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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Arctic Regional Methane Fluxes by Ecotope as Derived Using Eddy Covariance from a Low Flying Aircraft" *by* David S. Sayres et al.

Anonymous Referee #2

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Sayres et al. present measurements of methane fluxes in the Arctic using a low-flying research aircraft. This dataset is valuable to understand methane emissions in the arctic area and the distribution of methane emissions in different regions. The comparison between aircraft and tower measurements is also encouraging for the usage of airborne flux measurements. The authors used a method called flux fragment method to explore the heterogeneity of the fluxes. But this method is questionable, as each flux calculation only consider data points in a very short period (1 s) and low frequency parts of the fluxes are totally ignored in the calculation. Thus, all of the conclusions made from this part are not justified. As pointed by the other reviewer, other promising methods are available for investigate heterogeneous fluxes, such as wavelet analysis.

A few recent papers have used the wavelet analysis method to determine fluxes of air pollutants in urban and oil/gas regions (Karl et al., 2009;Vaughan et al., 2015;Yuan et al., 2015). The authors are encouraged to try this method. The authors spent some time to introduce the fast measurement system of wind and CH4. Could you add some spectral analysis for measured data.

Figure 4. Can you show the graph as 2*2 layout? The inserts are somewhat misleading and are hard to follow at present layout. Figure 2 and Figure 7: Could you use a consistent way to indicate flight numbers conducted at the same days. Please include this information in the figure caption.

I suggest a major revision is needed before the manuscript can be accepted by ACP. A point-to-point review is still necessary after the revision from the authors.

References:

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