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Biogeosciences Discussions

Interactive comment on "Activity and abundance of denitrifying bacteria in the subsurface biosphere of diffuse hydrothermal vents of the Juan de Fuca Ridge" *by* A. Bourbonnais et al.

Anonymous Referee #1

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Bourbonnais and coworkers present data on nitrogen (N) loss rates and the presence of denitrifying organisms in hydrothermal vent fluids, specifically at two sites along the Juan de Fuca Ridge. To my knowledge, these are the first detailed data on N loss pathways in such a system, and it is an exciting study in that regard. The study combines both stable isotope tracer experiments with molecular data on the presence and abundance of potentially denitrifying organisms. The authors do a nice job of putting their results in the 'big picture' and relate their data back to the global N cycle. It is generally well written and well organized, and I found the authors struck a nice balance in the amount of background information given.

My main criticism of the manuscript is that data about the abundance of denitrifiers are excluded from the manuscript, even though we are told they exist. Why are the nirS and nirK data separated from this manuscript? Are those data really so abundant as to warrant their own manuscript? Being able to add quantitative information about the entire denitrifying community would make the present manuscript exceptional.

Specific comments:

Abstract: The authors write: 'Little is known about nitrogen transformations in general . . .' I think a lot is known about nitrogen transformations in general.

p.4184/section 2.1 Would be good to indicate how much time passed between sample collection and the initiation of the rate measurements.

p. 4184, line 21: How is DI equilibrated with ship air a 'blank' for N2O? Also, it would be good to note which/how many standards were used.

p.4185: Were the rate measurements replicated in any way? It is difficult to tell if there were replicates for each type of rate measurement. From Fig 2 it looks like maybe not?

p. 4192, line 16: What is the lower limit of detection for the rate measurements? i.e. is 0.5 nM d-1 significantly different than zero? I think this is an important thing to calculate and discuss as some of the 'rates' are quite low.

Section3.3 title terminology is correct (16S rRNA gene) but the text of this section uses the not-quite correct term rDNA

p.4193 line 10: in order of abundance, not importance

Why are rates reported as N per L in the Results, but as N per kg in the Discussion?

p.4199, line 2: would it be more correct to refer to SUP05 as a clade of bacteria?

Section 4.3: There were no data presented here on the abundance of denitrifiers, only abundance of SUP05, so how can this section be about 'environmental controls on

denitrifier abundance?'

Fig. 6: It would be a lot more useful to have the actual gene abundance on this figure, rather than a percent of total community.

Fig.7: reporting r^2 and p values out to four decimal places is not really appropriate. also, non-parametric rank correlations would probably be more appropriate for this data set, especially panel b.

Technical comments: p. 4180, line 22: bacteria and archaea

p.4187 line 8: μM should be μm

p.4193, line 16: missing a 'the', should be 'the 16S rRNA . . .'

p.4195: should be 'productive' not 'production'

p.4197, line 9: a few too many 'generally'

p.4199, line 1: should be rRNA gene

p.4199, line 2: proteobacterium

p.4201: a small style point: three sentences on this page alone start with 'However, . . .' and it is also used very frequently throughout the manuscript. Besides being repetitive, it is not grammatically correct

p.4216, table 2 caption: should be rRNA gene

Interactive comment on Biogeosciences Discuss., 9, 4177, 2012.