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Biogeosciences Discussions

Interactive comment on "Comparison of soil greenhouse gas fluxes from extensive and intensive grazing in a temperate maritime climate" *by* U. Skiba et al.

Anonymous Referee #1

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General comments: To estimate the GHG fluxes for different areas, for different countries is essential in calculation of GHG budgets on country or larges scales. The default values for fluxes in GHG budget models are simplified and rough, causing one order error in predicted values. It is important to get as many information by field measurements, as possible, both for validation of models and to get more precise default values in models. Though methodology in the manuscript based on routine measurements, and there are several papers in the literature dealing with GHG balance at similar surface, I strongly believe the paper has much useful information. I recommend publishing in BG after a revision.

Specific comments: Authors were measured the soil respiration but it does not need for GHG budget calculation, anyway it is an interesting information, it would be nice to see the NEE, soil exhalation and the difference of these too, i.e., the uptake in one diagram.

Page 10059, row 5: it is a question whether N2O emission after application of mineral fertilizer is anthropogenic or not.

Page 10061, rows 21-22: it has not sense to indicate the detection limits (0.2 and 1.3 ppb) when background concentrations are 320 and 1900 ppb. Would be more informative to calculate the detection limit for fluxes, after a statistical analysis, rows 22-26: I miss an equation for calculation fluxes including conversion factors.

Page 10065, row 5-6: significant relation is mentioned in contrast to the sentence on page 10064, rows 25-28.

Page 10068, rows 15-18: if water table affects nitrous oxide and methane emissions in the same manner, and large CH4 and small N2O emission occur when water table is at the top 7 cm layer it is a contradiction. What does it mean: both gases were absorbed; does it mean they remained absorbed? Authors should have been treat the problem more precisely, i.e. role of soil wetness in anaerobic methane production, point out that there is an optimum soil wetness for N2O emission (not for production), production of N2O is fast also close to saturation but remained in soil solution with no emission making possible the denitrification up to N2 et c. Anyway Fig. 3 says nothing; there is no significant relationship between fluxes and water table. It would be easier to understand, if we take into account the critical role of soil temperature in soil production. Monthly mean values range the whole year including warm and cold periods. A two variable analysis (in one diagram) would be better as the dependence of individual fluxes on soil temperature and on soil moisture (at the typical layers of both anaerobic decomposition and denitrification).

Page 10069, rows 13-14: EF-s are in the range of 1.4 to 6.5% (as usual in the litera-

ture). In contrast the percentage of emitted fertilizer N is up to 70% (one order higher), it is a contradiction at a first view; should be solved.

Page 10078: In Table 2 and everywhere in the text: I estimate flux measurements are burdened by at least 10% percentage of error. It is not sense to indicate the data by 5 digits (suggesting 0.01-0.001 percent of error).

Page 10080: legend of Fig 2, to tell the truth, I completely do not understand the sentence in rows 4-5, why should cross the line the y axis?

Technical corrections:

Page 10058, row 1: their instead of its; till 2050 instead of in 2050

Page 10059, row 2: delete “concentrations”; row 14: yrs instead of yr; row 26: lambs instead of lamb.

Page 10060: GreenGrass; NitroEurope and CarboEurope.

Page 10062, rows 19-20 ultrasonic, instead of sonic.

Page 10065, row 12: Nitrous oxide fluxes.

Page 10066, row 20: Soil and ground cover respiration of carbon dioxide

Page 10080: legend of Fig 2, to tell the truth I completely do not understand the sentence in rows 4-5, why should cross the line the y axis?

Page 1083: legend of Fig. 5: row 1: “between”

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