



Interactive comment on “Measurements of hydrocarbon emissions from a boreal fen using the REA technique” by S. Haapanala et al.

Anonymous Referee #3

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General Comments: This paper deals with relaxed eddy accumulation (REA) measurements of light hydrocarbons from boreal wetlands. It reports original data on fluxes of methane and isoprene from the fen environment. While there are many measurements of methane fluxes reported in the literature, there are only a few for isoprene and this paper is an important contribution to our knowledge of isoprene fluxes. An important weakness of the paper however, is the lack of information about how well the particular fen being measured represents boreal wetlands. For example, previous work has demonstrated the significant difference in isoprene emissions between the hummock and flark microenvironments. Fens of varying degrees of wetness are expected to exhibit different emission patterns. From the information given in this paper, we cannot determine to what degree the results can be generalized. The comparison to chamber results reported in the literature is also incorrect.

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Specific Comments: p. 1650, line 9: Tedlar-bags were used for sampling "thus avoiding potentially contaminating pumps" in the sampling system. However, potentially contaminating pumps were then used to transfer the air sample from the bags to stainless steel canisters. Your reasoning is not entirely consistent here. If there was no other reason for using Tedlar-bags, then it seems to me it would have been better to use the canisters directly, thus eliminating a potentially contaminating extra step in the sampling process.

p. 1651, line 5-6: You report that data for soil temperatures and water table height were recorded continuously. Yet you do not attempt to use the data. Was there any correlation between methane or isoprene emission and soil temperatures, or to water table height? Was the water table height steady over the season? What percent of the fen consisted of elevated hummocks and how much of the area could be classified as flarks? What bearing do you think this had on your results? How representative is this particular fen for boreal wetlands?

p. 1651, line 13-14: Measurements performed on 14 April 2005 "are not included in the data analysis". If the measurements are not included, then why are they mentioned? Was there no information to be gained from those measurements?

p. 1651, line 18-21: Uncertainties were obtained by parallel analysis "at Utö and Pallas". And: "In Table 1...precision of the chemical analysis...are shown". How do these two sentences relate? The uncertainty obtained from parallel samples reflects the precision of the combined sampling and analytical steps, not the precision of the chemical analysis. Where do the standard deviations given in Table 1 come from? From the parallel samples taken at Utö and Pallas? That would mean that the SD values do not relate to the concentration values given in Table 1. It's not clear. Further, you do not give any information on the number of parallel samples. Nor do you give the average concentrations of the parallel samples. Is the sampling and analytical uncertainty best described as absolute numbers, or is it concentration dependent and best described as a percentage deviation?

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p. 1651, line 24-25: Here you mention the April measurements again, but only to exclude them. Don't they suggest that the flux of isoprene is zero prior to the growing season?

p. 1652, line 7: You state: "This might be due to the small data set and rather inaccurate methane flux detection". Why is the data set for methane too small, which I assume means smaller than the data set for isoprene? And, why is the methane flux detection inaccurate? Is your methane data often below the detection limit? Then, you should report it here. Is the sampling and analytical precision too poor?

p. 1653, line 11-12: You state: "This agrees well with the results of...". Your comparison looks to be incorrect. When comparing your results with earlier results reported in the literature, you are comparing REA results for the total fen area with results for chamber experiments on flark environments, not for the entire fen area. You need to consider the proportions of flark and hummock environments on Siikaneva fen before making a comparison.

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