

Revised MS has been improved to describe the Author's logic more clearly along the line of (1) nutrient depletion leads unhealthy status of diatom --> (2) unhealthy/senescent diatom sinks down faster than healthy diatom --> (3) diatoms reaching the aphotic zone die and lyse soon --> (4) downward export of unhealthy/senescent diatom increase the progression of the surface pCO₂ unsaturation. Results from the experiments fully support (2) and (3), but not (1), even though many previous studies suggest it. I would like to request Authors (i) to state insignificant correlation between nutrient concentrations and %living biomass in the photic zone, and, (ii) if possible, to cite the previous studies on the mechanisms driving diatom senescence other than nutrient depletion. My other concern is about (4), as rapid lysis of senescent diatoms (3) might result in supply of suspended/dissolved organic carbon and their remineralization within the subsurface waters which reduces air sea disequilibrium in the surface through processes such as upwelling, mixing and vertical diffusion (Bates and Mathis, 2009). I suggest Authors (iii) to explain the contradicting effects of (2) and (3) for the surface pCO₂. There are many errors in writing. I recommend (iv) to ask an English proofreading service before re-submission. I hope my comments would help Authors to enhance the value of their findings.

Specific comments

- p. 4, l. 26: Write the station ID (#3?) whose sample was used in the sinking experiment.
- p. 5, l. 7: NO₃ should be NO₃ + NO₂.
- p. 6, l. 2 – 4: “At station #4, the community sampled was more diverse at the aphotic than at the photic layer (Fig. 4) indicating high sinking despite the low biomass.” Why does high sinking rate contribute to higher diversity in the aphotic zone than that in the photic zone?
- p. 6, l. 17 – 16: “Initially, only 6.7 % of the cells of the *Flagilariosis* sp. and *Thalassosira* sp. colonies dominating the community tested were dead.” There seems no stations where these two species were dominant in Fig. 4. Again, at which station was the sinking experiment conducted?
- p. 6, l. 29 – 30: “6.3 days for the largest *Thalassiosira* sp. cells” “6.3 days” would be “5.3 days”.
- p. 7, l. 18: “..., although diatom sinking was still low. “ Was it confirmed at this station?