continue with details that need correction, neither Table 1 nor Table 2 contribute much to the paper as they exist. I suggest either expanding Table 1 as suggested above or deleting it and providing a detailed appendix. The figures are effective, but Figure 3 could be improved by inverting the salinity color code so that salinity (and hence density) increases downward and Figure 8 needs to have the spelling of Redfield corrected the left panel and in the legend.

Reply: Table 1 is expanded as suggested above and Table S1 with the hydrographic data is also included in the appendix.

As suggested, Table 2 has been deleted in the revised revision. Figure 3 has been improved, as suggested; however, we don't know how to invert the salinity colour code using Ocean Data View. The spelling of Redfield has been corrected in Figure 8.

Thank you very much.

Please also note the supplement to this comment:
https://www.biogeosciences-discuss.net/bg-2017-290/bg-2017-290-AC1-supplement.pdf

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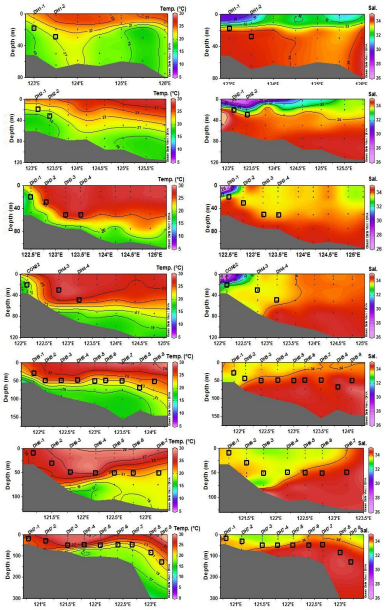

Figure 3. Vertical distributions of temperature and salinity along seven transects in the East China Sea in summer 2013. Note that there is an obvious thermally-stratified water column during the collection of suspended particulate matters in the East China Sea.

Fig. 1. Revised Figure 3

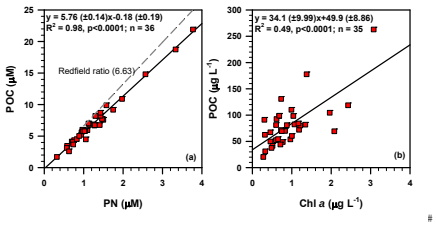

Figure 8. Bi-plots showing the relationships of (a) POC vs. PN and (b) POC vs. Chl *a* in suspended particulate matters investigated in this study. Redfield ratio (dashed line in panel a) is taken from Redfield (1958).

Fig. 2. Revised Figure 8