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## ***Interactive comment on “Pure stands of temperate forest tree species modify soil respiration and N turnover” by N. Brüggemann et al.***

**Anonymous Referee #1**

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### General comment

The paper reports rates of soil respiration, gross mineralization and nitrification measured in two soil layers of pure stands of different tree species planted 40 years ago. Samples were taken in spring and summer of one single year, and all measurements were done under standardized laboratory conditions. Thus they are useful as they indicate the existence of difference in the N-turnover between plots with different species. However, others have observed similar differences between stands of different species, and the paper is purely descriptive and offers little new insight into the controlling factors of the different processes. It would be helpful if the authors would provide a hypothesis, which can be tested with the data, rather than a justification of their work by referring to modelling. As a result, it seems difficult to generalize the information from this survey beyond the conditions of these specific experimental plots, which also

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appear to be influenced by high atmospheric N-inputs. Whether the data are useful for modelling purposes is questionable.

#### Specific comments

1.Better understanding of N turnover in forest soils is a relevant issue, and experimental data are needed to improve mechanistic models. Thus this study addresses a relevant question, which is clearly within the scope of the journal. 2.The study uses established methods and concepts. Qualitatively, the results confirm those of other studies, whereas quantitatively the data are site-specific, and they represent potential rates, rather than actual rates. 3.The conclusion is that there are differences between species, but that more in-depth work is needed to understand why. So what is the purpose of this publication? 4.The main deficiency in terms of the experimental setup is the lack of repetition. The authors give no details about that, but it must be assumed that plots were not replicated. Hence, the samples taken within each plot (Fig. 1) do not represent true replicates. Consequently, the statistical analysis using analysis of variance is not suitable in this situation. A further improvement is necessary with respect to the basis for the calculation of the different rates. For instance, if respiration rates would be based on SOC content rather than soil dry weight, the influences of substrate quantity and substrate quality could be better separated. Also, models typically relate activity rates to substrate concentration. Thirdly, the authors could provide more data, e.g. on soil temperature and ammonia concentrations, which are mentioned by not reported. 5.The data support the conclusion that more information is needed!! 6.The paper is generally well written and the artwork is of good quality. Methods are described in sufficient detail. 7.The authors relate their results to those of other studies, with only limited discussion of the differences between their results and those of others. 8.The abstract is fine. 9.Title: Given the concerns listed above, I would suggest to alter the title to: Differences in potential soil respiration and N-turnover rates between pure stands of different temperate forest tree species. 10.The presentation in terms of organization etc. is ok

**BGD**

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