

Interactive comment on “Seasonal and latitudinal patterns of pelagic community metabolism in surface waters of the Atlantic Ocean” by S. Agusti

Anonymous Referee #2

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This ms describes a dataset collected during 4 quasi-meridional cruises from 1995–1999, bisecting the Atlantic Ocean as part of the LATITUD project. While there were some differences in sampling design, cruises generally followed a diagonal pattern across the Atlantic Basin from the coast of Africa to the coast of South America. Surface waters were sampled at from 10–34 stations per cruise. Incubation assays were done to measure community respiration (R), net community production (NCP) and gross primary production (calculated as NCP+R). R and NCP rates were measured as changes in oxygen concentrations over a 24 h for samples incubated in darkness and natural or simulated sunlight, respectively. Oxygen was measured using a precision Winkler method. The main findings from the study were that NCP and R were very low in these oligotrophic waters, and that R typically exceeded NCP, indicating that much of the open Atlantic ocean is net heterotrophic. The author describes the

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results using latitudinal plots of chl a, GPP, and NCP; the latter was further divided into boreal/ austral Spring and Autumn sub-categories. A strong negative relationship was observed between NCP and R. The author discusses the results in the context of prevailing current patterns across the basin and the seasonal temperature regimes, and conclude that understanding the net metabolic balance of large ocean basins require further study of oceanographic, climatic, and micro-heterotrophic processes.

This study provides useful data on net metabolism in surface Atlantic waters during different seasons. The author contends that seasonal studies are lacking for this region, therefore this dataset help fills a gap in the literature. However, I found this to be a very sparse dataset, especially given the sampling design only includes surface waters, traverses such a large geographic range, and transects a diversity of current regimes, each with its own seasonal dynamic. Furthermore, many of the samples were collected from tropical regions where seasonal variation in solar irradiance and temperature are diminishingly small. Therefore, I think it is difficult to resolve meaningful seasonal patterns.

The relationship between NCP and R is interesting, though the implications of this finding could be further explored. Apart from resolving the point at which autotrophic and heterotrophic processes are balanced, are there implications to the slope of the relationship? Similarly, what is the nature of coupling between autotrophic biomass (chl a) and production (GPP). Does a scatter plot of GPP and chl-a show a strong relationship? Why or why not? If so, what does the slope of that relationship suggest?

One technical note: The detection limit should be stated explicitly. In other words, what is the minimum difference in dissolved oxygen from initial to 24 h that can be reliably resolved? What proportion of the samples were at or below this detection limit?

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