
Author's Response to Journal: BG

Title: Nutrient dynamics in tropical rivers, estuarine-lagoons, and coastal ecosystems along the eastern Hainan Island

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MS No.: bg-2013-173

MS Type: Research Article

Special Issue: Biogeochemistry and ecosystems in the western north Pacific continental margins under climate change and anthropogenic forcing

Dear Editor,

We sincerely thank the reviewers for their insightful comments which have substantially improved the paper. After carefully studying the Referees' comments, we have checked the manuscript and revised it according to the comments. Please find the point-to-point responses below.

Hope these will make it more acceptable for publication.

Yours sincerely,

Ruihuan Li

**Response to Anonymous comments on Biogeosciences Discuss., 10, 9091-9147,
2013 “Nutrient dynamics in tropical rivers, estuarine-lagoons, and coastal
ecosystems along the eastern Hainan Island”**

We use different font to show distinction: reviewer's comments with Times New Roman and Italic and modified comments with Arial.

Response to comments from Anonymous Referee #1 (RC C2632)

Comment 1. This revised manuscript is a nice piece of work which should be published as it is.

Response: We thank referee #1 for the comments.

Response to comments from Anonymous Referee #2 (RC C3610)

We want to thank anonymous reviewer #2 for his or her comments and suggestions. According to the referee's comments, our manuscript was revised. We addressed all the points raised by the reviewer as summarized below.

Comment 1. *The manuscript reports nutrient concentration and distributions in rivers and coastal systems on and off Hainan Island. Without going into detail this manuscript still needs much work to be suitable for publication in "Biogeosciences". In addition to the abundant spelling and grammatical issues the manuscript in its current form needs to be restructured and condensed significantly, which is beyond the role of a reviewer.*

Response: First of all, we appreciate valuable and constructive comments from the referee #2. We have taken your comments very seriously in preparing this revision. Please refer to our detailed responses to your comments.

As you suggest, this revised manuscript would be asked a native English speaker to do a thorough editing to improve our manuscript.

We deeply dig into our data set again and re-think through our way of presentation. The referee #2's comments were also very helpful for us to revise our ms and had significantly improved the quality of this ms. In this revision, we have significantly restructured and condensed our results and discussion, and limited tables and figures as suggested. Please also refer to our reply to your comment 3, 4, and 5.

General comments:

Comment 2. *Have a map that clearly (and large enough) shows the rivers and lagoons that have been studied (may be focus on big river systems), write out river names and do not use abbreviations in this figure.*

Response: According to the reviewer's suggestion, we have revised the map (Fig. 1) and written out river names in the figure, and make the map big enough to clearly show investigation fields. All the full names of the studied rivers and lagoons had been labeled in the revised map, see Fig. 1 as follows.

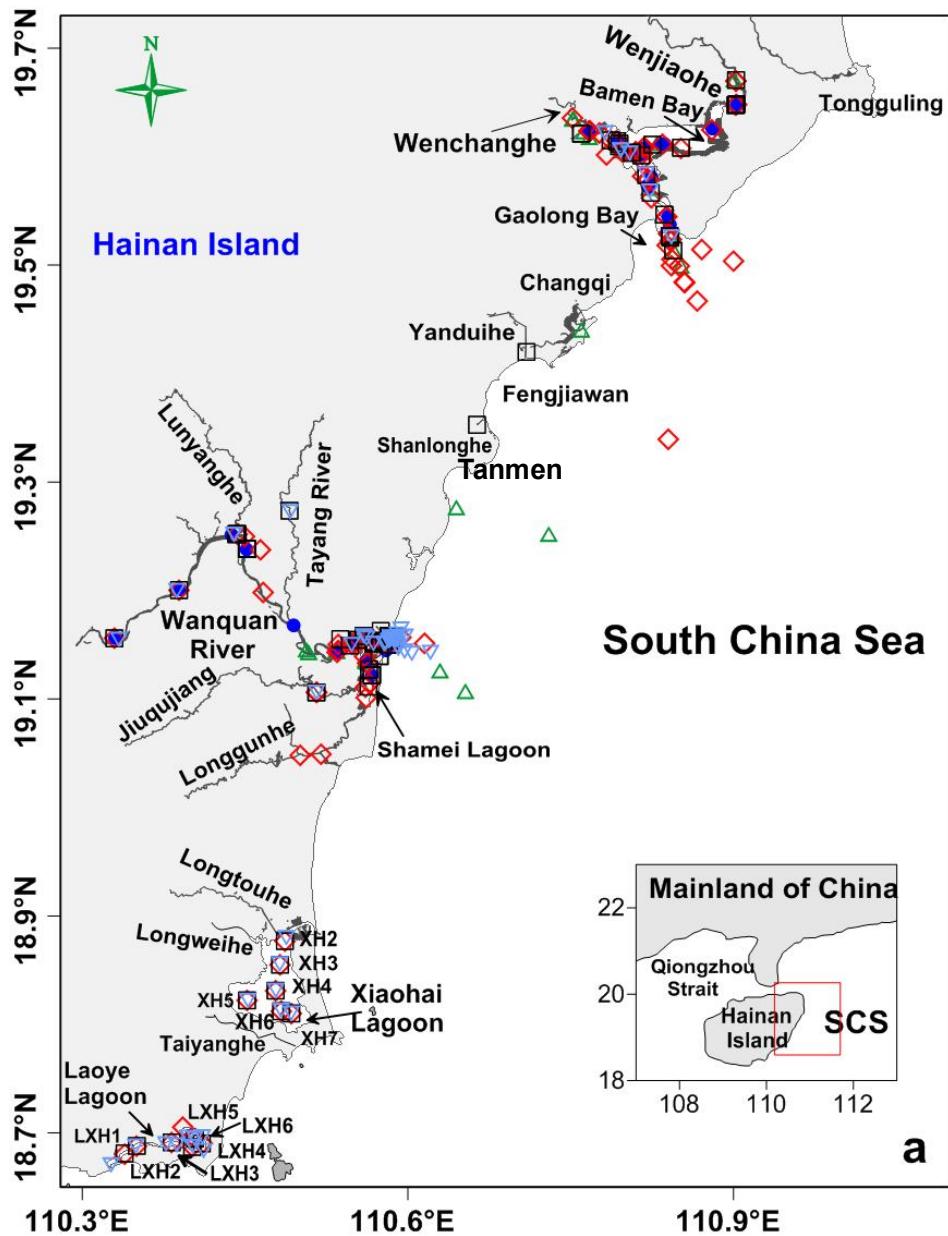


Fig. 1 Locations map of the study area and sampling stations for the cruises along the eastern Hainan Island during 2006–2009. (a): Sampling stations for the cruises in rivers, estuaries, shrimp ponds, groundwater, and lagoons of the South China Sea in December 2006 (\triangle), August 2007 (\bullet), June–August 2008 (\diamond), March–April 2009 (\square), and June–August 2009 (\triangledown). (b): The sampling stations in the coastal region in August 2007 (\bullet), June–August 2008 (\diamond), in August 2008 (\blacktriangleleft); March–April 2009 (\square), and June–August 2009 (\triangledown) (16#: anchor station). Anchor stations carried out in August 2007 (\star), June 2008 (\star). The red square in the map (a) shows the location of eastern Hainan Island in the South China Sea.

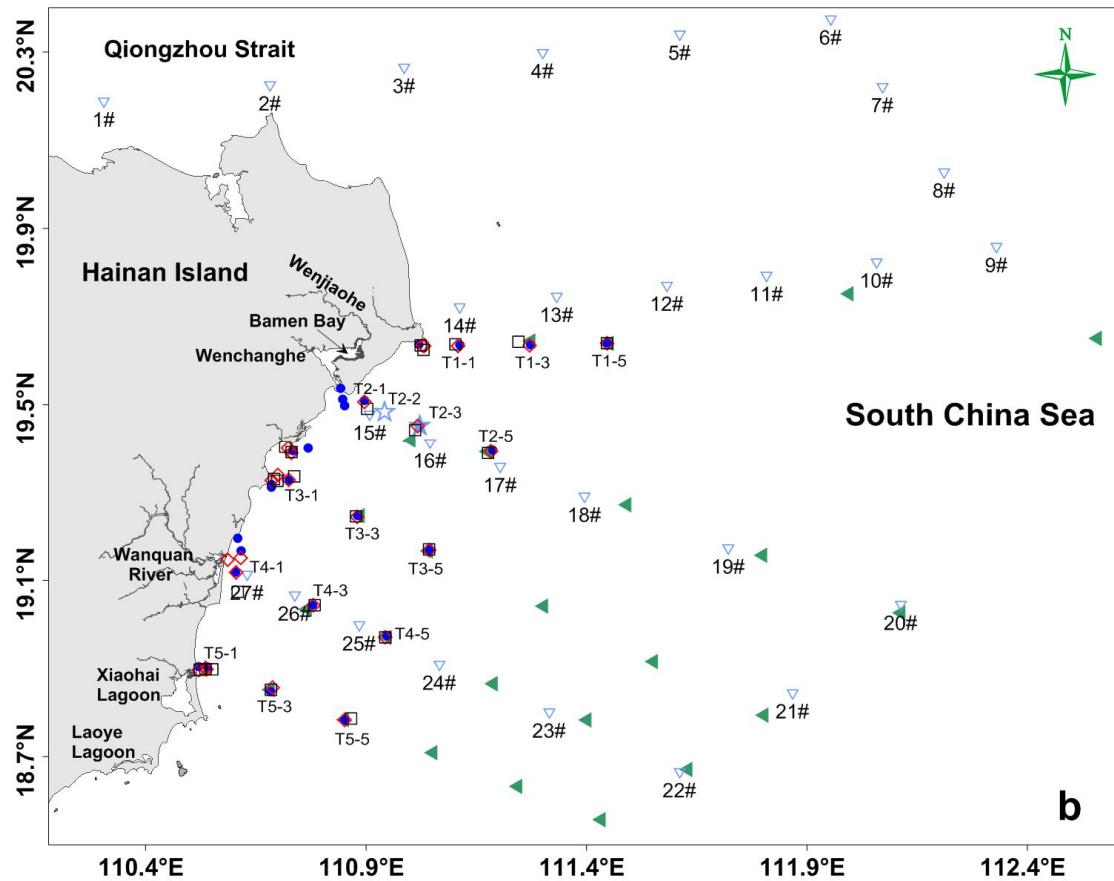


Fig.1 continued

Comment 3. The tables 1-4 should focus on river systems where all data to be presented are available. In the current version table 1 lists 9 rivers, but table 2-4 show results for only a few rivers from table 1 along with other rivers that are not listed in table 1. Again, may be focus on fewer river-lagoon systems.

Response: In our study region, there are four large river-lagoon systems. Besides, there are still many small-sized rivers flow through village and farmland in the study area and empty into coastal region. But background data (i.e., discharge, length) of these rivers was limited. Hence, table 1 just listed 9 rivers. These rivers which were not listed in table 1 were significantly affected by human activities, such as aquaculture and wastewater. Untreated human sewage, agriculture fertilizers and heavily polluted wastewater transported to these rivers, caused high concentrations of nutrients in rivers. As a result, large quantities of nutrients might be transported to coastal region through these small rivers to some extent. For example, coral reefs in Dongjiao Yelin and Tanmen can be seen as the ones facing the most severe threat due to their exposure to river runoff (Roder et al., 2013, CSR). In addition, in order to give an overall review about nutrient dynamics and anthropogenic perturbation in

rivers along the eastern coast of Hainan Island, nutrient contents were all listed in table 2-4 that are not listed in table 1 in our original ms. In our revision, table 2 combined with table 3 and table, forming a new table. (Please also refer to our reply to your comment 4)

Comment 4. *The figures are way too busy with labels that are much too small. Significantly reduce the number of figures and the number of panels per figure. Significant data reduction is needed for this manuscript to be appropriate for “Biogeosciences”.*

Response: We agree that many figures and panels per figure in our previous version. There are six cruises in our study, we want to give specification about nutrients description, hence, many figures in our ms. As the reviewer suggest, we have significantly revised the figures large enough to show, limited the number of figures and reduced numbers of panels per figures, especially Fig. 3 and Fig. 4. In addition, we combined “Table 2 Temperature, salinity, and SPM in surface water of rivers, lagoons, and coastal region during the investigation periods. The average values are shown in parentheses.” with “Table 3 Mean \pm SD of nutrient concentrations ($\mu\text{mol L}^{-1}$) and molar ratios in surface water of the Wenchanghe (WC), Wenjiaohe (WJ), Wanquan River (WQ), shrimp ponds, and groundwater (GW) during the investigation periods. (wet season: May to October; dry season: November to April)” and “Table 4 Nutrients concentrations ($\mu\text{mol L}^{-1}$) in surface water of other small rivers along the eastern Hainan Island in different season. (LY: Lunyanghe; YD: Yandunhe; SL: Shanlonghe; TYR: Tayang River; TY: Taiyanghe)”, forming a new table “Table 2 Hydrodynamics characteristics, mean \pm SD of nutrient concentrations ($\mu\text{mol L}^{-1}$) and molar ratios in surface water of the Wenchanghe (WC), Wenjiaohe (WJ), Wanquan River (WQ), shrimp ponds, and groundwater (GW), and other small rivers along the eastern Hainan Island in different season. (LY: Lunyanghe; YD: Yandunhe; SL: Shanlonghe; TYR: Tayang River; TY: Taiyanghe)”. Please find more details in our revised version.

Comment 5. *Results and discussion sections need to be clearly separated; currently the authors have a blend of results and discussion in both sections.*

Response: Thank you for the valuable suggestion. We divided section “3.2 Nutrients in rivers and lagoons” to section “3.2 Nutrients in rivers” and section “3.3 Nutrients in coastal lagoons”. Correspondingly, we divided section “4.1 Biogeochemistry of nutrients in rivers and lagoons” into “4.1 Nutrients dynamics in rivers” and “4.2 Nutrients dynamics in coastal lagoons”. Section “3.6 Water and nutrient budgets” was moved to and combined with section “4.3 Nutrient fluxes in estuarine-lagoons along the eastern Hainan Island”, forming a new section “4.3 Nutrient budgets in coastal lagoons”. In addition, the original

sections “4.1.2 Areal yields of nutrients in rivers” and “4.1.3 Estuarine-lagoons topography impacts” were integrated to “4.1 Nutrients dynamics in rivers” and “4.2 Nutrients dynamics in coastal lagoons”, respectively. Please find our revision in the ms.

Comment 6. *For a study that includes so many aspects, influence of agriculture (fertilizers), aquaculture, ground water discharge, and typhoons the manuscript needs to be structured well and focus on the most important points. Presenting all the data in figures and tables gives the manuscript the character of a data report, which is not what journals like “Biogeosciences” typically publish.*

Response: We do agree with you that so many aspects in our manuscript. As the referee #2's suggestion, we deeply dig into our data in the revision, restructured our manuscript to make the manuscript well arranged. We hope that this manuscript as a research article is now suitable for publication in “Biogeosciences”. We hope that this will have some contribution for understanding nutrient biogeochemistry along the eastern coast of Hainan Island in future studies.