Review Comments: Nitrous oxide emissions from a commercial cornfield (Zea mays) measured using the eddy-covariance technique

This is a well-written paper describing one of the first applications of an ultra-sensitive, fast N2O analyzer that is well-suited for measuring continuous N2O fluxes from agricultural crops. Results are reported for N2O fluxes over a corn crop during an entire growing season. On the basis of the new instrument and the complete growing season results, this paper should be published. There are some revisions suggested mainly to address the uncertainties in the results.

The authors report long term averages of N2O fluxes, including daytime and nighttime averages. However, these averages have very large standard deviations (factor of three larger than the mean) which show that the frequency distribution of the measured fluxes are highly skewed with a small number of high fluxes and a large number of low fluxes. It would be worthwhile to consider better statistical descriptions of the measured fluxes and to report the means based on a more rigorous statistical approach that takes into account the non-normal distribution of measured fluxes. In this case, the uncertainty should be expressed in terms of a 90 or 95% confidence limit derived from the analysis. This can be done by fitting the data with an appropriate non-normal distribution and then using a boot-strapping procedure to determine the average and associated confidence limit for the average.

The collected data only represented a small fraction of the total measurement period due to filtering of low turbulence and precipitation periods. Regression equations were used to gap-fill the data. Some discussion of the uncertainty in gap-filling is warranted and, in particular, how do uncertainties in gap-filling compare to the other EC measurement uncertainties. Further, how do the uncertainties in gap-filling affect the overall accumulated N2O fluxes and the conclusion that the N2O flux represents 1.43% of N applied. In the same way, since 93% of the good data were collected during daytime, can anything substantive really be said about daytime vs nighttime fluxes? Comparison of the averages with their large uncertainties seems misleading. Perhaps some case study periods where there is more complete data would be useful for addressing day-night changes.