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Interactive comment on "Phytoplankton communities determine the spatio-temporal heterogeneity of alkaline phosphatase activity: evidence from a tributary of the Three Gorges Reservoir" *by* Yijun Yuan et al.

Anonymous Referee #2

Received and published: 12 January 2017

Revision on the MS No.: bg-2016-455 entitled "Phytoplankton communities determine the spatio-temporal heterogeneity of alkaline phosphatase activity: evidence from a tributary of the Three Gorges Reservoir" by Yijun Yuan et al. This study investigate the spatial and temporal variation of alkaline phosphatase activity (APA) in different fractions (<0.45μm, 0.45-3 μm, >3μm) of waters from the Xiaojiang River (China). This research topic is not novel in the field of aquatic microbial ecology, though eventual interest can rise from the specificities of the studied site. The MS is clear and well written, but problems in the methodology and statistical analyses make me feel rather skeptical on results interpretation by the authors.

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Main comments:

The main weak point of this study is methodological. Authors consider bacteria absent in the fraction < 0.45 μm, but they can actually be comprised between 0.45-0.2 μm. According to this, half of the total APA in your study is found in the dissolved fraction (53.4% , L 235) were a huge amount of bacteria are still present after filtration. I suggest authors to take this comment into account and modify results and discussion sections accordingly.

Hypothesis in this study are missing. Please, supply them at the end of the introduction section.

Statistical analyses: all environmental parameters analyzed in this study were retained, after MonteCarlo's permutation test, in the RDA which is quite surprising. I was really confused after reading P10 L200-202 where authors state that permutation permitted to determine the significance of canonical axes. Could you please clarify this? Second, I suggest authors to remove APA total from the RDA since it will covaries with APA in fractions. Third, is there a sense in discussing about correlations between APA and environmantal parameters showing such a low "r-values" ? In my opinion, the correlations presented in Figure 6 and 8 should be removed. Fourth, is there a sense in checking for chl-a and APA<0.45μm correlations when you already know that algae are not present in this fraction? Finally, standard errors over means are not present in Figure 2. Please supply.

Discussion: I suggest authors to include phytoplankton community composition (i. e. diversity indices) in RDA in order to reinforce discussion in P13 L253-277. I would also appreciate a deeper discussion in spatial differences in APA in the Xiaojiang River. Why APA decrease downstream in the estuary zone?

Minor comments:

The amount of replicates analyzed for each of the biological parameters (i. e. APa,

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chl-a. . .) measured has not been specified in the methods section

Be consistent through your MS on: APA or APase? Check APA units (molPNP L-1 min-1)

L27-27. This statement is contradictory according to what you described above (L22-27).

L32-32. Not only cell surfaces but also freely diffusible enzymes (See Burns et al. 2013)

L54-55 and L59-60. Repetition.

L 57-59. A reference is missing.

L68-70. Not clear, rephrase please.

L 96. Correct.

L122-123. Supply reference here, please.

Figure 2. Remove lines indicating seasons, they are confusing. Use dotted line, at least, for Water Level, this will improve lecture.

Show ANOVA P-values in a separate Table for improving clarity of results.

L158. This sentence is not correct since cyanophyta are dominant in April.

L247-248. This statement is wrong. Reconsider it after reading main comments described above.

L270-271. Rephrase, please.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-455, 2016.