

Interactive comment on “Speciation and dynamics of dissolved inorganic nitrogen export in the Danshui River, Taiwan” by T.-Y. Lee et al.

Anonymous Referee #1

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General Comments: This paper describes fluxes of dissolved inorganic nitrogen (DIN) from the Dashui River in Taiwan. The novelty of data describing DIN fluxes in a river draining to Oceania makes this analysis potentially interesting. However, the paper as written contains a number of significant flaws in its presentation, analysis, and discussion of results. Perhaps the most significant flaw is the lack of a coherent message that advances our understanding of how DIN moves and is transformed throughout the catchment. At the forefront, there are no objectives or testable hypotheses stated in the introduction. As far as the results go, the shifts in nitrate, nitrite, and ammonium seen here have been seen in other river systems, and in of themselves are not groundbreaking. Neither is the change in instantaneous DO concentrations, which may not be the appropriate way to represent DO here (no diel DO curves were sampled, which would have been more interesting and informative). Attempting to relate DIN fluxes observed

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here more broadly to the Oceania region is of greater interest to biogeochemists, but is not done effectively here and requires more thought. In reality the discussion focuses mainly on nuances of how DIN speciation changes along the Danshui River. Also, the discussion section contains material that mostly should be placed in the results section.

Specific Comments: I also see two significant flaws in the analysis. The first concerns the calculation of DIN fluxes. Using four separate methods to calculate DIN fluxes seems like overkill, and taking the average of the four methods to estimate flux is not valid statistically. This is because each estimate relies on the same two parameters, concentration and discharge, violating the assumption of independence. Moreover, the second flux estimate (equation 2) is thoroughly dismissed in the literature. I would suggest only using the calculation from equation 4 for the flux estimate.

The second flaw pertains to the investigation of factors controlling DIN yield from the Dashui River watershed. Although examining the role of runoff in DIN export seems attractive (as in Figure 6a), this analysis is inherently flawed because runoff is used to calculate DIN yield (meaning the axes are autocorrelated). More importantly, attempting to relate DIN fluxes in Danshui to NANI model estimates (as in Figure 7a) is an apples to oranges comparison because NANI (or NTNI) uses TN flux as a base comparison. I do not see any information on DON or particulate N presented here.

Technical Comments: The authors should consult with a native english speaker. Overall, this paper was extremely difficult to read because there were numerous grammatical errors, awkward phrases, and misspelled words. There also are several items that are incorrectly described in the text (highlighted below).

line 15, p2498: “close-to-top”? lines 19-23, p2498: Not a real strong or informative statement to conclude the abstract line 24, p2498: “huge” is not a scientific term line 24, p2498 - line 10, p2499: This a general review that can be found in many other places; need to get to relevance of your study quickly. line 1, p2499: “doubled biologically available nitrogen”? line 13, p2499: “nitrogenous nutrients”? Nitrogen is a

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nutrient. lines 11-20, p2499: This paragraph needs a better transition into it. It does not fit well with the previous paragraph. lines 7 - 14, p2500: Need objective and hypotheses here. lines 14-15, p2502: flux is defined as the movement of mass over time through a defined cross-sectional area. lines 16 - 18, p2502: This sentence is really awkwardly worded. line 21, p2503: Don't the Qi's in the numerator and denominator cancel out? lines 11-12, p2505: Delete the last sentence of the paragraph. line 12, p2506: delete "were" lines 22-25, p2507: Not appropriate to calculate means and st deviations because the flux estimates are not independent of one another. lines 18-20, p2508: This is a weak start to the discussion section. This sentence really belongs in the results. lines 23-25, p2508: This is not surprising. Overall, the start to the discussion section should really describe how the study results are novel and contribute to global understanding of N cycling. lines 3-5, p2509: Not really sure what this means. line 17, p2509: "population-associate"? lines 11-17, p2510: This belongs in the results section. lines 25-26, p2510: "denitrification signals"? lines 20 - 29, p2511: More results. line 13 page 2513: "closed"? lines 11-12, p2516: Assume that you mean the watershed area here, although this is not stated. line 16 p2516 "longdistance"? line 1, p2517: NEWS is a hybrid statistical-process based model, not a conceptual model. Tables and Figures: Captions need to be written so that they can stand alone independent of the paper. Referring the reader to the text for details is not appropriate. Table 4: Missing a row for Water (%) Figure 1: Difficult to pick out details on map. Figure 3: Difficult to see NO₂; suggest moving NO₂ to bottom. Figure 6: More detail is needed in caption on data sources. Figure 6a: autocorrelation between axes. Figure 7a: Can't compare this because NANI data are total N fluxes.

END REVIEW

Interactive comment on Biogeosciences Discuss., 11, 2497, 2014.