Atmos. Chem. Phys. Discuss., 14, C8522–C8534, 2014
www.atmos-chem-phys-discuss.net/14/C8522/2014/

Interactive comment on "Nitrous oxide emissions from a commercial cornfield (*Zea mays*) measured using the eddy-covariance technique" *by* H. Huang et al.

H. Huang et al.

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Dear Dr. Guenther,

First of all, we would like to thank you and the reviewers for the valuable comments. We appreciate their time and contribution. We have made revisions to reflect all of the reviewers' comments. We have added more analysis and revised some parts of the manuscript to make it clearer and more accurate.

The responses to the reviewers' comments and the revised manuscript (Supplemental file), and the revised figures are attached .

We hope the revisions are satisfactory for final acceptance of the manuscript.

Sincerely,

Junming Wang

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/14/C8522/2014/acpd-14-C8522-2014-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 20417, 2014.

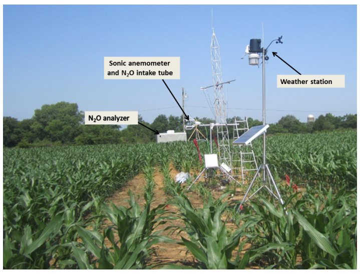

Figure 1: Photo of the experimental site, Williamson County (Nolensville, TN).

Fig. 1.

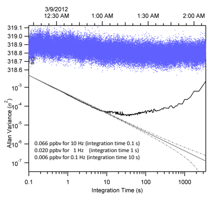

Figure 2: Time series of measured N_2O concentrations (blue dots, ppbv, 10 Hz) under field conditions and the associated Allan variance, downward sloping straight line shows the theoretical behavior of white noise (with a slope of -1, bracketed by dotdash lines showing the 95% confidence interval), provided by Dr. Mark Zahniser at Aerodyn.

Fig. 2.

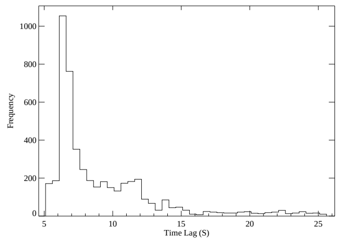

Figure 3: Whole-season histogram of the frequency distribution of time lags of N_2O measurements from wind velocity measurements, found by searching the maximum of cross-covariance.

Fig. 3.

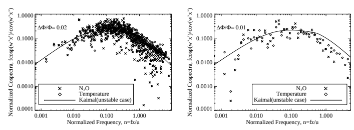

Figure 4: Normalized cospecta, (left) daytime (7 am to 7 pm May 22, 2012, $u_* \geq 0.2$, $L < 0$), (right) night time (7 pm May 16 to 7am May 17, 2012, $u_* \geq 0.2$, $L < 0$). (L is the stability parameter: Monin-Obukhov length (m) output from Eddypro; because under stable conditions ($L > 0$), the eddies may not have been well developed, the nighttime unstable conditions ($L < 0$) were chosen). The axis is normalized frequency, n=fz/u, f is natural frequency (Hz); z is measuring height (m); and u is wind speed (m s^{-1}). The idealized undamped cospectrum according to Kaimal et al. (1972) and sensible heat cospectrum are also given.

Fig. 4.

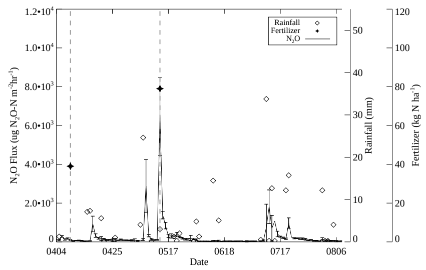

Figure 5: Daily average N_2O flux (μg N_2O-N m^{-2} hr^{-1}) with rainfall and N fertilizer applications from April 4 to August 8, 2012. Error bars were the standard deviations of all data collected on each day ($u_* \geq 0.2$ m s^{-1}), the dates of fertilization were indicated by dashed lines.

Fig. 5.

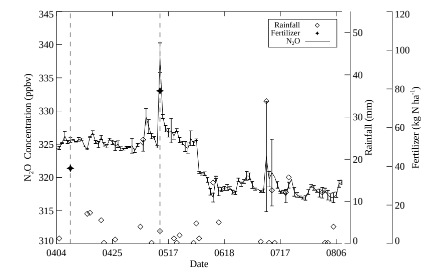

Figure 6: Daily average N_2O concentration (ppbv) with rainfall and N fertilizer applications from April 4 to August 8, 2012. Error bars were the standard deviations of all data collected on each day ($u_* \geq 0.2$ m s^{-1}), the dates of fertilization were indicated by dashed lines.

Fig. 6.

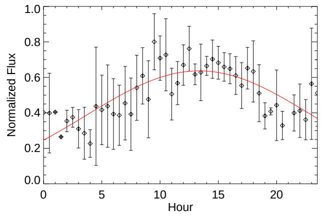

Figure 7: Diurnal variation of 30-min N_2O flux of five selected days when day and night were nearly complete (data points > 20 hours/day and $u_* \geq$ 0.2 m s^{-1}). The five days were April 15, April 25, April 26, June 1 and June 10. Bars are 95% confidence interval. Data were normalized by each day maximum.

Fig. 7.

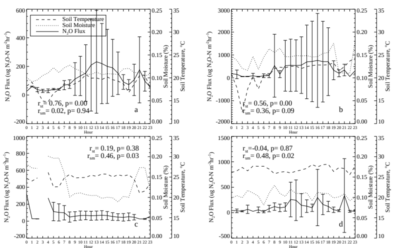

Figure 8: Diurnal variation of 30-min N_2O flux for the four sub-periods defined in Table 1, a. the first period, b. the second period, c. the third period, and d. the fourth period. r_{st} is the correlation coefficient of N_2O flux and soil temperature; r_{sm} is the correlation coefficient of N_2O flux and soil moisture.

Fig. 8.

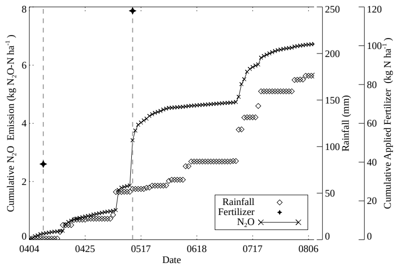

Figure 9: Cumulative N_2O emission for the experimental site, during April 4 to August 8, 2012. Rainfall and N fertilizer applications data were also shown, 24 days before the experiment (March 10) chicken litter was applied at a rate of 99 kg N ha^{-1} (not shown on the figure).

Fig. 9.

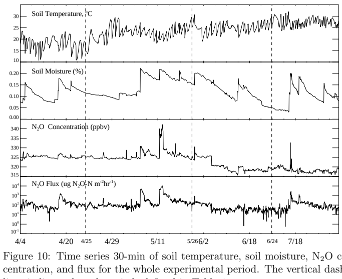

Figure 10: Time series 30-min of soil temperature, soil moisture, N_2O concentration, and flux for the whole experimental period. The vertical dashed lines indicate the sub-periods defined in Table 1.

Fig. 10.

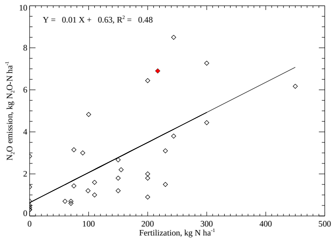

Figure 11: Regression of cumulative N_2O emission on the total applied fertilizer N in 10 different studies (where both amount of fertilizer and cumulative N_2O emission are provided) listed in Table 6, the result of this study is indicated by the red square.

Fig. 11.