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Comment

# ***Interactive comment on “Coupling the chemical dynamics of carbonate and dissolved inorganic nitrogen systems in the eutrophic and turbid inner Changjiang (Yangtze River) Estuary” by W.-D. Zhai and X.-L. Yan***

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We thank the three anonymous reviewers for their comments and constructive suggestion. All of them have been seriously considered in the modified MS.

[1] We have added five similar surveys conducted from January 2011 to February 2012, covering the four seasons. During these added cruises, water depth samples together with surface water samples were collected. Although spillover waters from the North Branch into the South Branch were sometimes absent due to different tidal status,

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coupled additions of nutrients and carbonate system parameters were always observed in the salty North Branch, suggesting that the coupled dynamics of carbonate and dissolved inorganic nitrogen systems indeed occurred over there. We also determined dissolved calcium in a dry season (April 2011) and in a wet season (July 2011). The signals of Ca additions were revealed along with the above-mentioned biogeochemical additions of nutrients and carbonate system parameters, suggesting that the  $\text{CaCO}_3$  dissolution also occurred in the North Branch. Therefore, the crucial ideas of this study are confirmed.

[2] In the revised manuscript, we focus on explaining controls of estuarine  $\text{CO}_2$  by coupling the nitrogen and carbonate dynamics. The discussion on the residence time of the North Branch waters has been strengthened. The detailed area maps have been added. Also we have updated the estimation of  $\text{CO}_2$  degassing flux from the inner Changjiang Estuary (covering both of the North and South Branches), based on new data.

[3] Point-by-point responses have been made in the supplement.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/12/C4121/2015/bgd-12-C4121-2015-supplement.pdf>

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