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Interactive comment on “Phosphate supply explains variation in nucleic acid allocation but not C : P stoichiometry in the Western North Atlantic” by A. E. Zimmerman et al.

Anonymous Referee #1

Received and published: 10 January 2014

The authors hypothesise that the flux of phosphate into the euphotic zone will have an impact of the particulate phosphorus concentration and allocation of phosphorus to DNA and RNA. They present data from the western subtropical Atlantic across a significant gradient in temperature and phosphate and use a standard k_z to calculate the phosphate supply along this gradient. There are some weakness in this study that need to be addressed:

1. The authors estimate the flux of phosphate from assessing the phosphate gradient between 80 and 160m and multiply by K_z . The authors collected samples for particulate phosphorus, DNA and RNA from 0 to 5m (as far as I can tell). The authors then correlate fluxes from ~ 100 m to properties in the top 5m. In a severely phosphate

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depleted system, do the authors believe that phosphate that is supplied at $\sim 100\text{m}$ will reach the phytoplankton community living in the top 5m? Even if we assume that phytoplankton are circulated in the mixed layer, in these stratified environments, the mixed layer is much shallower than the euphotic zone. The lack of correlation for most flux-property plots would suggest there is a mismatch in the sampling horizons perhaps? This needs to be addressed in the paper.

2. In Figures 5, 7 and A5, there is an obvious high data point that is perhaps controlling the strength of the correlation analysis. Is the correlation between properties or flux-properties still significant when this data point is removed?

3. The assumption is that the supply of phosphate will have an impact on cellular P content and allocation. But a supply of phosphate will also supply nitrate, silicate, iron etc. So how will this affect the carbon (e.g. if there is a stimulation in carbon fixation and cell growth) and therefore the C:P ratio. The current version of the manuscript reads as though the only property to change if phosphate is supplied is particulate phosphorus.

Interactive comment on Biogeosciences Discuss., 10, 16295, 2013.

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10, C7813–C7814, 2014

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