Response to Review #1 Comments

This manuscript provides a review on the recent progress on how BGC-Argo can be used to advance our understanding of marine productivity, with a special focus on the two key fluxes: gross primary production and net community production. The manuscript started with an explicit introduction about the fundamental concept of these two parameters, followed by a detailed recap on the main approaches used to constrain these two fluxes by using the high-frequency BGC-float observations. Subsequently, an in-depth analysis is performed using a compilation of datasets from prior studies to assess the natural variability of marine productivity, as well as the main uncertainties and challenges that persist in the float-based methodology. Lastly, the authors present a new estimate of the global meridional pattern of carbon export ratios by combining the float estimated GPP and NCP, demonstrating an encouraging agreement when compared with traditional estimates.

Overall, the manuscript is well-written and logically organized, and the figures and tables effectively support the conclusions. I believe this work is of great value and will be of interest to the broad community in the field of marine biogeochemistry, autonomous platforms, sensor technology, and climate. Additionally, it contributes to the ongoing global BGC-Argo project (GO-BGC) and provides valuable guidance for future float deployments.

Thank you for reviewing our manuscript and providing these helpful comments. We have responded to your suggestions below in blue. In our responses, line numbers refer to the revised, unmarked copy of the manuscript.

During the revision, I suggest the authors consider the following comments to improve the clarity of the manuscript:

Figure 1: The PP profile displays the subsurface maximum, in contrast with the light attenuation as described by the authors. I believe this reflects the trade-off between light and nutrient availability, and it would be helpful to provide an explanation in the caption. Furthermore, consider adding an elementary equation describing the organic carbon production somewhere in the figure, as this can provide necessary context regarding why different tracers (O2, NO3, and DIC) are used to track productivity.

Thank you. We added the following equation to the figure, with additional text in the caption as follows: “The equation represents average oceanic aerobic photosynthesis, following Redfield nutrient stoichiometry. The reverse reaction represents respiration.”

$$106\ CO_2 + 16\ HNO_3 + H_3PO_4 + 78\ H_2O + \textit{trace elements}$$

$$\downarrow \textit{light}$$

$$(C_{106}H_{175}O_{42}N_{16}P) + 150\ O_2$$

We also added details about why the subsurface maxima exist in the figure caption: “with a subsurface maximum due to photoinhibition”.

The new figure and caption are as follows:

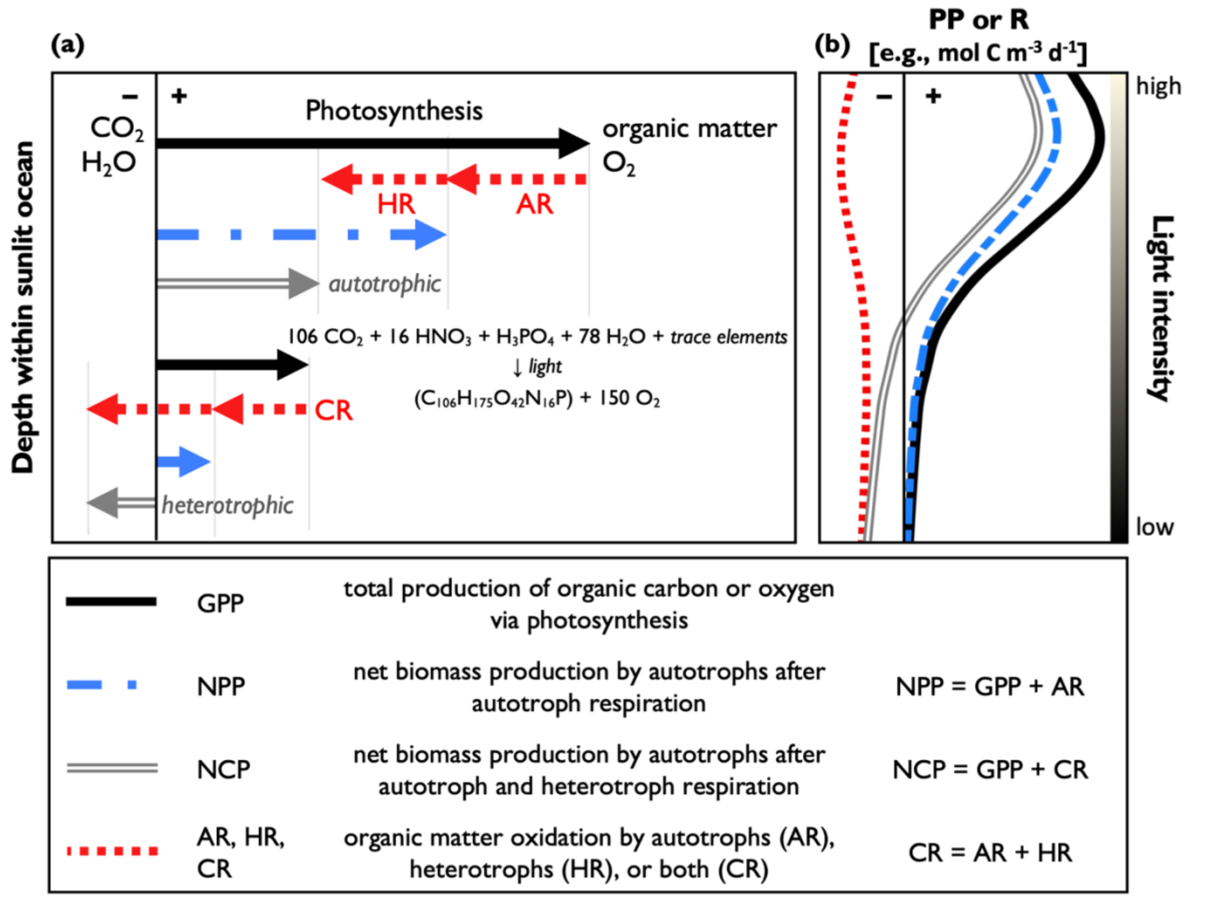
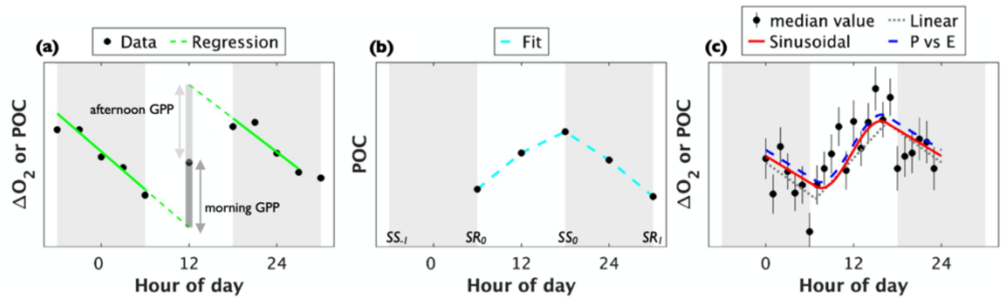


Figure 1. A conceptual schematic and definitions of the common primary productivity (PP) and respiration (R) metrics: gross primary production (GPP), net primary production (NPP), net community production (NCP), and autotrophic, heterotrophic and community respiration (AR, HR, CR, respectively). Panel (a) shows simplified reaction equations of organic matter production and R. The upper part of the figure represents a region of net autotrophic conditions (NCP > 0), while the lower part represents a region of net heterotrophic conditions (NCP < 0). Panel (b) represents idealized PP and CR profiles, where PP declines with depth due to the light dependency of photosynthesis with a subsurface maximum resulting from photoinhibition. The vertical axis represents water column depth, and the thin black line divides positive and negative rates. The equation represents average oceanic aerobic photosynthesis, following Redfield nutrient stoichiometry. The reverse reaction represents respiration.

Table 1: Ensure that the literature citation format within the table is consistent.

We have altered the citation format in Table 1 to ensure it is now consistent and added a new column to make the citations and the study abbreviations clearer. We also edited Figure 3 and Table A1, A2, and A3 to ensure it has consistent formatting with the rest of the manuscript. Figure 3 is now as follows:



Sampling Platform	Single profiler, multiple profiles per day	Single profiler, multiple profiles per day	Single profiler, rapidly profiling,; multiple floats, profiling at ~5.2- or 10.2-d intervals
Variables used to date	O_2, b_{bp}-POC, c_p-POC	b_{bp}-POC, c_p-POC	O_2, b_{bp}-POC
Fit approach (Equation)	Difference between observed noontime O_2 or POC and linear regression extrapolation of nighttime data (Eq. 4)	Partial differential equation solved between SS_0 and SR_1 (CR), and between SR_0 and SR_1 (GPP + CR) (Eq. 5)	GPP vs light model (P-vs-E, sinusoidal or linear) fit to diurnal curve (Eq. 6)
Assumptions			GPP = CR[(1)]; $\frac{GOP}{GPP} = \frac{PQ}{(1\text{-}PER)}$ [(2)]
	All approaches: night $^{d\vert T(z)\vert}/_{dt}$ = CR; day $^{d\vert T(z)\vert}/_{dt}$ = GPP – CR; CR constant over 24-hr		
References	Briggs et al. (2018); Gordon et al. (2020)	Barbieux et al. (2022)	Nicholson et al. (2015); Barone et al. (2019); Henderikx Freitas et al. (2020); Johnson and Bif (2020); Stoer and Fennel, (2022)

Line 80: Provide information on the global range of GPP and NCP estimates, highlighting the large uncertainties in current estimates, which may exceed the magnitude of air-sea CO2 flux.

We have added details on the uncertainty of GPP and NCP to line 73: "*Ultimately, the challenges associated with quantifying PP from the various in situ and ex situ methods has resulted in large uncertainties in global estimates of GPP and NCP. Reported estimates of GPP, for example, range from 8 to 14 Pmol y^{-1} (Westberry and Behrenfeld, 2013; Huang et al., 2021), while estimates of NCP and carbon export range from 250 to 2650 Tmol y^{-1} (Boyd and Trull, 2007; Henson et al., 2011; Siegel et al., 2016; Westberry et al., 2012).*"

We have added these new citations:

Westberry, T. K., and Behrenfeld, M. J.: Oceanic Net Primary Production, in: Biophysical Applications of Satellite Remote Sensing, edited by: Hanes, J.M., Springer, Berlin, Heidelberg, Germany, 205–230, https://doi.org/10.1007/978-3-642-25047-7_8

Boyd, P.W., Trull, T.W., 2007. Understanding the export of biogenic particles in oceanic waters: is there consensus? Prog. Oceanogr. 72, 276–312. https://doi.org/10.1016/j. pocean.2006.10.007.

Henson, S.A., Sanders, R., Madsen, E., Morris, P.J., Moigne, F.L., Quartly, G.D., 2011. A reduced estimate of the strength of the ocean's biological carbon pump. Geophys. Res. Lett. 38. https://doi.org/10.1029/2011GL046735.

Siegel, D.A., Buesseler, K.O., Behrenfeld, M.J., Benitez-Nelson, C.R., Boss, E., Brzezinski, M.A.,Burd,A.,Carlson,C.A.,D'Asaro, E.A., Doney, S.C., Perry, M.J., Stanley, R.H.R., Steinberg, D.K., 2016. Prediction of the export and fate of global ocean net primary production: the EXPORTS science plan. Front. Mar. Sci. 3. https://doi.org/ 10.3389/fmars.2016.00022

Figure 2d: Clarify how the number of BGC-floats was determined. Do you include all floats equipped with at least one chemical or bio-optical sensor? Please clarify this point.

Thank you. We have clarified in the figure 2 caption that "Only floats equipped with at least one biogeochemical sensor and registered in the international BGC-Argo program were included in (d)". The new figure caption is as follows:

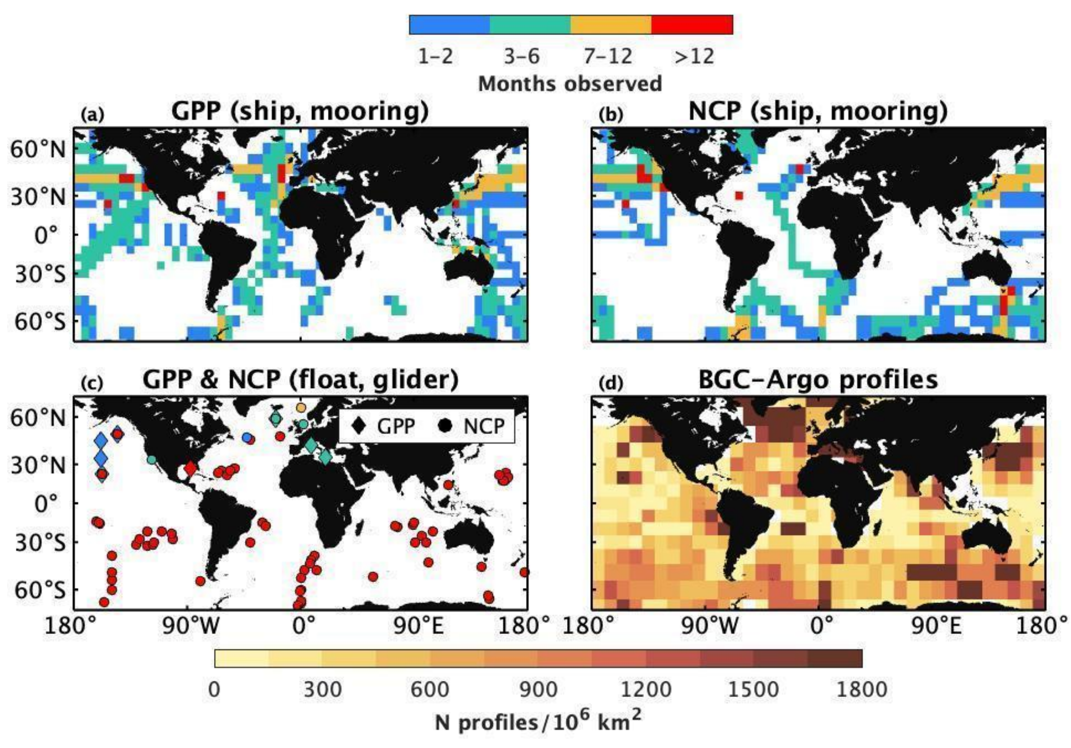


Figure 2. Coverage of gross primary productivity (GPP) and net community productivity (NCP) datasets, and biogeochemical-Argo (BGC-Argo) profiles. The upper row represents archived GPP and NCP data obtained from ships or moorings, while panel (c) shows the locations and durations of float- or glider-based GPP and NCP studies. Panel (d) shows a heatmap of the distribution of BGC-Argo profiles collected from 2010 through 2022. Data in panels (a) and (b) were binned to a five-by-five-degree grid. Data in panel (d) were binned to a ten-by-ten degree grid, and normalized by the surface area in each grid cell. Only floats equipped with at least one biogeochemical sensor and registered in the international BGC-Argo program were included in (d). A list of archived data sources is provided in the appendix.

Line 315: Note that DIC, TA, and POC are secondary-derived variables and not directly observed from floats. Describe how these variables are obtained from BGC-float observations to make the paper self-explanatory.

We changed the language on line 310 to remove the word "observations" in the sentence so DIC, TA, and POC are not directly referred to as being observed. We also edited the caption for Figure 4 so that "tracer observations" is now "tracer concentration"; we removed references to "observations" from lines 561, 636 and 643. We also removed the word 'observed' in front of "DIC:salinity ratio" from caption of Table A3.

We describe how DIC, TA, and POC are estimated in the last paragraph of Section 2 "Overview of approaches and application details" (lines 180 to 188). The description for POC reads:

"POC concentrations (typically mg m^{-3}*) for GCP and NCP calculations are derived from particle backscatter (*b_{bp}*) or beam attenuation (*c_p*, typically at 660 nm) measurements (both* m^{-1}*) using regional algorithms (e.g., Loisel et al., 2011; Cetinić et al., 2012) or those derived from latitudinally distributed datasets (e.g., Graff et al., 2015 based on data obtained from the Atlantic Meridional Transect and equatorial Pacific) (see Table A4 for a list of selected POC algorithms). Many algorithms estimate POC from* b_{bp} *at 700 nm (*$b_{bp,700}$*), the wavelength that is most commonly measured by BGC-Argo floats. For algorithms that rely on different* b_{bp} *wavelengths (e.g.,* b_{bp} *at 470 nm, as in the algorithm of Graff et al., 2015), a power-law equation is required to convert between* $b_{bp,700}$ *and* b_{bp} *at other wavelengths (Boss et al., 2013; Boss and Haëntjens, 2016). Only a subset of floats directly measures* $b_{bp,470}$ *or* $c_{p,660}$*."*

Furthermore, to make the explanation for TA and DIC clearer, we changed the final sentences of that section (L188-192) from:

"Lastly, NCP estimates derived from TA and DIC budgets rely on float pH measurements and an empirical TA function (Huang et al., 2022), where TA is estimated from float O_2 *and hydrographic observations using a neural network algorithm (e.g., Bittig et al., 2018; Carter et al., 2021). DIC is subsequently calculated from pH and TA based on known seawater carbonate system relationships (Gattuso et al., 2022)."*

to:

"Lastly, because TA and DIC are not directly measured by BGC-Argo floats, NCP estimates derived using those variables rely on calculations of their concentrations using float measurements and an empirical TA function (Huang et al., 2022). Total alkalinity is estimated from float pH, O_2 *and hydrographic observations using a neural network algorithm (e.g., Bittig et al., 2018; Carter et al., 2021), and DIC is subsequently calculated from float-pH and derived-TA based on known seawater carbonate system relationships (Gattuso et al., 2022)." – lines 186 to 190)*

Line 315: Mention that salinity normalization is another commonly used approach to account for the EP term.

Thank you for the suggestion. We modified the sentence beginning on line 342 from:

"*T:S is the ratio of tracer T to salinity,* $\frac{d[S(t,z)]}{dt}$ *is the observed change in salinity over time, and* $\frac{d[S(t,z)]}{dt}_{phys}$ *is the change due to physical processes*"

to:

"The evaporation/precipitation term (Eq. 7.5) is typically estimated by normalizing tracer concentrations to the observed salinity during each time step, and multiplying by the measured time-dependent change in salinity (Fassbender et al., 2016; Huang et al., 2022). In Eq. 7.5, T:S is the ratio of tracer T to salinity, $\frac{d[S(t,0)]}{dt}$ *is the observed change in salinity over time, and* $\frac{d[S(t,0)]}{dt}_{phys}$ *is the change due to physical processes"*

Figure 4: Spell out all abbreviations shown in the figures in the caption to enhance readability. This issue should be addressed for all figures throughout the manuscript.

We spelled out the abbreviations in the caption for Figure 4. We also corrected Figures 1-3, Figures 5-10, Table 1, and Tables A1 to A4.

Line 410: Consider adding a short sentence to introduce the background of OSP.

Two sentences were added at the beginning of Section 3.1.1 to add this detail (starting on L448). We changed some sentence structure in the original sentences so that it reads better with these new details.

Figure 5: Add a legend to panel a to make the figure easy to interpret. Denote the geographic location of OSP in the caption. Also, consider using the carbon unit in all figures.

Thank you for your suggestions. However, because the figure is already quite busy, we have elected to not include a legend in panel (a). As described in the figure caption, the colours in (a) correspond with those in panels (b)-(d). Our intention in the figure was to demonstrate the discrepancies between approaches, rather than highlight the magnitude or seasonality of any one study – for this reason, we feel it is unnecessary to add additional details to identify the different NCP time series in (a). Moreover, we have elected to maintain O_2-based units for consistency with the rest of the paper, which primarily describes NCP and GOP in O_2 equivalents.

We added the geographic location OSP to the caption.

Line 585: Subscript "2" alongside the O2.

We corrected this typographical error with O_2 as well as with bbp.

Figure 7: There appears to be no clear response of the GPP_O2:GPP_bbp ratio to depth. To explore potential geographic patterns. Based on the current knowledge, fractional contribution of DOC to the total carbon production is highly correlated with the NO3 concentration. I would suggest replacing the dot color with the latitude band or background NO3 concentration (i.e., derived from WOA2018) to see if we can derive some geographic pattern.

Thank you for this suggestion. We agree that it would be interesting to explore geographic patterns in the GOP:GPP relationship. However, our analysis only includes regions (provinces and latitude bands) where the number of floats exceeds the bootstrap threshold for both O2 and b_{bp}-based calculations – after we filter out calculations where the bootstrap threshold is not met, only three geographic regions remain. As a result, we are not able to perform an analysis involving latitude or NO_3^- concentration. We have thus elected to keep the figure as-is, but added the following text to line 629:

"We note that our analysis presented in Fig. 7 is, unfortunately, unable to discern geographic patterns in or predictors of the GOP:GCP relationship due to an insufficient number of floats available for calculations in most geographic regions (see next section). However, future work should use float data to explore potential relationships between the GOP:GCP ratio and NO_3^- concentrations (a predictor of the fractional contribution of DOC-to-total carbon production) or latitude."

Line 720: Point out that the tracer budget approach typically assumes the float follows the same water mass, which is not always the case in reality.

Thank you for this note – we agree that this is an important distinction. We added the following text as a new paragraph after line 817 (section 4.2):

"*Similarly, it is important to note that budget-based NCP calculations assume that the float follows the same water mass over the duration of the calculation period. However, floats may often transition into adjacent water masses, making the interpretation of observed tracer changes somewhat challenging. The resulting uncertainty in NCP calculations may be important, but is difficult to constrain. In some cases, if floats are judged to transition between different water masses (e.g., by assessing water mass temperature and salinity properties), NCP calculations may be precluded altogether.*"

We also added the following text to line 350 to identify this assumption in the description of the NCP method (section 2.2):

"Importantly, when evaluating NCP following Eq. 7, it is assumed that the float remains in a single water mass, such that tracer changes strictly represent temporal variations due to NCP

and the processes described in Eqs. 7.3-7.9. In reality, however, this may not always be the case, and the resulting effect on NCP calculations remains a source of uncertainty that is difficult to constrain."

Line 735: Change to something like "reflect the fraction of suspended particle organic carbon."

We have changed "reflect the particulate organic fraction" to "reflect the fraction of suspended POC" on line 768.

Line 735: I don't quite understand why the relative importance of new production (based on NO3-) versus recycled production can affect the coupling between O2 and NO3-based NCP estimates. The biological term solved from the NO3 budget reflects net production fueled by NO3, aligning with the original definition of NCP

In contrast, the GPP_O2:GPP_DIC ratio (GPP_O2:GPP_N ratio) may be impacted by the relative importance of new production versus recycled production, as GPP is supported by the bulk inorganic nitrogen (=NO3+NH4), and the C:O ratio (or O:N) differs depending on the nitrogen sources (i.e., C:O=1.1 when the substrate is NH4 and C:O=1.4 when the substrate is NO3; for more details, see Laws et al., 1991, and Huang et al., 2021, GBC).

The extent of denitrification and N2 fixation indeed affects the consistency between O2 and NO3-based NCP estimates. On one hand, denitrification can lead to some degree of decoupling between O2 and NO3-based NCP because it generates NO3 without consuming O2. Regarding the influence of N2 fixation, it depends on whether we account for the external NO3 source inherited from N2 fixation in the NO3 tracer budget. If not, the NO3-based biological term solved from the tracer budget will be biased toward low values. This bias is particularly pronounced in the oligotrophic ocean (see Huang et al., 2023, PNAS). Additionally, it is worth pointing out that budgeting nitrate may be subject to considerable uncertainty in the oligotrophic ocean, as the magnitude of surface NO3 and associated seasonal evolution in this area is typically close to the instrument-to-noise ratio.

It would be also helpful to mention that the reliance on empirical estimate in TA will introduce error in TA-and DIC NCP.

Thanks for the feedback. Regarding the impact of new versus recycled production, O_2- and NO_3^--based estimates would be decoupled because O_2-based estimates would reflect O_2production during photosynthesis, while NO_3^- would be un-impacted under photosynthesis based entirely on NH_4^+. For photosynthesis based on NO_3^-, O_2- and NO_3^--based estimates should be consistent, within the uncertainty of the C:O:NO_3^- stoichiometry. Similarly, as you have noted, the extent of denitrification and N_2-fixation would affect the decoupling between NO_3^--based estimates and estimates based on other tracers due to the consumption/production of NO_3^- during those processes.

We have modified the text, starting on line 769 to explain this line of reasoning:

"Differences between O_2 and NO_3^--based estimates, moreover, are sensitive to the relative importance of new production (based on NO_3^-) versus recycled production (based on NH_4^+), and, to a lesser degree, denitrification or N_2-fixation. For example, under fully recycled production, O_2-based NCP estimates would reflect O_2 production during photosynthesis, while NO_3^- concentrations would be unchanged. As a result, O_2-based estimates would exceed NO_3^--based values. Similarly, denitrification and N_2-fixation would affect the decoupling between NO_3^--based estimates and estimates derived using other tracers if the consumption/production of NO_3^- during those processes is unaccounted for in the NCP budget calculations. Indeed, if the NO_3^- source of N_2-fixation is unaccounted for, the resulting NCP estimated will be biased low. This bias is particularly problematic oligotrophic waters (e.g., Huang et al., 2023)."

We agree that it is worth noting the uncertainty in NO_3^- in oligotrophic regions due to measurement noise. We have added the following text on line 804 (new text underlined):

"…particularly during the transition seasons. Moreover, NO_3^- budget calculations may be subject to considerable uncertainty in oligotrophic regions when the NO_3^- concentration is close to the sensor's signal-to-noise ratio. In some cases, erroneous float data should preclude NCP calculations altogether (Plant et al., 2016), and, in general, NCP calculations cannot be performed reliably on unadjusted BGC-Argo data."

Line 750: I noticed that many prior studies don't account for the effect of in situ sea-level pressure on oxygen solubility, leading to biases, particularly in high-latitude regions where the sea-level pressure is lower than the standard pressure. Therefore, it is crucial to emphasize this point in the manuscript and call for attention to it in future work.

Thank you for pointing this out. We added the following text on line 807:

"*Another potential source of NCP uncertainty resulting from the air-sea flux parameterization is the impact of sea-level pressure on gas solubility. In the diffusive air-sea flux equation described by Eq. 7.3, the term $[T(t,0)]_{eq}$ refers to the gas saturation concentration at ambient sea level pressure (P_{SLP}), which can be calculated from empirical solubility algorithms (e.g., Garcia & Gordon, 1992). These algorithms describe the saturation concertation at one atmosphere, yet, the saturation concentration in situ is impacted by P_{SLP}, such that $T_{eq}(P_{SLP}) = T_{eq}(1\ atm.)\frac{P_{SLP}-P_{H2O}}{1\ atm - P_{H2O}}$, where P is pressure and P_{H2O} is the pressure due to water vapour. In temperate and high-latitude regions where P_{SLP} is typically lower than one atmosphere, neglecting to account for this effect may lead to an overestimate in the importance of the diffusive air-sea flux term, and a corresponding underestimate in NCP. Such impacts will only be relevant to gas-based budget calculations, and will be most important for those based on O_2. Future work should thus endeavour to address this important detail.*"

Line 825: NCP results from Johnson et al., (2017) represent the seasonal maximum of NO3 drawdown during the austral productive period, rather than true ANCP. I wonder if the authors applied any corrections to convert it to a NCP.

Thanks for pointing this out. We did not make a correction and have identified this in the Figure 10 caption. In addition, we included results from Huang et al. (2023) in the analyses presented in Fig. 10 and updated the caption accordingly. Figure 10 is now as follows:

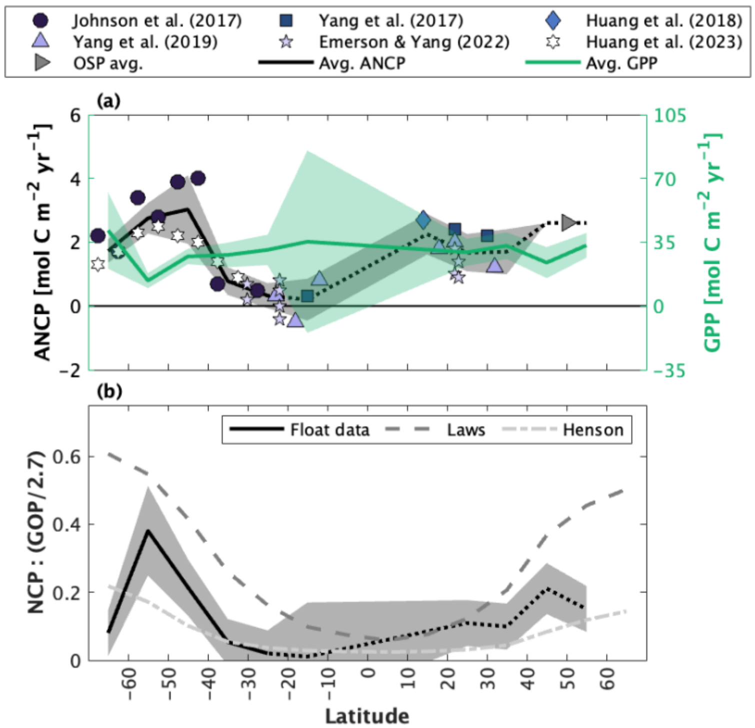


Figure 10. The latitudinal distribution of float-derived annual-average gross primary production (GPP), annually-integrated net primary production (ANCP), and the export ratio (equal to GPP divided by ANCP). GPP estimates in (A) are gross oxygen productivity estimates from oxygen measurements (ΔO_2-GOP) integrated within the euphotic zone and converted to carbon equivalents using a photosynthetic quotient value of 1.4. ANCP values are from various data sources, as indicated in the figure legend or from the compilation of Ocean Station Papa data in section 3.1 (Fig. 5). <u>Note that values from Johnson et al. (2017) represent NCP calculated from NO_3^- drawdown over the austral productive period; we did not perform any corrections to adjust those values to represent annually-integrated NCP</u>. <u>The data from Huang et al. (2023) represent the average of NO_3^- and DIC-based ANCP estimates</u>. The black line and shading represent average ± one standard deviation values in 10º latitude bands. In (B), a float-based estimate of the export ratio was derived by dividing average float-based ANCP by float-based net primary productivity (NPP), using a GOP-to-NPP ratio of 2.7, as in Johnson and Bif (2021) and Stoer and Fennel (2022). Independent estimates of the export ratio from Laws et al. (2011) and Henson et al. (2012) are also shown. The dotted black lines north of 30ºS indicate poorer latitudinal representation of float-based ANCP, and therefore lower confidence in the derived export ratio.

Huang et al. 2023 citation has been added:

Huang, Y., Fassbender, A. J., and Bushinsky, S. M.: Biogenic carbon pool production maintains the Southern Ocean carbon sink, PNAS, 120, 18, https://doi.org/10.1073/pnas.2217909120, 2023.

Line 835: "We present NCP and ANCP values integrated to the annual maximum mixed layer depth (MLD), scaling values from Huang et al. assuming constant NCP between 56 m and the maximum MLD." and "Accordingly, we scaled all independent NCP estimates to the annual average maximum MLD at OSP". Based on this statement, I still have difficulty understanding how you performed the depth conversion throughout the manuscript.

We have clarified what we mean by this by modifying the following text on line 901:

"*We present NCP and ANCP values integrated to the annual maximum mixed layer depth (MLD), scaling values from Huang et al. to maximum MLD (i.e., NCP estimates from Huang et al. were scaled by dividing values from that publication by 56 m, and then multiplying by an annual maximum MLD of 120 m for OSP). We appreciate that this approach may result in an over-estimate in maximum MLD-integrated NCP values from Huang et al. (2022) as it assumes constant NCP between 56 m and the maximum MLD, which is likely not the case.*"

We also modified the text on line 911 as:

"*Accordingly, we scaled all independent NCP estimates to the annual average maximum MLD at OSP, as described above, using MLD estimates obtained from the Argo Mixed Layers climatology (Holte et al., 2017).*"

In addition to your comments above, we made additional corrections or clarifications to the text as follows.

We have modified the text starting on line 521:

"*Two Southern Ocean studies (Johnson et al., 2017; Huang et al. 2023) and two subtropical ocean studies (Yang et al. 2019; Emerson and Yang, 2022) have, however, provided extensive assessments of (A)NCP from a compilation of multiple floats. Johnson et al. (2017) used BGC-Argo data to characterize ANCP in the Southern Ocean by compiling* NO_3^- *data from 24 floats deployed between 2009 and 2016. Similarly, Huang et al. (2023) provided basin-scale estimates of NCP in different biogenic carbon pools in the Southern Ocean, derived using a compilation of floats and multiple tracers (DIC, TA,* NO_3^-*, POC).*"

We have also used consistent terms for b_{bp}-GCP (rather than POC-GCP on line 615 and 618) in Section 4.1.

We added more to the foot note in Table 1 to explain what 'surface' and profile' means.

We changed O_2/GOP and b_{bp}/GPP in the legend of Fig. 6d to ΔO_2-GOP and b_{bp}-GCP, respectively.

The x-axis label in Figure 7 was changed from "particulate b_{bp}-GCP" to "b_{bp}-GCP".

In the caption of Figure 10, "NPP-to-GOP ratio" was corrected to "GOP-to-NPP ratio".

We have also updated Stoer and Fennel (2022) to Stoer and Fennel (2023) (in accordance with the publication date)

We have also corrected the Data Availability Statement:

1) To give the appropriate links to the raw float data starting on line 970:

"BGC-Argo data were collected and made freely available by the International Argo Program and the national programs that contribute to it Argo (2023). The Argo Program is part of the Global Ocean Observing System. Float data are available from the Argo Global Data Assembly Centers in Brest, France (ftp://ftp.ifremer.fr/ifremer/argo) and Monterey, USA (ftp://usgodae.org/pub/outgoing/argo)."

2) To reference the Zenodo data repositories of Stoer and Fennel (2022) and Izett et al. (2023), which have also been added to the citation list.

Stoer, A. C. and Fennel, K.: Processing and Data for "Estimating ocean net primary productivity from daily cycles of carbon biomass measured by profiling floats", Zenodo [dataset], https://doi.org/10.5281/zenodo.6977161, 2022.

Izett, R. W., Haskell, W., Huang, Y., Pelland, N., Plant, J., and Yang, B.: An archive of net community production estimates derived from autonomous profiler observations at Ocean Station Papa [Dataset], Zenodo, https://doi.org/10.5281/zenodo.7667521, 2023.