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www.atmos-chem-phys-discuss.net/8/S5004/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The use of disjunct eddy sampling methods for the determination of ecosystem level fluxes of trace gases." *by* A. A. Turnipseed et al.

Anonymous Referee #2

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General comments

Turnipseed and co-authors evaluate the concept of disjunct eddy sampling (DES) for measurements of trace gas exchange fluxes over forests. They first revisit the theory of these approaches and discuss their applicability based on a series of comparisons with conventional eddy covariance measurements. The disjunct eddy sampler that was developed for these intercomparisons showed a good performance, but the limitations of the disjunct eddy sampling techniques - and the disjunct eddy accumulation technique in particular - also became evident.

Considering the increased number of studies applying DES techniques for quantifying

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Interactive Discussion
Discussion Paper

trace gas fluxes between earth surfaces and the atmosphere, and given the fact that many of these gases are highly relevant for atmospheric chemistry, this paper is of great interest for the ACP readership. The paper is of high quality in several aspects. It is well written and nicely structured. The theory behind the different techniques is clearly presented and discussed appropriately. Furthermore, an innovative disjunct sampler was introduced which should help to avoid some of the practical limitations associated with this technique. The results demonstrate both the potential and limitations of the DES approaches, and the conclusions are drawn accordingly. My comments below are of minor nature and I recommend the paper for publication in ACP.

Specific comments

Experimental

Page 15: Description of the DES sampler: Sample air is fed through a pump before analysis (or storage in case of DEA); this can be critical for measurements of some compounds and a sentence should be added explaining why the authors are convinced it will not affect the measurements presented here.

The flushing via V2 (and through the vent between VA and VC?) during step(1) and step (3) minimise carry-over effects. In case of DES (configuration 3a) carry-over seems to be completely avoided, but from the given information it is not possible to assess potential carry-over for the DEA configuration. More detailed information about the remaining “dead volumes” (vol. between the cross and VA/VC and between VA/VC and bags) should be given to exclude significant carry-over effects.

Page 16: Selection of w for determining dispense time in DEA mode: It seems that the best w reading would be the data point just before stopping the ISR flow, i.e. 0.1s before stopping the flow or an averaging of the two w measurements during the filling of the ISR. Have the authors explored the influence of such a w-averageing/selection?

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Interactive Comment

Results and discussion

4.1. DEC/EC intercomparison: The tendency of DEC to be higher than EC fluxes is surprising, but as stated, within the uncertainty. How close were the EC and DEC inlets to each other, could differences in sensor separation be an issue?

Technical corrections

Page 15, lines 11 and 14: Wrong figure numbers

Page 15, line 18: remove “the”.

Page 15, line 19: ... and obviously also V1 needs to switch

Page 15, line 20: sccm/min

Page 24, line 3: Figure 8b. Switching the order of figure 8a and b would be more intuitive and logical.

Table 1: The websites mentioned here cannot be accessed, please verify.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 13413, 2008.