

Interactive comment on “Seasonal variation in marine C:N:P stoichiometry: can the composition of seston explain stable Redfield ratios?” by H. Frigstad et al.

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In this study, Frigstad and co-workers describe the seasonal variation in marine C:N:P stoichiometry at two coastal stations offshore of Norway. The authors have collected an impressive multi-year dataset of particulate nutrients and associated environmental parameters with more than 1000 observations. They use this dataset to first analyze for any relationship between C:N:P and season or environmental conditions. This part of the paper is great and will be of broad interest. An added discussion of inter-annual trends would be of interest too.

In the second part of the paper, they use various statistical relationships between chlA

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and POC or biovolume and phytoplankton carbon to derive the contribution of autotrophs to the total POC, PON, and POP concentration. This part of the paper is more controversial as it builds on several assumptions, e.g. constant POC/chlA ratio that we clearly know does not exist. The authors are well aware of these assumptions per their discussion in section 4.3. I'm personally a bit skeptical of this kind of analysis so I find the conclusions in the latter part of the paper somewhat speculative. One thing is to try to derive the contribution of autotrophic and non-autotrophic cells to POC, but the authors take it one step further and use it to derive the C:N:P ratios of different fractions. Then the authors go on and discuss the implications of these findings. This all seems a bit iffy to me. These results are associated with great uncertainty and this uncertainty should be included in the discussion of the actual results (and abstract) and not just a separate section. A sensitivity analysis of the assumptions in this model could be one way to quantify the effect of various ways of analyzing the results. So I recommend to tone down the conclusions in this part and include wording that reflect the uncertainty.

In section 4.7, the authors discuss the implication of variable seston composition on elemental ratios. First of all, this section relies heavily on the analysis (and the issues associated with) discussed above. Further, coastal run-off likely plays an important role in regulating the seston composition. Thus, I would recommend that the authors clearly identify if any issues they discuss only applies to coastal waters. Several of the mechanisms for regulating C:N:P discussed here (e.g. nutrient limitation) may still be important for open ocean seston.

Minor comments: P6228L9. This line is very unclear, please rephrase

P6235L18. Should this be PC2?

Figure 2: I would recommend putting the nutrient values on a log scale and marking the detection limit. As it stands, it is very hard see how low the nutrients get in the summer months.

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Figure 3: It seems that there may be a seasonal trend in POC and PON at Jomfruland.
Did you do any statistical analysis to rule out seasonality?

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