

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 RC S1634, anonymous referee #2

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

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

Anonymous Referee #2

1. It is not very clear and not specified exactly what was the software related problem, which was corrected. In Abstract, that could be shortly explained and it should be stressed how this is generally interesting. Also in Conclusions, p. 5214, lines 25-26, what is exactly the upgrading done? This also relates to the point raised by Referee 1,

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that what is the exact focus and aim of the paper.

> The software related problem was already discussed in our response to the comments of referee #1. The problem we are referring to is a software upgrade of the FMA system. From laboratory measurements, for which we usually use the internal pump, it appeared that the noise clearly decreased to 1ppbv. We expected the same thing to happen for the measurements in an EC set-up when writing this paper. We recently discovered that this actually does not help at all to reduce noise for our EC set-up. We now suspect that part of the noise is caused by pressure fluctuations due to the high pumping speed of the external pump in the EC set-up. The pressure fluctuations inside the measurement cell will add noise to the methane signal. We rewrite the text in places where we mentioned the software problem. Concerning the exact focus we will specifically aim at testing the FMA in an eddy correlation set-up and description of the specific problems when using a combined open and closed path system. We will rewrite parts of sections 3.1 and include some of the Appendices in here.

2. p. 5206, line 5: is the LAI value total (all-sided) or projected?

> It is a one-sided leaf area index (LAI) for the full canopy (overstory and understory) is estimated at 5.1 m² m⁻² based on a tree survey conducted in early October 2007 and previous surveys of tree and brush leaf area (Xu et al., 2001; Misson et al., 2005). We will include this in the text.

3. This is just a suggestion for the future, not needed for this paper, why not to dry the sampled air, then you wouldn't need any WPL correction for water vapour.

> Yes, that would of course solve the whole matter concerning H₂O vapor influence on the methane signal. Remember, however, that the pumping speed through the closed system is high (40 l/min) and would put high demands on the drying capacity. We do not think that this is feasible (think of the high water content in tropical rainforest areas). Alternatively, H₂O vapor could also be measured inside the cell (a FMA measuring CH₄, CO₂ and H₂O simultaneously is available now from Los Gatos). Besides,

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closed path systems with drying of sampled air are not widely used and we think that addressing the (in part) not very well known consequences of different behavior of water vapor in a closed system is very useful.

4. It is not clear what kind of filtering was generally used for the data, especially was any friction velocity limits used and any stationarity tests?

> In Appendix A we list all criteria used to filter the data. This will be made more clear as we rewrite parts of section 3.1 (we will include part of the Appendices in here).

5. p. 5214, lines 1-3: it could be added that the flux values represent upward fluxes.

> We will add this to the text.

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

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