

Answer to the first Anonymous Referee

GENERAL COMMENT - We thank the referee for the positive reaction with regard to our manuscript. Also thanks for your valuable suggestions, which helped to improve our paper. We addressed your suggestions as follows (the referee comments are reproduced in italics):

SPECIFIC COMMENTS

In page 5324, line 28 you state that the CH₄ gradients “does not suggest a significant CH₄ production in the canopy.” That’s true but could you briefly discuss which other factors may modify gradients within the trunk space and canopy?

Reply: Additional information about potentially relevant processes below the canopy will be added in the revised manuscript. Tota et al. (2008) studied sub-canopy horizontal and vertical CO₂ fluxes. Results showed that nighttime advection could transport significant amounts of CO₂ in the lowest 10m of the canopy. According to the same research advection accounted for 73% and 71% of the CO₂ budget during the dry and wet period. Advection could have similar relevance for CH₄. Nevertheless, if CH₄ is horizontally transported below the canopy, it also implies that production is happening close to the ground. Also, in response to the comments from the other referee, this part will be rephrased and presented a bit more cautiously, e.g. that the observed gradients are conceptually in agreement with a source from the soil or near the surface.

How do you end up concluding “The present measurements indicate that organic composition at the soil is the most important source for the CH₄ budget at this site.”? From the chamber data mentioned in the end of section 4.1 but not shown in this manuscript? In my opinion it’s better to leave out such non-specific results unless they are properly described.

Reply: As stated in the reply to the last comment, this will be rephrased. Still, we think that this observation, namely the detection of a significant CH₄ source at or near the surface, is one of the main findings of the paper and we do not want to remove it, but improve the wording.

Page 5331, line 24: Maybe it’s somewhat too strong to say that the spectral analysis is “proof for the high quality of our EC measurements”. I agree that this comparison supports the quality of your results.

Reply: We will also reformulate this sentence, stating that this supports the quality of our data.

TECHNICAL CORRECTIONS

Page 5320, line 3: place only the publication year inside parentheses

Page 5320, line 15: ‘obteined’ should read ‘obtained’

Page 5328, line 13: ‘05’ should read ‘5’

Page 5330, lines 7, 8, 18: primes indicating the fluctuating parts are missing in some variables

Figure 5: Y-axis title should read 'Height' instead of 'High' in subplots a and b. In the subplots c and d, the Y-axes are titled 'Level' but aren't they really the same than in the subplots a and b? It's confusing to change axes within the same figure. Mixing ratio difference is indicated in the X-axes titles of c and d using 'dCH4' and in the figure caption using '_CH4'.

Figures 6, 7 and 9: I'd prefer seeing the time ticks at e.g. 00, 06, 12, 18, 24 in graphs showing diurnal cycles.

Reply: All technical corrections will be included.