The manuscript “Ecological Controls on N2O Emission in Surface Litter and Nearsurface Soil of a Managed Pasture: Modelling and Measurements ”, investigates to effect of the temporal variability in soil water content and soil T of surface litter and near-surface on N2O emissions. To do so results of a simulation experiment were used to construct a mathematical model of terrestrial processes involved in N2O emissions at high temporal and spatial resolution. Model performance compared with pluriannuelle field measurements (eg N2O, CO2 and energy exchange, SWC, Ts) of an intensively managed pasture in Switzerland (Oensingen). Modelled N2O emissions were found to be sensitive to defoliation intensity and timing (relative to that of fertilization) which controlled plant N uptake and SWC and Ts prior to and during emission events. In a sensitivity study, authors tested the reduction in harvested biomass (via LAI) and delaying harvest dates by 5 days. Model results indicated that C storage activity could be affected by suboptimal harvest intensity and timing. The manuscript very well written, interesting and ready to be published in the present form. Furthermore, the present model Ecosys gives further possibilities to test management options for intensively used grasslands. A long this line, what is missing here, is probably a comment of the applicability of the study (i.e. in conclusion, perspective), saying how the model will/can be used in the future. Is the model valid for other grasslands than the Swiss grassland, and can authors generalize that slow grassland growth (as a result of low harvest) does increase N2O. As there is also fertilizer amount : : : guess it0s a mixture of the four, herbage use, fertiliser amount, timing of cut and fertilization. Can we use LAI as an indicator for timing and amount? this would be great for farmers

We have added a statement to the Conclusions in ll. 818 - 823 about how our modelling approach should confer robustness of model application to the study of land management effects on N2O emissions.

Does the paper address relevant scientific questions within the scope of BG? -YES
Does the paper present novel concepts, ideas, tools, or data? -YES
Are substantial conclusions reached? –needs to be completed
Are the scientific methods and assumptions valid and clearly outlined? -YES
Are the results sufficient to support the interpretations and conclusions? -YES
Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? -YES
Do the authors give proper credit to related work and clearly indicate their own new/original contribution? -YES
Does the title clearly reflect the contents of the paper? -YES
Does the abstract provide a concise and complete summary? -YES
Is the overall presentation well structured and clear? -YES
Is the language fluent and precise? -YES
Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? -YES
Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? -See comments
Are the number and quality of references appropriate? -YES
Is the amount and quality of supplementary material appropriate? -YES
Specific comments
In the results, for reader would be helpful to quicker capture why authors have chosen a given time period/ year among the whole data set to show results (eg fig 6 and 7) : reading in detail, this was to capture/show management/climate events and the fact

the model can provide good simulations. Suggest to mention this briefly (eg. sub title, bold paragraph beginnings) in the respective paragraphs(L455, 477ff)/legends.

These periods were selected to examine changes in N2O emissions under contrasting SWC and temperature following similar fertilizer or manure additions, as stated in ll. 519 – 520.

Tab 3. Would be nice to have a las columns with the mean GPP, Reco, : : : and model results and the %under/overestimation. Eg harvest is overestimated while GPP, Reco are reasonably well represented.

Table 3 is already very large, and the key points to be drawn from it concern the interannual variation. Adding another column would squeeze the existing data.

Tab 2 is quite long and may be interesting as a detail. Given that main management events are in the Figs., I suggest to move into supplementary material.

I would like to keep it as is because I refer to it several times in the text.