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Biogeosciences Discussions

Interactive comment on "Methane fluxes measured by eddy covariance and static chamber techniques at a temperate forest in central ontario, Canada" *by* J. M. Wang et al.

Anonymous Referee #1

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This manuscript presents methane flux measurements at a temperate forest in Canada by using the eddy covariance (EC) method. Since measurements of methane flux at forest ecosystems by the EC is currently a few, the manuscript potentially contributes the FLUXNET community who will measure methane fluxes in future. Totally, the study does a good job to provide example for the eddy covariance measurement and to analyze environmental regulations over the methane fluxes. However, some points, mainly for uncertainty issues, are needed to be addressed before the publication.

General comments: Presented detection limit in Fig. 1 and Fig. S5 is precision of the system rather than the detection limit. Since null fluxes were calculated from actual vertical wind speed and methane concentration at the calibration, examined errors were distributed around zero value as shown in Fig. S5. In the actual case, however, those errors must be distributed around true fluxes; consequently, the precision must be drawn as error bars centered on each flux rather than on zero value in Fig. 1; if error bar crosses the zero value, the data is considered to be statistically zero. Please redraw the figure and show what percent of observed data did statistically differ to zero for daytime and nighttime.

Precision of the gas analyzer must be presented as the Allan variance (Allan, 1966) as well as time-series data as shown in Fig. S3, because time-series data cannot provide direct measure of the precision. Since the low flow setting of the analyzer cannot be available for the eddy covariance measurement, data obtained at the high flow setting must be shown also. Such information is necessary in measurements in forests, because range of the actual fluxes was near the detection limit.

Conpectra presented in Fig. S4 was results from ensemble mean. Although the ensemble provide a general characteristic, standard error in each data point is also necessarily, which can provide information how the general characteristics were hold in each run. In addition, please explain how you determine the cutoff frequency of 0.2Hz.

When you compare mean values, please add the standard error in order to understand that differences are statistically significant. For example, in page 17753 lines from 5 – 14, you compared the values from the EC and chambers, but standard error was not shown. In page 17756 line 5, you compared fluxes from the EC and BML methods, but errors in each method were not shown.

Specific issues: Page 17750 line 20-22: Please show the diurnal variations obtained at chamber measurements in the results section. Page 17755 Line 4: “longer timescale” is ambiguous. Please be concrete. Page 17760: If substrate limitation was significant, relationship between methane concentration and flux may be obvious. Please examine the relationship.

Fig. 2 – 6: The pried for the analysis used in the figure must be shown in the captions.
Fig. 6: Please show p-value for the slope.

References: Allan, D. W., 1966. Statistics of atomic frequency standards. Proceedings of the IEEE 54, 221-230.

Interactive comment on Biogeosciences Discuss., 9, 17743, 2012.

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9, C7469–C7471, 2013