Biogeosciences Discuss., 12, C1867–C1869, 2015
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Biogeosciences Discussions
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Interactive comment on "Links between surface productivity and deep ocean particle flux at the Porcupine Abyssal Plain (PAP) sustained observatory" *by* H. Frigstad et al.

Anonymous Referee #3

Received and published: 5 May 2015

General comments This study provides a decade long time series data set on hydrography, biogeochemistry and sediment traps for the PAP site in the North Atlantic. Results are valuable for understanding the present and future functioning of the biological pump in the PAP site. They also suggest that there might be changes in export as the PAP site transitions into subpolar conditions. However there is little discussion on the actual implications of the results in that context. Although I just have some minor comments on the ms, I recommend the authors to further develop the implications of their study.

Abstract Line 10 please specify that a Redfield ratio of 12 is higher than the expected value of 6.6.

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Interactive Discussion
Discussion Paper

Introduction

I am surely not well informed on the dynamics of the PAP site but I have trouble with the sentence “It is at or near the boundary between the sub-polar and sub-tropical gyres of the North Atlantic”. Is it or is it not? And if both are true how is it explained? This is important for data interpretation.

Slide 5171 line 1 (and throughout the text) please include the correct formula of nitrate (NO3-). Lines 10 to 15: These are valuable motivations for the study but I though you already named those before. Please regroup your arguments at the end of the introduction section for clarity. Line 23: “multitude” is vague and you cite only one reference. Please detail or rephrase.

Slide 5172: consider giving acronyms to concepts such as transfer efficiency, new production, sequestration flux and export flux.

Materials and Methods Section 2.1: I think details are missing here. For instance, what sensors for nitrate were used during the last 10 years? What is the detection limit? I understand that this information can be found in a variety of papers but it is best not to force the reader to look for sparse information. A Table sumarising limits of detection, techniques and periods of use can be useful here.

Slide 5176 line 9 “an explanationfor December to be followed shortly”. Delete. One supposes you are going to explain this later.

Slide 5177: Please justify your assumption of negligible mixing.

Slide 5178 line 11: Why did you use 100 m d-1 for all particles?

Results. Slide 5180 line 14. Particle tracking shows considerable interannual variability. You don’t mentioned mesoscale variability as a cause of this variability. Please comment.

Discussion Slide 5182 lines 20-23. Maybe a table compiling previous N:C estimates

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would help here.

Line 23: N2 fixation could be (and references will show you that it is) important in the North Atlantic. Assuming the opposite can be misleading. Please discuss its possible effect on your observed C:N. Also discuss your choice of assuming negligible N2 fixation.

Slide 5185 line 20. Transfer efficiency is already defined in the text. Also, please discuss a little bit more the implications of the 4% you report here.

Slide 5186 last paragraph of discussion. This is a speculative statement and I don't think it's a good way to finish your paper. Either you discuss this point in more detail or you replace it with a more conclusive statement that is actually supported by the data. Line 10: Change how?

Figure 5: Please clarify what the axes are.

Interactive comment on Biogeosciences Discuss., 12, 5169, 2015.