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Biogeosciences Discussions

Interactive comment on "Nitrous oxide in the Changjiang (Yangtze River) Estuary and its adjacent marine area: riverine input, sediment release and atmospheric fluxes" *by* G.-L. Zhang et al.

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Biogeosciences Discussions 7:3125-3151, 2010 Title: Nitrous oxide in the Changjiang (Yanf\gtze River) estuary and its adjacent marine area: river input, sediment release and atmospheric fluxes Authors: Zhang et al.

This interesting paper discusses the results of measurements of N2O concentrations in the Changjiang river, fluxes from sediments and concentrations and dreived fluxes from the water of the Changjiang estuary and adjacent sea.

The paper is weill written, well structured and reads easily. There are a few editroial suggestions listed below.

The results of the paper are really interesting. However, the paper could be even more interesting for a wider audience if the results are put in perspective. Firstly, the estimated N2O fluxes could be compared to the river DIN and total N load in the Chanjiang. On page 3127 there is only data for sediemnt load.

The river load of N2O was estrimated to be 15.8x10ˆ6 mol/yr. This is only a small fraction of the N2O in the estuary. I wonder how the authors conclude that the river input of N2O is “significant”.

The total N2O flux from the estuary and adjacent marine area is more than 1000 g N2O-N per year. Such high fluxes are comparable to fluxes from fertilized agricultural soils. My suggestion is that the authors make a comparison of fluxes and total emission from Chinese agricultural land (of agricultural land in the Changjiang river basin) and the estuary and adjacent sea area. I wonder how important the estuary is compared to agricultural land. Also, is there reason to modify the IPCC methodology for estimating N2O emissions from nitrogen leached from agricultural soils, transported via runoff and through groundwater to surface water and estuaries. At present the default estimate is 0.25% for N in groundwater, plus 0.25% for N in rivers, and 0.25% for N in estuaries. I wonder what % of N is eventually emitted as N2O.

Detailed comments Page 3127, line 28: is only inorganic N responsible for N2O? Could not dissolved organic N and particulate (mainly suspended organic mattter, and sediment) be involved in nitrification and denitrirfifcation processs whereby N2O is formed?

Page 3131: The discussion of the calculation of the sea to air flux of N2O is confusing. Different terms are used (transfer velocity, transfer coefficient, see also page 3136, line 21-22) which may or may not be the same. Other terms (Sc, k600, u10) need explanation, because most readers will not know.

BGD

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Figure 2 and page 3132: The relatinoship between DIN and N2O concentrations is counterintuitive. One would expect that when DIN is lost through denitrification, N2O is high, so an inverse relationship. Could the authors add a brief explanation?

Editorial suggestions Page 3128, line 4: change dessicated to aerobic. Page 3128, line 6: Here we present. Page 3128, line 7: The objectves of ous study . . . Page 3129, line 26: Microbial acitivity in filtrates was inhibited by HgCl2 and then stored . . .. Page 3130, line 2: using the closed chamber technique .. Page 3130: what are bungs and bangs? Page 3131, line 12: added instead of purposeful. Page 3132, line 17: may be partly due to the fact that most . . . Page 3135, line 10: change easily into high. Page 3136, line 7: change “In any way” into “In summary”. Page 3137, line 10: change “should be relatively” inot “are probably”.

Page 3136, line 18: what is the unit of the salinity?

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