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Interactive comment on "Nitrification and its oxygen consumption along the turbid Changjiang River plume" *by* S. S.-Y. Hsiao et al.

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Review on "Nitrification and its oxygen consumption along the turbid Changjiang River plume"

General comments: This study investigated the nitrification process in turbid shelf water by measuring nitrification rate, dissolved oxygen (DO), community respiration rate (CR), and the abundance of relevant bacteria, etc. The results indicated that nitrification was a particle-associated process in Changjiang Plume, and the reactive Fe3+/Mn4+ may play a role as oxidant in nitrification process which could provide some implications for further nitrogen studies. However, there are some tough spots in this study. The manuscript is too long and redundant, and the organization of the manuscript should be improved. The introduction does not clearly convey the originality or importance of the research. The introduction should state the importance of

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suspended sediment to nitrification, instead of describing the widespread of suspended sediment, and thereby provide a clear hypothesis for this study. The introduction should address the information which is relevant to the aim of this study. For example, the author state the nitrous oxide is a greenhouse gas which has not been discussed elsewhere. The author should distinguish the results obtained from this study and the results cited from the other references. In the introduction, the author should propose the hypothesis based on the results of other researches, instead of stating the results of this paper. Material and method The author should explain why this paper select the sampling time at one week after typhoon Muifa passed. Line 21-26, the logic is very bad. The sampling sites described in Fig.1 are not clear, what is the meaning of N0-N5, what is the total numbers of sampling sites? The author should describe the detection method in detail; For example, "TSM sample were collected by filtering 1–4 L of water sample onto pre-combusted Whatman GF/F membrane." what is the size of this membrane? In the incubation experiments section, I cannot get how these incubations are finished; what is a tank with continuous circulation of surface sea water; how are the bottles for experiment fixed in the tank? For the incubation of particle-free nitrification, why use the water after removing particle by using 3 um membrane? It was not consistent with the later mentioned sediment fraction, for example, 0.22-3um. Results This section should be reorganized by dividing it into several subsections with titles. The results describe lots of data which is not so relevant to the aim of this study (e.g. the first four paragraphs of the Result section), maybe the author can shorten these descriptions and state the relevant results in a more logically method. Page 8693 line 8-9, how can you deduce that the particulate organic matter was mainly marine sourced? Page 8693 line 21, the intercept mentioned in the paper is different from that shown in figure 4, could the author explain where these differences come from? Page 8694 line 2-5, the statement is wrong and disagree with line 9-10 of page 8696, how can you get that aerobic degradation of organic matter was the major source of ammonium? The correlation is between the initial NH4 concentration and CR. This Discussion The aim of this study the author present at the introduction is to investigate the interplay of

BGD
10, C4719–C4721, 2013

nutrient and suspended sediment in nitrification rate, however, here in the discussion 4.1, the author discusses the interplay between nitrification and environmental parameters; this discrepancy leads the readers to be lost, and the readers cannot get what the author want to do in this study. Page 8695 line 26-28, the nitrification rate in the nitrite maximum layer was under detection limit indicating that nitrite was not sourced from ammonium, why? Then what is nitrite sourced from? 4.2 Reactive Fe as oxidant supply for nitrification in turbid river plume, why only Fe not Mn? Mn has also be analyzed in the following text The meaning of the first paragraph of 4.2 is not clear. Page 8697 line 27, "The excess oxygen consumption may result from allochthonous ammonia", what is allochthonous ammonia? Where it come from? Page 8700 line 1-6, how can "the different slopes of TSM against NRb from in inner shelf and river mouth" can imply that "ammonia can be supplied from in situ decomposition". ? This conclusion was not obtained from the results of this manuscript.

Specific Comments: Page 8687 line 9-10, The sentence "One of the most affected processes is nitrification, in which ammonium is oxidized to nitrate and nitrous oxide, a greenhouse gas, is produced as a byproduct." is awkward, rewrite it. Some of data in this paper are not consistent, for example, the percentage of oxygen consumption by bulk nitrification reported at the discussion section and abstract section is different. In figure 4a and 4b, are these points fitted by linear regression? Do not they seem more like a curve instead of a straight line?

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