

Interactive comment on “Biogeochemical variations at the Porcupine Abyssal Plain Sustained Observatory (PAP-SO) in the northeast Atlantic Ocean, from weekly to inter-annual time scales” by S. E. Hartman et al.

Anonymous Referee #2

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General comments

The manuscript of Hartman et al. describes a new dataset of biogeochemical parameters from the PAP station in the Northeast Atlantic. The PAP station is located in a biogeochemically interesting area that shows high seasonal and interannual variability. Therefore the presented dataset adds valuable knowledge and can help to understand and separate the various processes driving the biogeochemical variations. However, the manuscript mainly describes the data of two 3-year periods and lacks of deeper interpretation of the data. Furthermore some information which are necessary to assess

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the quality of the dataset are missing. In general I'm missing uncertainty estimates for all measurements and the calculated data. Especially when the data are used for further calculations (alkalinity, flux) this information helps to assess the dataset. The dataset could have been used to calculate budgets. All data are there and maybe an estimate of the influence of advection could be given. The whole results and discussion would benefit from this estimation. I suggest publishing this manuscript after minor revisions.

Specific comments

p. 12415 affiliations are not consistent

p. 12419ff

p. 12420 l. 11: The use of a gas tension device is mentioned but the data are neither shown nor are they used for further interpretation. I suggest not mentioning the instrument. l. 12ff: The authors write that they compare their data with the ones from Körtzinger et al. (2008). But there is no quantitative comparison in the manuscript.

p. 12421 l. 3ff: The authors say that the factory calibration was used for all instruments. Especially for the CO₂ sensor I have my concerns if this is enough. Normally IR based CO₂ sensors are drifting with time, not only in one direction. In addition there is strong temperature dependence, what was also seen in Jiang et al. (2014). l. 14ff: Please show how the ARGO temperature compares with the Microcat data. l. 22ff: The chosen box seems quite big for a comparison. Furthermore this box covers also the shelf region that is not reflecting open ocean conditions. Why did the authors not use the SOCAT database for comparison? So they could easily increase the amount of data for validation.

p. 12422 l. 20: for consistency use also parenthesis for pCO₂sea and pCO₂air

p. 12423 l. 21: delete the part “. . . , the partial pressure of carbon dioxide, . . .”. This was already introduced. l. 24ff: The authors mention that the p(CO₂) data are confirmed

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by the used VOS line. How good is the agreement?

p. 12424 l. 13: parenthesis are missing around the 2010 in the citation.

p. 12425 l. 10: Use PAP-SO instead of “sustained observatory” l. 14ff: Uncertainty estimates are missing.

p. 12427 l. 4ff: The authors use the measured nitrate and calculated DIC data to estimate C:N ratios. As the C:N ration includes only biological pathways the DIC data have to be corrected for air-sea flux before.

p. 12428 l. 11: The NAO was already introduced.

p. 12429 l. 3-5: Here the authors point out that advection needs to be taken serious. I suggest trying to estimate the influence of advection as all other processes might be covered by data.

p. 12432 l. 16: correct page numbers are 264-280.

Figure 1: Adding a contour line for the shelf break would be good.

Figure 2: The labels are too small, it's hard to read. Please keep the legend consistent (e.g. no legend in panel a).

Figure 3: Please add temperature data from Micocats for comparison. The last part of the figure caption needs to be rephrased.

Figure 4: Please increase font size. Typo in the caption (... concentrations...). Add “of” before the 6.6 in the last line. If there is a legend there is no need to repeat the symbols in the caption. Furthermore the dashed line for the Redfield ratio is not visible.

Figure 5: Please increase font size. Please keep the legend consistent and no repetition of the legend in the caption.

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