Biogeosciences Discuss., 6, C4222–C4223, 2010
www.biogeosciences-discuss.net/6/C4222/2010/

Biogeosciences Discussions

Interactive comment on "A comparison of the variability of biological nutrients against depth and potential density" *by* J. While and K. Haines

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Received and published: 29 January 2010

This is the most positive of our reviews, stating that this is a "relatively simple but important paper" and noting that the use of a very large set of sampled data is very impressive.

The reviewer asks about the seasonality of the data. The main result of this paper concerns the variability of measured nutrients about some local nutrient-density relationship when compared to a nutrient-depth relationship. It is certainly true that in areas with sufficient data a seasonal nutrient-density relationship might be defined, instead of a single relationship for the year. Variability about this seasonal relationship could then be monitored. The main drawback of the approach would be insufficient data in most locations, while, as the reviewer notes, this paper has the advantage of showing

results on a global basis using all available data. One advantage of using a nutrient density relationship in the first place is that in winter the densities in the upper water column are very different to summer and if deeper nutrients behave passively when the mixed layer retreats, then winter and summer relationships will not be so different. In going to a nutrient density relationship it is likely that a lot of the variance reduction we have detected in the upper water column is coming from the seasonal cycle variability with depth. We would thus be showing that nutrient-density relationships are less sensitive to the seasonal cycle than equivalent nutrient-depth relationships. This would be an interesting extension of the work for the future and we thank the reviewer for their suggestion.

Interactive comment on Biogeosciences Discuss., 6, 10177, 2009.