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Interactive comment on “N₂O emission from organic barley cultivation as affected by green manure management” by S. Nadeem et al.

Anonymous Referee #1

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General comments The theme of the manuscript is up-to-date and the study gives new data on N₂O emissions from soils. Data on the factors affecting N₂O emissions is needed for the estimation of the environmental effects of different farming practices. As organic farming is increasing in many countries, data on its effect on greenhouse gas balances is needed e.g. for greenhouse gas inventories and life cycle analysis of agricultural products. Although this study did not give data on full-year greenhouse gas balances it points out important differences in the effects of the different fertilizing strategies. The manuscript is basically well written and only minor corrections are suggested.

Specific comments Page 2318 line 14 The reader does not see the “short-lived peaks” after ploughing since there were no measurements right after ploughing. It would be

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better to say “During the growing season, N₂O emission showed...”. See also p2323 line24. I think the spring peak is the result of fertilizing, not ploughing. P2322 line 7 The difference of 370 g is shown in Table 4, not Table 3 and it seems to be statistically significant, not non-significant as you state? I would say it is small but significant. Figures. It would be nice to have the standard deviations in the figures but they would indeed reduce the readability. In the case of N₂O, there are the deviations and results of statistical tests in the tables which is adequate. In the case of mineral N, you could probably add a statement of the (lack of) statistical differences in the text. Discussion on the amount of applied N in the GM/fertilizer is lacking. The reader would appreciate data on the amount of N in the mulch (maybe presented in Table 2) and a comparison on the different forms of fertilizer. You state that the biogas residue did not yield as much DM and N as mineral fertilizer but you might also say that there was less available N in the residue at the time of application. The availability of N in the mulch is poor as well and the estimate of the amount of N in it would be interesting background data. The small (or lacking) differences between the treatments in the mineral N content of the soil are also worth of discussing. One would expect greater differences? Since there were no clear differences in mineral N content could the higher N₂O flux from mulch treatments reflect the higher soil moisture content under the mulch (P2322 lines 7-9)? Correlation analysis could reveal something more of the results?

Technical corrections p2308 line7 “return” is a better verb than “replace” in this connection. See also p2320 line 11. line 23 “greenhouse” not “green house” p2315 line 20 please give the manufacturer of the porous cups line 24 “augered” line 25 “angle” page 2317 line 6 “excursion” is probably not the best word here? line 12 “NH₄+” line 18 What do you mean by “erratic”? p2319 line 2 On the contrary, not “to”

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