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Interactive comment on "Short-and long-term temperature responses of soil denitrifier net N_2O efflux rates, inter-profile N_2O dynamics, and microbial genetic potentials" *by* Kate M. Buckeridge et al.

Anonymous Referee #1

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Overall, this is a very interesting manuscript that is presented in a clear and easy to follow manner. The objectives and hypotheses are presented well and are followed with an exceptional design and conclusions. I thought the use of the combined incubations was a novel approach to provide a link to landscape-scale processes from the experimental setup. The site selections provide a very useful

The manuscript presents very interesting results especially regarding the potential for N2O reduction in mineral soils, but the impact of this finding is somewhat muddled in the presentation of the data.

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Discussion paper

In figure 4, the combitionation effect is presented and presented as a percent of the 'expected N2O production rate', but the definition of this rate is not clear. The logic behind these calculations is not clearly explained in the manuscript itself. Is the expected rate actually the rate at the end of the 60h incubation of the soils incubated in isolation? So that the values expressed in Fig 4B are the absolute rates of Fig4A divided by the rates in Fig3 A &C? It would be important for the reader to understand the logic behind figure 4 and clearly explain the calculations within the manuscript.

Additionally, the results from the incubations of mineral soil horizons demonstrate low rates of N2O production, but without confirmation of 15N-N2 measurements, how are the authors confident that these low production rates correlate to high N2O reduction rates? This can be addressed with the rate of 15N-NO3 throughout the experiment, but it is not clear in the text as the manuscript is currently written, please elucidate on this in the discussion.

Finally, one very minor comment regarding the figures. To help distinguish between the incubated soils, please use symbols additional to the colors.

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