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Biogeosciences Discussions

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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General comments: Thomas Rütting and co-authors reviewed the current state of knowledge on dissimilatory nitrate reduction to ammonium (DNRA) in terrestrial habitats that has been known for a long time but at the same time has been ignored by many researchers studying soil N transformations. The importance of DNRA is in the transformation of highly mobile nitrate ions that may be prone to leaching or denitrification to a less mobile inorganic N form, ammonium that can be used by plants or be adsorbed to the cation-exchanger of soils. This can lead to substantial N conserva-

tion in soils with low redox potential and high org.C-to- nitrate ratio. The review comes timely and nicely summarizes the factors potentially affecting the abundance and activity of DNRA microorganisms in relation to the second dissimilatory nitrate conversion process, denitrification. The authors provide an in-depth analysis of the available literature and in every chapter try to present key conclusions as take-home message. They clearly identify major gaps in the knowledge of DNRA and by reviewing the knowledge (hopefully) will foster studies to better understand the in situ controls and the ecological significance of this process in many ecosystems. The paper is clearly and concisely written.

Specific comments: The only thing one may criticize is that the paper is a "classical" review presenting no meta-analysis of the DNRA data. Though the authors state that the data do not allow meta-analysis techniques, the paper would become much more attractive and significant given that they used multivariate statistics to investigate broad controls of DNRA across and within ecosystems. Based on Table 1, after filling some gaps with further data (e.g. Behrendt et al. 2010, Cookson et al. 2006, Inselsbacher et al. 2010, Laughlin et al. 2008), the effects of soil water content or WFPS, soil texture, soil C and N content and soil C:N, soil pH, nitrate and DOC content, where presented, as well as biome, vegetation type, mean annual precipitation and mean annual temperature, and or other parameters (such as technique used) on absolute and relative DNRA rates could be statistically studied. Mixed effects models or generalized linear models may help with this task.

Technical corrections: Page 1175, line 4 – exchange "while" by why Page 1175, line 6 – exchange "if" by whether Page 1175, line 7 – correct to "this is supported" Page 1175, line 8 – correct to "with respect to" Page 1175, line 17 – exchange that by which Page 1178, line 2 – correct "wider spread" to wide-spread Page 1180, line 4 – correct to "by functional genes" Page 1184, line 17 – correct to "direct mineralisation pathway" Page 1187, line 1 – correct "possible" to possibly Page 1187, line 9 – exchange "transformation" to processes

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