**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 #3**

**Received and published: 26 April 2011**

**This manuscript holds relevant information on $N_2O$ emissions from poplar plantation after high rainfall events. The $N_2O$ measurements were carried out with EC system. The data analysis is appreciable but the novelty issue is still there.**

We thank the reviewer for valuing the data and results presented in our manuscript, and our methodology.

**I am not fully convinced with the novelty of the manuscript. The high $N_2O$ emissions after heavy rainfall are not new and there is no temporal or spatial resolution.**

The reviewer is right in stating that the peak $N_2O$ emissions were already observed in previous studies. However, the temporal resolution of the data presented in this manuscript (10Hz data averaged in 30 minutes) certainly makes this dataset unique (as it was also stated by reviewer #2). Previous papers presenting eddy covariance $N_2O$ data, reported daily average as the data presented high noise. The data presented here have the temporal resolution of half-hour (never shown before); this allowed modeling the fine temporal scale environmental drivers responsible of the $N_2O$ emissions. Also, the spatial resolution (landscape scale) of this study is not well represented (as also highlighted by reviewer #2), as there are sparse and short-term studies on $N_2O$ fluxes using eddy covariance.

**The author seems not very well aware of the present studies (e.g. Rafique et al 2011; Kim et al 2010).**

We thank the reviewer for pointing out these manuscripts that we will include in the discussion of the revised manuscript.

**I have doubt if this work is publishable with this present output. Author wrote the manuscript very well but most of them look over speculation and spent too much time other things rather than any main issue. I am very much agreeing with the comments of the reviewers 1 and 2. I would encourage resubmitting the manuscript after taking in to account the following issue:**

1- **Improve the novelty issue with the explanation of N concentration changes and investigation of CO2 and water fluxes etc.**

   Following the advice of this and the other two reviewers we will include a discussion about N concentration changes in the soil and include $CO_2$ and water fluxes in the revised manuscript.

2- **Interpret the results and discussion with new studies (e.g. Rafique et al., 2011; Kim et al 2010)**

   We will include these studies in the discussion

3- **Include temporal and spatial resolutions (agreed with reviewer 2)**

We are not sure what the reviewer means here: reviewer #2 did not requested a different temporal and spatial resolution? He suggested doing chamber measurements, which we are currently performing, but they were not able to capture this peak emission event.