

Interactive comment on “Controls over N₂O, NO_x and CO₂ fluxes in a calcareous mountain forest soil” by B. Kitzler et al.

B. Kitzler et al.

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Comments: The anonymous referee #2 remarks that most of the insights presented in the paper are not new, beside the reported time-deferred relationships.

ANSWER: The following aspects of our paper are new:

- o It is the first report on nitrogen oxides fluxes from Alpine forest ecosystems on limestone soil, these soils cover 29 % of the Austrian forest area.
- o It is the one of the few reports on long-term continuous N₂O and CO₂ measurements including NO emissions and continuous N input data of forest soils. Such measurements are needed for the estimation of global budgets.
- o The high ratio of N₂:N₂O emission is something new, compared to low values of 0–0.4 reported from other forests (Wolf and Brumme, 2003, Brumme et al. 1999; Mogge et al., 1998).

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o The introduction of time-series analysis into GHG-flux investigation is a new approach. So is the search for time-lagged responses to environmental factors. Both may prove valid in many other ecosystems in the future. We have changed the manuscript in order to make the new aspects more obvious.

The anonymous referee #2 criticizes the last paragraph of point 3.3.1 as an example of a too statistical approach when interpreting the data. We have deleted the criticized paragraph and introduced more discussion on functional relations, where it seemed appropriate.

The anonymous referee #2 criticizes the modelling aspect, especially two runs with the Pnet-N-DNDC model. We have deleted these two runs from the manuscript and explained the other modelling parts in more detail in order to more clearly point out the advantages of the GARCH simulations to the reader.

Specific comments

The anonymous referee #2 is concerned that measurements scheduled at 6 am could over estimate annual budgets. Several diurnal measurements showed that between 4:00 and 10:00am and again in the afternoon higher emissions could occur. We did not want to miss out these peaks. However, high variability was observed between the days and by our decision about measuring at the time of morning dew, we did neither over- nor underestimate mean diurnal emission rates.

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