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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Eddy covariance methane measurements at a Ponderosa pine plantation in California" *by* C. J. P. P. Smeets et al.

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Interactive author response to SC S1513 'short comment' by Ivan Mammarella

'Eddy covariance methane measurements at a Ponderosa pine plantation in California' by C.J.P.P. Smeets et al.

First the 'short comments' are reprinted followed by the corresponding authors response starting at $>$ for every item.

My short comment concerns the spectral analysis presented in the paper. The Figure 1 shows the ensemble average of 87 normalized co-spectra Cwx of different scalar quantities x as a function of natural frequency f. In order to reduce the uncertainty the authors used only daytime runs with high fluxes, corresponding to slightly unstable conditions (-0.5$<$(z-d)/L$<$0) (pp.5216, Line 9).

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However, 1) the ensemble average should account for different mean wind velocity U between runs and the correct way to present such cospectra is as a function of the normalized frequency n=f (z-d)/U. This would be irrelevant only if U does not change between runs, but the author does not mention it in the Figure caption.

> We fully agree with the above. However, for the 87 runs used in for the ensemble average the wind speed was fairly constant, i.e. 2.5 m/s +/- 0.5 m/s. In other words, presenting the cospectra as a function of normalized frequency only slightly changes the shape of the averaged cospectra in the low frequency range. It does not influence the interpretation of our data as presented in the paper. We will comment on the velocity variations for the 87 runs in the text.

2) Moreover it is not clear what is the universal Kaimal curve they plotted in Figure 1. They refer to Kaimal (1973), who however presents spectral curves in stable conditions.

> The curve plotted is not only valid under stable conditions but also in the limit to neutrality. In the text and in the Figure caption we also refer to this curve as being valid under neutral conditions. This type of universal curve was specifically described in Kaimal 1973 but introduced already earlier in Kaimal et al., 1972 (QJRMS, 98). The latter describe that they use the limiting curve on the stable side to describe the neutral cospectra (the 0+ curves in their Figures) which have the same general shape as all other curves in the stable regime. We will add a reference to Kaimal et al., 1972 to avoid misunderstanding.

3)Finally it is not clear why the Kaimal curve and the measured cospectra are arbitrarily offset, if the scope of the universal curve is to act as a reference.

> The curve is slightly offset merely for reasons of clarity so that the Kaimal curve is not obscured by our overlapping cospectra. In our opinion, using an offset doesn’t hinder a comparison of the different slopes at the low and high frequency ends. We will address this in the text.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 5201, 2009.

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Interactive Comment