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Interactive comment on "Quantifying the contributions of riverine vs. oceanic nitrogen to hypoxia in the East China Sea" *by* Fabian Große et al.

Anonymous Referee #2

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This manuscript quantified the contribution of nitrogen from Changjiang and open ocean (Taiwan Strait and Kuroshio) to the hypoxia formation in the East China Sea and proposed the reduction of nitrogen from river as an efficient way to avoid hypoxia. In general, I can follow this manuscript. However, I also found many points needed to clarify before I can recommend its publication.

General comments

1. Do you include the particle organic nitrogen from rivers? On line 61, you mention only dissolved organic matter (DON) but show TN in Fig. 2. If your TN includes particle organic nitrogen, how did you determine the proportion of PON, DON and DIN (NO3

and NH4) in your input data of TN?

2. Consumption of oxygen by sediment is an important factor affects formation of hypoxia. What is your sediment condition? There is only one sentence (line 62) saying it but it is not enough.

3. You mention the importance of winds in the interannual variations. However, the change of wind speed in Fig. 5 is very small (<2 m/s?). Would you like to present more evidences for the processes related to winds? For example, you mentioned changes in flow field and turbulence but did not show any figures for these changes.

4. You emphasized the importance of Changjiang in this study. However, you actually did not consider the interannual variations in the Taiwan Strait and Kuroshio region because you used a nudging to climatology there. The same thing also occurs for the nitrogen from Yellow Sea. Therefore, your conclusion is not fair.

5. What is background for reduction of O2 in the open ocean by 20%? It is better for you to check the papers for DO change at 137E line for some evidences.

6. I did not find figures showing interannual and seasonal variations in spatial variations of bottom DO concentration from your model. Apparently, they are important to your model validation because you can find some observations showing such figures. Without a serious validation of model results, no people in China can follow your suggestion on reduction of nitrogen input by 50%.

Specific comments

Line 29-31: This statement is not correct.

Line 74: please use full spell for 'FW'.

Line 84-86: ". . .the initial and open-boundary O2 concentrations were reduced by 20% throughout the water column in regions deeper than 200 m. . ." How much O2 reduction from the Kuroshio boundary or Taiwan Strait boundary?

Line 110: "...Minjiang, Hanjiang and Oujiang Rivers; grouped into one source..." You mean Hanjiang River or Qiantangjiang River? In Figure 1, Hanjiang River is not inside the tracing region. How did you trace the N of it?

Line 112: What is your evidence for that the tracer cannot reenter the tracing region?

Line115: "...To spin up the tracing, we first re-ran year 2006 three times. For the first iteration, all N mass already in the system was attributed to the small rivers...." What's the purpose of doing this?

Line125: Figure2. In 2009, 2011, 2013, the Changjiang discharge and TN concentration seem to have the similar trend, but 2010 and 2012 the opposite. Why does this happen?

Line 135: do you have any data to verify the GOC given here?

Supplement: what is your purpose to show PEA/D not PEA itself?