

## ***Interactive comment on “Vertical partitioning of phosphate uptake among picoplankton groups in the P-depleted Mediterranean Sea” by A. Talarmin et al.***

### **Anonymous Referee #1**

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This paper clarified vertical distributions of phosphate uptake rates by different planktonic groups in the Mediterranean Sea, where surface phosphate is often severely depleted. The results can contribute to the understanding of biogeochemical cycles of phosphorus in the open oceans. The methods employed are well established ones, and they are totally reliable. All the data have sufficient quality and novelty for publication in Biogeosciences. However, I think that the authors could expand the discussion more extensively and intensively. Some sections of the discussion give me the feeling that something is left unfinished. The authors should totally rearrange the discussion and abstract before publication in Biogeosciences.

P3L7. As widely known, these are reports on utilization of organic phosphorus by  
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marine plankton after enzymatic hydrolytic actions, not direct uptake of organic phosphorus. And the utilization of phosphomonoesters after hydrolysis catalyzed by alkaline phosphatase had been known earlier. These precedent reports should be included in references.

P3L20. “realize a significant fraction of their P” I was not able to understand what this phrase means.

P4L14. “significantly higher” Is this true for all the 6 experiments conducted ever? This description gives us the impression that it is an established fact.

P5L5. In this section, it is not clear where and from which depths samples were collected for some parameters (FCM, Pi uptake and nutrient concentrations).

P6L15. What is the material of the bottles?

P7L10. Why did the authors choose the depth of 15 m above the DCM?

P9L6. Do these observations emphasize the strong P-deficiency?

P9L10. “possibly due to mesoscale variability” It does not explain the reason or mechanism for the high values in the western basin. Why or how was the mesoscale variability formed?

P9L19. “below” should be replaced by “over”?

P10L17. I did not understand how the authors obtained kinetic parameters from Fig. 5. In Fig. 5, the fitting to Michaelis-Menten curve seems to be unsuccessful for the bulk community at St. C. However, the kinetic parameters are described in Table 2. How were these values obtained?

P12L6. Does higher taxon-specific Pi uptake rate by *Synechococcus* just reflect their higher biomass, or higher affinity to Pi or both, compared to picoeukaryotes?

P12L7. Figs. 4 and 5 seem to show me that Hprok-specific rates of Pi uptake was not

always lower compared to cyanobacteria.

P12L26. "found no difference" sounds too strong. "found no clear difference" or "found no significant difference" may be more appropriate.

P13L12. What do the authors think caused the difference found among the areas?

P13L14. Theoretically, the community maximum uptake rate should be the sum of each population, thus this description seems no wonder.

P13L20. Is there any evidence or reference to support the low uptake by larger populations?

P14L1. The authors can estimate cell volume of phytoplankton measured by a flow cytometer, if they obtained scatter (FSC or SSC) data. The data can be calibrated against standard beads, and converted to cell diameter.

P14L9. This discussion seems to contain some leaps in logic. I was not able to understand why the vertical partitioning of Pi uptake in the present study may show that Pi concentration was a major factor explaining the distribution of osmotrophs. Additionally, does "distribution" in this sentence mean vertical distribution or horizontal distribution?

P15L10. "the spatial distribution . . . was partly attributable to their respective capabilities to take up Pi" I do not fully agree to this idea. As mentioned in the comment above, this is not sufficiently supported by observations. The spatial distribution of plankton taxa seems to just reflect their Pi uptake traits.

P15L18. "While a few taxon-specific. . ." This sentence should appear on the top of this paragraph.

Figure 2, caption. The unit of turnover times should be included in the caption.

Figure 5. As mentioned earlier, more than half of the fittings were insignificant. Is it appropriate to include kinetic parameters from insignificant fittings?

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