

Interactive comment on “Impact of extreme precipitation and water table change on N₂O fluxes in a bio-energy poplar plantation” by D. Zona et al.

Anonymous Referee #2

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I basically follow the concerns of reviewer #1, that an interesting dataset is presented by this manuscripts, but major part of the discussions are too speculative. However, unlike reviewer #1, I think it has the potential to be published after major revisions. At the moment it does not fulfil the requirements of a “least publishable unit”. I am not a friend of the reading, that more “papers” is better than “less papers” at all, but I am very aware that particularly PhD and postdocs are mainly assessed by the number of papers and the impact factor of the journals rather than by their real quality! Therefore I do understand the try or need to publish field data on N₂O of approximately two months which is per se not en vogue today.

As already stated by reviewer #1 you should mainly skip the speculation on why μ^* and windspeed correlated for some days with N₂O fluxes (some literature can be in-

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cluded, a rough calculation on N₂O dissolved in water evaporated by the plants; but also wind may influence soil derived emissions). You must include data on H₂O and CO₂. One thing really missing that cannot be regained is additional chamber measurements for soil and plant fluxes (a) to check the rather novel method of the Los Gatos N₂O Analyzer and (b) to potentially separate soil fluxes from plant mediated fluxes. Even though it is highly likely that the Los Gatos Analyzer is measuring N₂O correctly it is always wise to compare with established methods. Mid-infrared based devices are always prone to “water vapour” errors. That is not only because condensation may happen in the device but also absorption of H₂O and N₂O may occur at very similar wave lengths. Therefore a very broad H₂O peak can overlap a small N₂O peak. I am always alerted if one needs to correct for dry air (as is done by the Los Gatos device) and use algorithms to produce raw data. You stated you have calibrated, but have you done it with wet air (calibration gas is dry!) also?

Assuming that you get another chance and of course cannot change the things that cannot be redone you should focus on what you can declare which is the importance of high temporal variability of N₂O fluxes. Again reviewer #1 is right it is not new (rainfall event, and water table) but (a) I think we cannot have enough papers on that point and we need spatial repetition in environmental science and (b) I have not seen it in that temporal resolution. Another point is the fact only really named in the title “bio-energy” poplar plantation – could these fluxes “offset” the aimed climate neutrality of such bio-energy attempts? At least it makes CO₂ equivalent flux calculations very difficult (Los Gatos devices cannot be used for too many bio-energy fields to test that) particularly in the light of a changing more extreme climate expecting more dry periods accompanied by heavy single rainfall events. So rather use your conclusions for your discussions. Do not formulate hypotheses, as you could not have expected such an event, but state what were the objectives after having the chance of having measuring during such an event.