

Interactive
Comment

Interactive comment on “Nutrient budgets for large Chinese estuaries and embayment” by S. M. Liu et al.

S. M. Liu et al.

Received and published: 5 April 2009

Response to Referee #1’s comments:

General Comments: The manuscript provides a large comprehensive dataset of nutrient concentrations in the main rivers and bays of China, covering a large region between 5N-55N latitude. The authors have also calculated nutrient budgets for coastal areas such as estuaries and bays in this region, using the LOICZ approach. However, the manuscript at its present form is not suitable for publication. It needs a general re-organisation of the text and a through revision of the English language. The way it is presented now is more like a government report than a scientific paper, with too much repetition of the information contained in the tables, especially in section 4. You should use the tables as a support for the text. The authors should consider re-organising the text so that: 1)it has a shorter abstract -> it has the same lenght as the introduction! 2)

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



it has a results section separate from the discussion 3) as well as a conclusions section instead of a summary 4) a section addressing the limitations of the LOICZ modelling approach.

Reply: Thank you for your detail suggestions. In this revised version of the manuscript, Results and Discussion has been separated into two sections. English language has been edited. The limitation for LOICZ modelling approach has been stated in the text, including the applicability of steady state assumption. The text has been revised to have a shorter abstract and a conclusion section instead of a summary.

Specific and Technical Comments: 1) English language: The authors should improve the English in the text, starting with the title: you refer to many bays in the text, so you should use the plural "embayments" instead of "embayment" - including the Title of the manuscript.

Reply: The English language has been edited.

Page 392 Abstract: as said before, it is quite long, especially compared to the introduction. Line 12: "...decrease exponentially..." instead of "... in exponential trend..." Line 18-19: are the estuaries and embayments sinks or sources? It is not clear from the sentence. Line 24-25: use "nutrients" instead of "nutrient elements"

Reply: The abstract is revised to be shorter. The sentences writing have been edited. In this revised version, nutrient budgets were constructed only for estuaries, not for embayments due to non-steady state conditions for the bays.

Page 393 Lines2-4: This is important information, should not appear only in the end of the text Lines 11-12: there is a verb missing. Maybe "... food web and PROVOKE more severe..."? Lines 14-16: Rewrite the sentence. What does "global change in relation to human activities" mean? Line 27-end: Rewrite the sentence. Estuaries and embayments can't "mark human disturbance". Page 394, Lines 4-7: Rewrite the sentence. This is the main objective of the manuscript! Here the biogeochemical data

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



is used to understand the behaviour and nutrient fluxes from coastal China to the NW Pacific.

Reply: The sentences writing have been edited. The important information is stated in the discussion section.

Material and methods: this section can be simplified by using the existing tables. Lines 9-17: You don't need to cite all the rivers in the text if they are already listed in table 1. Lines 19-26: This information is already appearing in table 2. Page 395, Lines 1-6: this information is already appearing in table 3.

Reply: The repetition of the information contained in the tables has been deleted.

Lines 7-12: Did you use average values of nutrient concentration in rain water? This information is missing, as well as the concentration values.

Reply: The nutrient concentrations in rain water are the rain volume-weighted average concentration, and the wet deposition fluxes were determined from the rain volume-weighted average concentration time the rainfall. The dry deposition fluxes were estimated by the dry deposition velocity time nutrient concentration in the aerosol. This information has been published (Zhang et al., 2007 in J Atmos Chem 57:41-57).

Lines 13-18: Were all samples collected and analysed exactly the same way? In some rivers there is a big time gap. Some were collected in the early 90's, some more recently. There is no year for the samples from the Huanghe River - see table 2a.

Reply: The sampling date for the Huanghe River has been provided. Detail information including methods with analytical precision is provided. All samples were collected similarly. We have national standard methods of Peoples Republic of China for how to collect samples and measure parameters. Of course, we deleted the data they did not follow this standard. The major difference is for nitrate measurement: NO₃⁻ was measured using the zinc-cadmium reduction method before 1993. Later the cadmium-copper reduction method was used instead. These two NO₃⁻ reduction methods were

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



comparable (Chen et al., 1998; Yu et al., 1998).

Biogeochemical modeling approach - maybe change the name for "Nutrient budgets -LOICZ approach"?

Reply: This has been revised.

Page 396 Lines 27-28: Here you should explain why V_g (groundwater) is negligible by citing values. The same for V_w (waste water). Is it negligible because there are no heavy input of waste water in any of the estuaries considered? I don't think this is the case. If you don't have any data for V_w please make it explicit in the text.

Reply: V_g is relatively small and negligible in this calculation because over-extraction of groundwater is a feature of the area. For example, the nutrient fluxes transported by submarine groundwater discharge to Jiaozhou Bay represented 0.06% for PO_4^{3-} , 5% for NO_3^- and 2.6% for $Si(OH)_4$ of the nutrient fluxes transported by the rivers around Jiaozhou Bay due to the construction of a low permeability subsurface dam and excessive groundwater withdrawal (Liu et al., 2007a, b). The ratios of nutrient fluxes from groundwater in the Huanghe delta to that from the Huanghe river water were 2.5×10^{-6} - 2.0×10^{-5} (Tan, 2002). For V_w (waste water), it is negligible as we don't have any data.

Page 397 Results and discussion - you should consider writing 2 separate sections, one for the results, and one for the discussion. It would improve the readability of the manuscript. For instance, my impression is that you have described all results for rivers, while estuaries and embayments have their results already mixed with a "discussion".

Reply: Results and discussion has been separated into 2 sections.

Page 398 Lines 1-6: You should avoid the use of semi-colon (;). This long sentence could be split up into shorter ones to improve the text. Line 14: "Comparison with..." -> Do you mean "Comparing with..."? Which unpolluted rivers? Lines 20-21: "10-20 or even more" -> do you mean in China agriculture uses 10 to 20 times more fertilizers?

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



More than European agriculture? You should give some values here for comparison.

Reply: The sentences have been rewritten, especially the sentence 'the N:P ratios in fertilizers used in China' is confusing, so that the reader doesn't understand what the authors want to express. The unpolluted rivers refer to Amazon and Zaire.

Page 399 Line 3: Do not use "etc" in the manuscript. As said before, this section could be much improved. Much of the information in page 399 is a mere repetition of the results shown in tables 2a to 2c. You should describe one nutrient at time, then describe the ratios, and use the tables as a support.

Reply: The repetition has been deleted and this part has been rewritten.

Lines 5-6: "hot and wet south than in the cool and dry north" -> Do you mean tropical humid and temperate dry climates?

Reply: We take the Changjiang as the boundary which separates the hot and wet south (average annual air temperature: >15 degree, annual precipitation: >1000 mm, aridity: <0.75) from the cool and dry north (average annual air temperature: <15 degree, annual precipitation: <1000 mm, aridity: >0.75).

Page 400 Lines 5-8 - This is a repetition. Lines 22-23: What do you mean? There aren't available datasets for Korean rivers? Page 401, line 6: Please change to " ...have increased 17 times in South Korea..."

Reply: The repetition has been deleted. The sentences have been edited. For Korean rivers, there aren't available datasets to construct nutrient budgets.

Page 402 Lines 1-4: The sentence is not very clear. Is there more of a sink or source? Are the nutrients being imported or exported?

Reply: The Yellow Sea is a sink or source of nutrients depending on elements. It is net sink for nitrate, ammonium and dissolved silicate and a net source for phosphate. But these contents for nutrients in the China Seas have been deleted based on the other

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

reviewer's comments.

Lines 5-25: This part could go into a discussion section. Lines 26-page 403: What is the contribution of this paragraph to the manuscript? Are you budgeting any of these coral reef areas?

Reply: The Results and discussion section has been separated. The contents which are not related to the manuscript have been deleted including the coral reef areas in the South China Sea.

Page 403 Line 4: Please use "Comparing" Line 16: Please use "surpasses" Line 17: Please use "river water" Again here The text could go into a separate discussion section.

Reply: The sentences have been edited. And the Results and discussion section has been separated.

Page 404 Lines 12-16: Please re-write this sentence. which rivers, estuaries, bays would be heavily affected by human influence? If the data is not available, how conclusive are the results shown here? This is an important point that should be addressed in the manuscript!

Reply: In this revised version, the human influence on nutrient delivery was estimated based on observations in the upper reaches of the Changjiang and Yalujiang.

Page 405 Line 13: Please use "Comparing" Section 4.5 could be a sub-section of the discussion. Here there is again repetition of the information from table 8.

Reply: The sentences have been edited and the repeated information is deleted. And the Results and discussion section has been separated.

Page 406 Line 16: The results "suggest", they do not "demonstrate" since here you are using a model approach! Line 26: Please avoid using expressions such as "a lot" in a scientific manuscript. Page 407, line 26: Please use "Supposing the contribution of

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



BSi..." Page 435, Figure 3 caption: just cite (Kim et al. 2004b).

Reply: The sentences have been edited.

Page 408 Summary - This section could be replaced by a "Conclusions" section, where the limitations of the approach use in the manuscript are addressed. For instance: the lack of data about waste water input, in which areas this would be an important issue for the calculated budgets. the important information, or the main conclusion of the manuscript is lost in the end of this summary -> that primary production in the China seas is supported by nutrient regeneration and exchange with the NW Pacific.

Reply: A 'conclusions' section replaced a 'summary'. The limitations of the approach are stated in the discussion section and the conclusion section.

Interactive comment on Biogeosciences Discuss., 6, 391, 2009.

BGD

6, S700–S706, 2009

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

