

Interactive comment on “Vertical activity distribution of dissimilatory nitrate reduction in coastal marine sediments” by A. Behrendt et al.

Anonymous Referee #2

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This manuscript by Behrendt et al., examines the differences in DEN and DNRA with sediment depth from five unique marine locations. Additionally, they compare the use of acetylene block/N₂O microsensors vs. gel probe-stable isotope technique and the use of whole core incubations vs. slurry incubations. Overall, this is a nicely written paper addressing key questions in the benthic nitrogen cycling world. It is often a choice we must make – sample volume (slurries) vs. maintaining natural biogeochemical depth horizons (whole core incubations). I just have a few questions/comments that are listed below.

Specific Comments:

1) 8066, Line 4: It would be nice to list the different marine sites in the abstract so that the readers already see that this manuscript is covering a wide range of habitats.

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Otherwise, people might just assume 5 different sites within a given location.

2) Ex. 8066, Line 23; 8067, Line 3: The words “they, them, their” should never be used unless speaking about a person or group of people. I know that many authors do this incorrectly, but it’s a bad habit that one should try to break.

3) 8069, Line 18: Why was 15 deg C used when some cores come from temperatures of 2.9 and other 30.5? Wouldn’t it have been best to store cores at in situ temperature prior to sampling, especially overnight and not just an hour or so?

4) 8070, Line 24: Many scientists are no longer trusting the acetylene inhibition technique, saying that the inhibition is not complete and therefore does not provide accurate rates. Personally, as incomplete inhibition would simply mean an underestimate of rates, I don’t fully see the problem. However, I think it would be advantageous to the authors if they included a small section here stating the limitations of this technique and how that may or may not impact the results of this study.

5) 8071, Line 22: I am guessing that sulfide levels were low enough as to not interfere with microsensor measurements (as sulfide is known to disrupt the N₂O microsensor).

6) 8073, Line 10: Was it too difficult to press porewater or to use rhizons to collect porewater? I’m guessing it’s because the slices are so thin. . .

7) 8077, Line 19: Sulfide concentrations this high surely would have messed up your microsensor readings. Did you do something to help counter this that perhaps I missed in the methods section?

8) 8081, Line 10: Any other explanations? Did you see the topography of the sediment bottom at each place you sampled? Did you see the relative abundance of burrowing organisms or sulfide-oxidizing mats?

9) 8083, Line 10: Did you try making slurry incubations that you did not rotate, essentially allowing microniches to reform within the slurry?

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10) I'm not quite sure how to express this, but I find that the discussion starts with a bang and then just slowly dwindles away. I was taught to think of the discussion as a pyramid where you start with the most specific details at the beginning and slowly get larger and larger until you reach the end where you have your big "why do we care" sentence. Even your conclusion section doesn't really address this. I would just reevaluate your discussion and make sure you think it gets all the necessary information to the author – especially keeping in mind many people just read the first and last paragraph of the discussion when time is limiting.

11) Is there any thought that someone from the group may used these same samples to look at DNA and RNA to see if in fact this microbes are where you think and if those microbes are truly active? This is obviously a question for the future and not something I am asking you to add in to this manuscript.

Interactive comment on Biogeosciences Discuss., 10, 8065, 2013.