

Interactive comment on “Isotopic fractionation of carbon during uptake by phytoplankton across the South Atlantic subtropical convergence” by Robyn E. Tuerena et al.

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Here we include responses to all of the comments: (1) Reviewer’s comment (2) Author’s comment

(1) 1/ A further comment concerning the following reply of the authors (page C7): "Although an increase in temperature in the ĩn ĘŽAgure shows an increase in ĘĞ $\delta^{13}\text{C}_{\text{POC}}$ and a decrease in ep, this will have very little effect compared to the predicted changes in carbon availability and cell size. "

I suggest authors make this future change (decrease) in $d^{13}\text{C}_{\text{POC}}$ more visible to the

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reader by marking it in Figure 9b. For example they could mark the jump from the 400 ppm to the 500ppm level with increasing temperature by an arrow.

(2) Agreed, we will amend Figure 9b accordingly.

(1) 2/ In their reply on the question about the latitudinal distribution of $\delta^{13}\text{C}$ -DIC, the authors don't really clarify the issue, I believe. Of course Southern Ocean $\delta^{13}\text{C}$ -DIC is very low because of upwelling of deep ocean waters depleted in ^{13}C -DIC there, a phenomenon not present in the North Atlantic. So I feel the question about which process really imposes lower $\delta^{13}\text{C}$ -DIC in the North Atlantic is not satisfactorily resolved by their reply. Admittedly this is not the subject of their paper.

(2) We include a Figure to show the relationship between $\delta^{13}\text{C}$ - CO_2 and CO_2aq globally, using the data from Figure 8. The $\delta^{13}\text{C}$ falls in line with expected values for the given CO_2aq of the North Atlantic (-9‰ red points in Figure1c). The Southern Ocean values are lower than the North Atlantic due to upwelling (-10-11‰, we will expand the axes in Figure 8b to make it more apparent (North Atlantic not as low as Southern Ocean).

Figure 1, relationship between $\delta^{13}\text{C}$ - CO_2 and CO_2aq . (a) map of data points, (b) $\delta^{13}\text{C}$ - CO_2 and CO_2aq with longitude as a z variable, (c) $\delta^{13}\text{C}$ - CO_2 and CO_2aq with latitude as a z variable.

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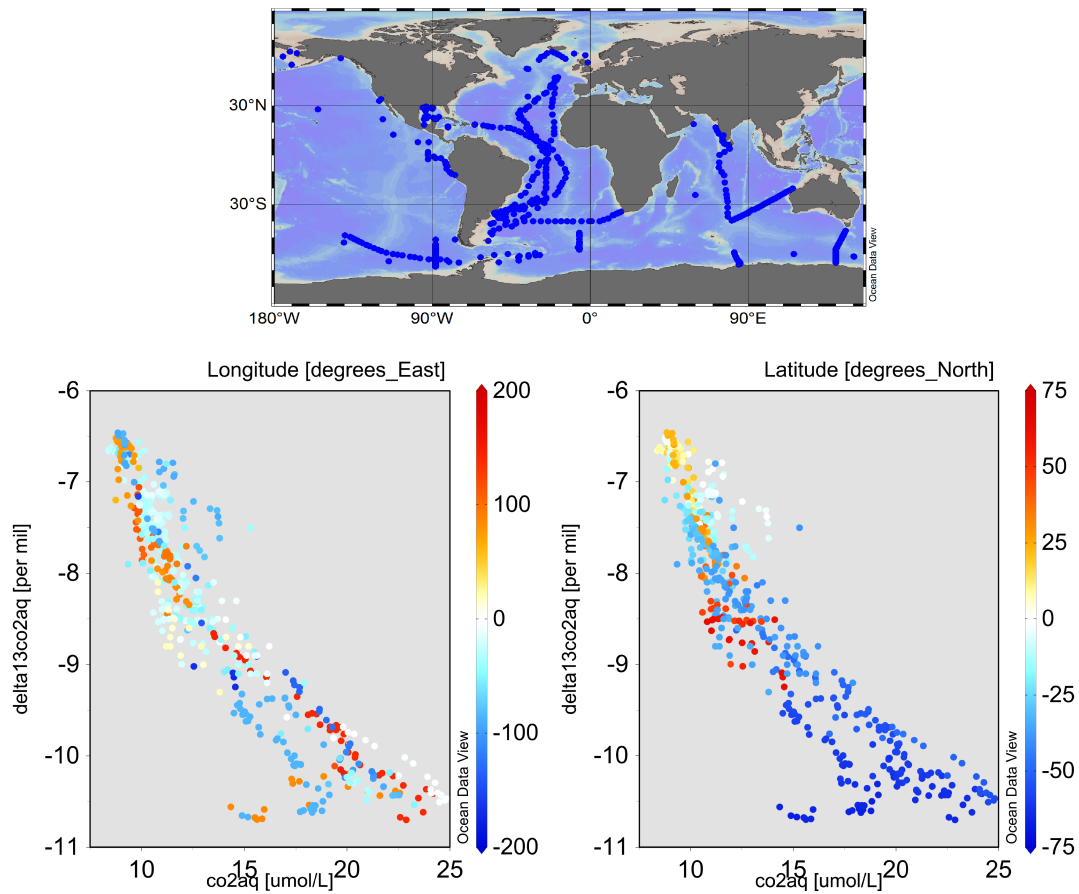


Fig. 1.