

Interactive comment on “Gaseous nitrogen losses and mineral nitrogen transformation along a water table gradient in a black alder (*Alnus glutinosa* (L.) Gaertn.) forest on organic soils” by T. Eickenscheidt et al.

Anonymous Referee #1

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This paper on ammonification, nitrification rates and associated nitrous oxide and nitrogen gas emissions in drained and undrained alder forest plots provided some interesting data suitable for publication in BG. The paper is reasonably well written and the data are presented clearly in several tables and figures, however some figures appear to be missing. There are a few points the authors need to consider before publication: Your title includes the words ‘water table gradient’, but this is not reflected in the text. You focus on the differences between undrained / drained. Please include the differences/similarities between D1 and D2 in your paper, in particular in the discussion

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section. Field N₂O emissions are supposed to be shown in Fig 1 d, 2d. These figures do not exist. Field N₂O data are only shown in Fig 5. I hope these missing figures will provide the missing information on the regression model you allude to in the discussion section (p 19089 line 19/20). Make sure you will describe them fully in a short paragraph in the result section. In the discussion section you deduce from a study in the black forest on Norway spruce that a mean GW level between those measured at U and D1 would enhance N₂O emissions. Can you really jump to this conclusion? The sites, climate conditions etc don’t appear to be very similar (Section 4.2 p 19089 line 21). In addition please include site information for the Jungkunst 2004 publication in line 21 (i.e Bavaria, Norway spruce...). In the discussion section (p 19090 line 19 onwards) you use the lack of methane emissions in the laboratory study as an indicator for favourable denitrification conditions. I would draw the opposite conclusion. The fact that you still have methane oxidation at 100% WFPS suggests to me that the system is not anaerobic enough for maximum rates of N₂ production. Here are some minor comments Section 2.2.2 p 19077 line 28: explain why the first 20 ml of the extract were discarded Section 2.3 p 19079 line 4: change to ‘...for site U were collected...’ (not ‘where’) Section 2.3 p 19080 line 9: Why did you adjust the WFPS of site U to 83% and for sites D1 and D2 to 70%. Does this large difference in WFPS not influence the results? Section 4.1 p 19086 line 6: it would be very helpful to the reader if you would put average NNM rates from your data into this first sentence. : ‘...observed NNM rates (x – y kg/ha/y) are at the high end...’ Section 4.2 p 19090 line 14: Change ‘Obviously’ and ‘temperate’ to: ‘Our data have shown that denitrification was limited by temperature ...@...’

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