

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

Anonymous Referee #2

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In this study, based on the in-situ data (T/S, nutrient, carbonate, etc.) the author present the surface water condition in two branches of the Yangtze River estuary during one cruise shortly after a spring tide. The author made a estimation of the residency time in the two branches, concluded the influence from the North Branch to the South Branch is minor, and proposed several key chemical processes in the North Branch (decomposition, nitrification. . .). While the importance of understanding a eutrophic, human-impacted estuary is beyond question, surface condition, with very limited temporal and spatial coverage, is hard to support the speculated mechanism of the key chemical

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processes in the estuary.

The author tried to conclude the influence from North Branch water spillover on the South Branch, yet it will be hard to prove this based on data from one cruise with very limited spatial and temporal coverage.

The paper lacks a detailed background of the dynamics of the Yangtze estuary. I agree with reviewer #1 that a lack of the analysis of tidal components together with other physical conditions makes the residence time calculation ungrounded.

In the abstract, the author stated that there are high salinity and residency time in the north branch, but what is the “unusual condition” (low salinity?) for the south branch and while this low salinity, if so, should be introduced by high salinity north branch water?

A lack of a detailed map hurts this manuscripts a lot during my reading. I did not see a detailed mapping of the estuary system throughout the manuscript, which is very hard for readers that are not familiar with local conditions.

The authors imply that they want to provide a method/procedure for quantify such estuary water exchange process, which is good, but how will their method be applicable to other large river estuary systems? Is this spillover water problem also common in other systems? In the conclusion the author mentioned briefly that “this study demonstrated a procedure to . . .”, but I could not see how their method could be applied to other system so far.

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