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7, C2387–C2390, 2010

Interactive Comment

Interactive comment on "Influence of seasonal monsoons on net primary production and CO₂ in subtropical Hong Kong coastal waters" by X. C. Yuan et al.

Anonymous Referee #3

Received and published: 19 August 2010

I. General Comments:

This manuscript was generally well organized and written, and the figures were of high quality. However, the methods in terms of calculations were not presented in a detailed and precise fashion in this study (See my specific comments), so that the calculated results seem to be not very convincible. I suggest that the authors should carefully deal with the calculations and thoroughly justify the uncertainties in these calculations before this manuscript can be considered for publication at Biogeosciences.

II. Specific comments:





P5625 L1-3: "Monthly data on salinity, temperature, primary production, dark community respiration, DO, DIC and pCO2 are found in Ho (2007) and Yuan et al. (2010)". Does this sentence mean that all the data used in this study have been published elsewhere?

2.3

P5626 L18-19: The method in pCO2 calculation should be given in a more detailed fashion. For instance, the pH scale and the dissociation constants of carbonic acid used in the computation should be specified. Furthermore, a careful error estimate on the calculated pCO2 is definitely needed, since the error could be quite large based on the reported precisions in DIC and pH measurements.

P5626 L19-24: Delete these sentences, since I did not find any pCO2 mean SST being used throughout the manuscript.

P5627 L6-12: The flux calculations of CO2 and O2 also need to be presented in a more detailed fashion. For instance, the formulae used in calculating the solubility of CO2 and saturated O2, and the wind speed data used (daily or monthly?) in parameterizing gas transfer velocity should be specified.

2.4

P5627 L12-13: The adoption of atmospheric pCO2 of 370 ïAmatm may be inadequate. Considering the sampling site is very close to a mega city, it is very likely subject to land mass influence as reported in many other near-shore environments (e.g. Borges and Frankignoulle 2001 and references therein). Therefore, I suggest the authors should try to find other more representative atmospheric pCO2 data.

4.2

P5631 L15 – P5632 L14: The plots of DO saturation level vs. IPP and $\ddot{A}DpCO2$ (the difference between surface water and air pCO2) vs. IPP would be helpful to clearly demonstrate the relationship between O2/CO2 and the trophic state (net biologically

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metabolic balance). Additionally, two recent publications (Chen and Borges, 2009; Chou et al., 2009) regarding to this issue should be mentioned.

4.3

P5632 L24: Coriolis effect \rightarrow Ekman transport would be a better term.

P5634 L3: The term of Rbenthic (benthic respiration) should appear in Eq. (4).

P5634 L4: oxygen input \rightarrow DIC input

P5634 L5-6: Are "total ecosystem respiration" and "gross primary production" equal to "DCR" and "IPP", respectively? If yes, please use the same terminology; if no, it should note the difference between these definitions, and explain how you got the values of "total ecosystem respiration" and "gross primary production" in your calculation.

P5634 L7: This equation is mathematically incorrect. It should be something like "DIC(mixing)= dDIC/dt + DIC(air-sea fluxes)-DIC(pelagic NPP)-DIC(benthic respiration)"

Figures

P5643 Fig. 3 should be enlarged.

P5644 Indicating saturated DO concentrations on Fig. 4(A) and atmospheric pCO2 levels on Fig. 4(B) would be helpful.

P5645 Please explain why there are 260 data points on Fig. 5. (8 (stations) x 7 (cruises) = 56?)

P5647 Please explain how to obtain all the numbers for dry and wet seasons (take average of summer and fall for wet season, and average of spring and summer for dry seaon? Or ...).

References

Borges, A.V., Frankignoulle, M., 2001. Short-term variations of the partial pressure of C2389

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Chen, C.T.A., Borges, A.V., 2009. Reconciling opposing views on carbon cycling in the coastal ocean: Continental shelves as sinks and near-shore ecosystems as sources of atmospheric CO2. Deep-Sea Res. II 56, 578–590.

Chou, W.C., Gong, G.C., Sheu, D.D., Jen, S., Hung, C.C., Chen, C.C., 2009. Reconciling the paradox that the heterotrophic waters of the East China Sea shelf act as a significant CO2 sink during the summertime: Evidence and implications. Geophys. Res. Lett. 36, L15607, doi:10.1029/2009GL038475.

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