Biogeosciences Discuss., 9, C2947–C2948, 2012
www.biogeosciences-discuss.net/9/C2947/2012/

Biogeosciences Discussions

Interactive comment on "Nitrogen turnover in a tidal flat sediment: assimilation and dissimilation by bacteria and benthic microalgae" *by* K. Dähnke et al.

Anonymous Referee #1

Received and published: 5 August 2012

The manuscript reports isotope-labeling experiments to investigate the fate of NOx and NH4+ in intertidal sediments. I like the combination of istotope addition experiments and modeling. Unfortunately, I believe the experiments to be badly designed, and did not yield any new insight into nitrogen processing on intertidal sediments. Creating the slurry as described, will change the redox, light, and transport processes within the sediment to such an extent that the results have little meaning unless a very specific hypothesis is being tested. They can't even be called potential rates because the 'light treatment' would only have only illuminated the surface/edge few mm of the slurry. In light of this serious flaw, the data provides no insights into nitrogen cycling in intertidal sediment beyond the expected observations that NH4+ assimilation dominates and

increases in the light and that nitrate was mostly denitrified.

The major insight from the experiment was that 15NO3 was being preferentially assimilated over 14NO3-, which is unexpected. I found the idea of preferential 15N uptake (as used in the model) implausible, and no references were given to back up the fundamentals of the hypothesis beyond reference to diatom uptake and storage. First, isotope discrimination is pretty well always against 15N uptake. Second, to see such discrimination in an enrichment experiment would require an impossibly high discrimination factor. Or have I missed something?

Interactive comment on Biogeosciences Discuss., 9, 6987, 2012.