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Interactive comment on "Upper ocean mixing controls the seasonality of planktonic foraminifer fluxes and associated strength of the carbonate pump in the oligotrophic North Atlantic" *by* K. H. Salmon et al.

Anonymous Referee #2

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The manuscript by Salmon et al. deals with a particularly important time series as it was one of the earliest, dating back to the late 1970's, continuing until today. Here Salmon et al. describe the fluxes of planktonic foraminifera intercepted by a sediment trap at 1500m for two periods of about 2.5 years, with a bi-weekly resolution, i.e. significantly higher than the classical studies with bi-monthly resolution at the same site. The foraminiferal fluxes are compared with seasonal drivers ("spring bloom", mixed layer depth, nutrient entrainment) and eddy-driven (NAO-related) variability.

In general the paper is concise, well written, clear and well-focused on the Bermuda

site. The latter, however is also a limitation as similar studies from elsewhere are not included in the discussion of results, which would increase the value of this study, e.g. with respect to both seasonality and eddy perturbation. Having said that, the manuscript is well within the scope of BG, presents novel data and discusses these data in a broader oceanographic perspective.

The manuscript would benefit from the addition of a map showing the location of the site with major surface currents, as well as with a full data table (supplementary).

Materials and Methods, 3.2, line 15-16: The authors state that the fast settling rates for individual tests of larger species would not cause a temporal offset between the hydrography and their arrival at 1500m depth (3 days for G. inflata and 7 days for G. ruber). However, this time period is taken from the moment the export of shells starts, not the time of life before that, which may be anywhere from two weeks to a full year. How does a living foram population respond to perturbances like eddies, or do they only generate a pulse of settling shells?

Fig. 3a. From the graph it seems that the relationship of PF flux to Chla concentration is curvilinear rather than rectilinear, i.e. while Chla increases, PF fluxes level off. If so, linear correlation is not warranted.

Given the title of the paper (".. strength of the carbonate pump.."), what is the contribution of planktonic foraminifera to the carbonate mass flux?

Conclusions, 7, line 16-19: The authors argue that the heavy tests of particularly the winter globorotaliids "...may serve as ballasting mechanisms for carbonate...". It is unclear, however, what is meant here as the large heavy tests concerned have settling velocities that exceed those of organic matter aggregates and would settle as individual particles rather than ballasting these aggregates as e.g. coccoliths do. Please clarify and include the reasoning in the discussion of results rather than in the conclusions.

There are various repetitive typos with respect to taxonomy that need correction:

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Globorotalia rather than Globoratalia; crassaformis rather than crassiformis; Globigerinoides rather than Globignerioides

Interactive comment on Biogeosciences Discuss., 11, 12223, 2014.