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Comment

Interactive comment on “Assessment of the importance of dissimilatory nitrate reduction to ammonium for the terrestrial nitrogen cycle” by T. Rütting et al.

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This review paper presents a host of very useful information and ideas about dissimilatory nitrate reduction to ammonium (DNRA) in soils. The paper discusses many studies that are contradictory, i.e. one study says that DNRA is important while another says that DNRA is insignificant in the same ecosystem. Some of these differences are discussed in a meaningful way, while others are not. After rereading the paper I don't come away with the feeling that the authors know the ecosystems in which DNRA is important or the soil conditions that promote the process. The vague terms like “seem to be”, “can be”, “potentially”, used by the authors also lead me to this con-

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clusion. However, from the information presented, I don't think that my conclusion is correct. I think that the authors could use their extensive knowledge of soils and soil microbial processes to better interpret the information presented, and provide more definitive conclusions as to where and when DNRA is important in terrestrial ecosystems. The manuscript could also be improved by the using the active rather than the passive voice of expression. Using a more direct writing approach would make the text much more reader friendly. Following are some, but not all inclusive, suggestions for revision and a few comments:

1. Could the Abstract include examples of where DNRA is known to be important?
2. P. 1172, line 8: Suggest—These findings support the hypothesis.
3. P. 1174, line 3: Suggest—Several studies showed that the addition.
4. P. 1174, line 22: Suggest—.....Other added C sources, like straw, glycerol, methanol and succinate did not promote DNRA.
5. P. 1175, line 2: Suggest—Possibly these C sources do neither.
6. P. 1175, lines 7-8: Suggest— This is supported by DeCantazaro et al. (1987) in respect to sulphide.
7. P. 1175, lines 16-17: Suggest— Under acidic conditions the slow breakdown of organic matter decreases the availability of organic.
8. P. 1175, line 23: Suggest— Taken together, the oxidation status and the C/NO₃ ratio appear to be the.
9. P. 1175, line 25: Suggest—Other investigations found.
10. P. 1175, line 28: Suggest—Hence, studies are needed to.
11. P. 1176, line 5: Suggest—However, no study has investigated.
12. P. 1176, lines 19- 20: Suggest—A riparian zone study by Dhondt et al. (2003)

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also showed that during the growing season denitrification was dominant while DNRA predominated when plant activity was low.

13. P. 1177-1178, lines 24-1: Suggest—The aim of this section is to summarize studies that compared the abundance of soil microbial DNRA to denitrifiers.

14. P. 1178, lines 6-8: Suggest—...In addition, a soil *Arthrobacter* strain that is abundant globally and is thought to be an obligate aerobe, showed DNRA when incubated anaerobically (Eschbach et al., 2003). This was also shown for.

15. P. 1178, lines 12-13: Suggest—...Mohan and Cole (2007) showed pointed out that there is no known bacterium capable of both denitrification and DNRA.

16. P. 1178, line 15: “new” should be newly.

17. P. 1178, line 26: Suggest—....DNRA microorganisms that reduce NO₃

18. P. 1178, lines 28-29: Suggest—.....these bacterial groups in soil. This would require....

19. P. 1179, line 4: need a comma after *amnigenus*

20. P. 1179, lines 10-11: Suggest—... In all 19 soils the number of NO₂- accumulators out number the denitrifiers, with an average ratio of 4:1...

21. P. 1179, line 19: need a comma after contrast

22. P. 1180, line 2: Suggest—....bacterium differed between pure culture....

23. P. 1180, line12: Suggest—This could provide a strong tool for.

24. P. 1180, line23: ...investigated if the assumption of negligible....

25. P. 1181, line 6: Suggest—....labile C source was added. This is in the same....

26. P. 1181, line 14: Suggest— In soil cores from a riparian fen, DNRA.

27. P. 1181, line 21: Suggest— ...during the dormant season. This was attributed

to.

28. P. 1181, line 27: delete the word their before redox state

29. P. 1182, lines 9-10: Suggest—Most ^{15}N labeling studies to date did not consider DNRA, because it was assumed to be.

30. P. 1183, lines 5-6: Suggest—...divided by NO_3 concentration was highest in anaerobic soils (Pett-Ridge et al., 2006).

31. P. 1183, last 4 lines: Why was the van Dam (1966) study introduced here and not discussed further?

32. P. 1184, line 13: Suggest starting a new paragraph after “were minimized”.

33. P. 1185, line 26: Suggest starting a new paragraph after “...productivity.”

34. P. 1186, lines 24-25: Suggest—...of several studies, we conclude that DNRA is a significant, or even dominant NO_3 consumption process in some ecosystems (Table 1). The importance of DNRA.

35. P. 1187, lines 5-7: Suggest—As Burgin and Hamilton (2007) concluded for aquatic systems, more work is needed to understand the importance of DNRA in various ecosystems.

36. P. 1187, line 12. The Schimel and Bennett (2004) reference is not noted in the Fig. 1 caption. How does the Schimel and Bennett N mineralization paradigm fit into Fig. 1?

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