Biogeosciences Discuss., 5, S751–S753, 2008
www.biogeosciences-discuss.net/5/S751/2008/


Biogeosciences Discussions



# *Interactive comment on* "Nitrification and inorganic nitrogen distribution in a large perturbed river/estuarine system: the Pearl River Estuary, China" *by* Minhan Dai et al.

**Anonymous Referee #1**

Received and published: 4 June 2008

General comments

In this paper, the authors studied the spatial and seasonal evolution of dissolved inorganic nitrogen in the three main tributaries of the Pearl River Estuary. On-site incubation was also carried out for determining nitrification rates (ammonium and nitrite oxidation rates) and the relative importance of substrate concentrations, temperature, pH, dissolved oxygen and microbial abundance as controlling factors of nitrification rates.

The objective of the paper and the study area are clearly introduced and results clearly presented. Based on their measurements, the authors conclude that temperature is



Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

the main controlling factor of nitrification rates in the Pearl River. Despite the fact that temperature variability could explain seasonal variability of nitrification rates, what is the impact of this factor on the spatial variability? Seasonal and spatial controls of nitrification have to be clearly identified in the conclusion of the paper.

Specific Comments

P 1550, L 19: Why express measured water flow related to the long-term average? The authors could give measured values for the three cruises.

P 1552, L10: As pointed by the authors the MPN-Griess technique is known to underestimate bacteria biomass. This underestimation is, as also mentioned in the paper, lower than the one induced by the immonufluorescence technique or MPN-PCR method. Have the authors considered the method proposed by Brion and Billen (1998)?

P 1555, L1: While the increase in wastewater discharge clearly appears on Fig. 2, the intensification of chemical oxygen demand discharge (with highest value recorded in 1995) and ammoniacal nitrogen is not so evident.

P 1560, L 4 : What is the difference between the nitrifier number presented Fig 6 and Table 3? As an example, in Table 3 a value of 3500 is referenced for stations 1 and 2 in March 2006 then a value of 3000 is shown Fig. 6. Similarly in August 2005, a nitrifier abundance of 1150 is presented Table 3 and a value lower than 500 is shown Fig. 6.

P 1561, L 8: Light and community composition control on nitrification rate are not study in this paper. Could one of these factors be more important than the tested one in the Pearl river estuary?

P 1562, L 5: Please could you add temperature data in the manuscript (Table 3 for example)?

P 1563, L 25: Despite the distribution pattern in nitrifier abundance was broadly consistent with that of the nitrification rates based on section category (p 1560 L 10), there



BGD

5, S751–S753, 2008

is no relationship between ammonia oxidation rate and nitrifier number measured in the different section (Fig.6 c-d).

P 1565: Is a DO concentration higher than 4 mg L-1 really limiting for nitrification rates in the downstream Humen estuary and in the Yamen estuary?

P 1566, L 10: This statement contradicts the interpretation made for station 6 p 1596 L 20. In consequence, how can the authors explain the low DO concentration associated to high nitrification rate measured at station 6?

P 1567, L 10: What is the value of pH during the other cruises? As for temperature, please could you add pH values in the paper?

P 1568, L 16: I agree with the fact that temperature variability could explain seasonal variability of nitrification rates but what about the spatial variability? This has to be mentioned. What is the controlling factor of the spatial variability? Moreover can temperature explain the difference of nitrification rate observed in the Pearl Estuary and in the Scheldt or the Gironde Estuaries as suggested P 1559 L20-30 ?

References: Brion, N., Billen, G., 1998. A reassessment of the H14CO3- incorporation method for measuring autotrophic nitrification and its use to estimate the biomass of nitrifying bacteria. Rev. Sci. Eau, 11, 283-302.

---

Interactive comment on Biogeosciences Discuss., 5, 1545, 2008.