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Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Nitrogen attenuation, dilution and recycling at the groundwater – surface water interface of a subtropical estuary inferred from the stable isotope composition of nitrate and water" *by* Sébastien Lamontagne et al.

**Anonymous Referee #1**

Received and published: 16 April 2018

Review of Lamontagne et al: Nitrogen attenuation, dilution and recycling at the groundwater – surface water interface of a subtropical estuary inferred from the stable isotope composition of nitrate and water

Lamontagne et al present a manuscript wherein isotopes of oxygen and nitrogen in nitrate in ground water and the ground water – surface water mixing zone are used to estimate nitrogen removal rates downstream of a contamination source. Overall, I find this an interesting application of isotope effects and a potentially useful method. Generally, the methodology looks OK, however there are too many details missing from



the manuscript to judge this certainly. At this stage, the manuscript is not suitable for publication, however I would be very happy to perform a more complete review of this study when a complete manuscript is presented.

Major comments

1. Disclosure of location & data.

I am not comfortable with the lack of disclosure in this MS. For example, it is not appropriate to be unable to give the location of the site. The specifics of the site (size, catchment, land use) are important for placing it in a local, national and global context. In addition, the non-availability of (1) much of the complete dataset and (2) several pieces of data cited as "unpublished" is in conflict with (a) the HESS guidelines on data availability (https://www.hydrology-and-earth-system-sciences.net/about/data_policy.html); (b) modern approaches to data availability in scientific literature (e.g. the general policies of EGU, AGU, ACS); and (c) the FORCE 11 guidelines. I do not accept that this work can serve as (presumably) a private consultation for industry, with confidential outcomes, and also a public, fully peer-reviewed scientific research. The objectives and interests of these two are in conflict. The authors should obtain unconditional permission from the funding organisation to publish the complete dataset and site details.

2. DNRA

DNRA is known to be dominant in many Australian sub-tropical estuaries (e.g. see Dunn refs below and the references therein) – this should not be ignored in your analysis.

DNRA likely produces 15N-depleted NO3, similar to denitrification, but does not result in removal. Thus, it seems somewhat pre-determined to only include removal process (the model assumes denitrification and anammox dominate) and exclude DNRA.

This should be at least addressed.

Dunn, R. J., D. Robertson, P. R. Teasdale, N. J. Waltham, and D. T. Welsh (2013),

Benthic metabolism and nitrogen dynamics in an urbanised tidal creek: Domination of DNRA over denitrification as a nitrate reduction pathway, Estuarine, Coastal and Shelf Science, 131, 271-281.

Dunn, R. J. K., D. T. Welsh, M. A. Jordan, N. J. Waltham, C. J. Lemckert, and P. R. Teasdale (2012), Benthic metabolism and nitrogen dynamics in a sub-tropical coastal lagoon: Microphytobenthos stimulate nitrification and nitrate reduction through photosynthetic oxygen evolution, Estuarine, Coastal and Shelf Science, 113, 272-282.

Minor comments

3.25 – what River?

4.5 – if the rubber mats were not completely successful, what is the impact and extent of contamination? Discuss.

4.25 – nitrate not filtered for isotopes?

9.14 – it is a pity that you did not measure the rainfall signature or any ground water at the site. It is hard to evaluate how appropriate the Lucas Heights data is, as we do not know where your site is: if it's in south Sydney, this makes sense. If it is in Newcastle or Wollongong, it's tenuous. If it is in Bateman's Bay, this is a useless comparison.

Fig 2 – show direction to sea.

Fig 4 – needs better explanation in caption

Fig 5 – needs to be made simpler. Figure panel lettering would aid in a clearer caption. These figures are busy and unclear. Remove the text rom the figures to discussion.

Fig 6 – see Fig 5.

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