**Atmospheric
Measurement
Techniques
Discussions**

Interactive comment on "Lag time determination in DEC measurements with PTR-MS" *by* R. Taipale et al.

Anonymous Referee #1

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The paper presents a systematic comparison of different methods for the determination of the lag time (between wind and scalar measurements) for the disjunct eddy covariance method. The paper is generally well written and structured. To my knowledge, the issue that the individual maximum covariance method could lead to an overestimation of the flux was analysed here quantitatively for the first time. I think it should be pointed out clearly that this effect can occur (and be avoided by the averaging method) not only for DEC but also for normal EC applications with a low signal-to-noise ratio (see comment below). Thus I recommend the paper for publication in BG after minor revisions detailed in the following.

SPECIFIC COMMENTS

P408,L15: '...but it may be the only viable method...' A (visual assessement) method

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which can not be described formally and objectively is not scientifically sound and thus not really useful!

P409,L3-7: I suggest to move this paragraph to the 'Conclusions' section, since it is important. Maybe the application for normal EC measurements could also be mentioned in the Abstract. In addition to Blake et al. (2009) also the following very recent paper could be referenced: Müller et al. (2010) First eddy covariance flux measurements by PTR-TOF, Atmos. Meas. Tech., 3, 387-395.

P411,L8-10: How can m37 fluxes be compared quantitatively to H2O fluxes if m37 is expressed in ncps?

P412,L13-15: The example displayed in Fig.2 suggests that the use of such small intervals of the covariance function tails may underestimate their true variability. Please comment.

P413,L6-7: Why was the lag time determined as median of only five measurements. Where they the only ones with 'distinct covariance function maximuma' during the entire measurement period?

P413,L20-24: If the VIS method cannot be explained more clearly and objectively here, it is not of real use in this study and should be omitted. Moreover, given the example in Fig.3, I have difficulties to imagine how a lag time could be determined visually with reasonable precision within such a large x-Axis range of -180s...+180s.

Conclusions: I fully accept the conlusion that the AVG method is the best of the options presented here. But it may be worth to add a few words about the optimum choice of the averaging window (here: 5 sec. width), e.g. depending on the measurement height.

LANGUAGE CORRECTIONS

A number of somewhat odd and inappropriate expressions where used in the text.

P406,L15: replace 'resting' by 'using' or 'based on'

P407,L23: replace 'The slower instruments' by 'Slower instruments'

P408,L14: replace 'contingent' by e.g. 'depending'

P408,L18: replace 'hardship' e.g. by 'problems'

P409,L4: replace 'beset' by 'affected'

P409,L8: replace 'resort to' by 'look at' or 'investigate'

P410,L28: replace 'manoeuvre' by 'procedure'

P411,L12-13: rephrase this sentence!

P413,L5: '...the lag time was set constant...'

P413,L20: replace 'rested' by 'was based'

P418,L1: replace/rephrase the expression 'cavalier and blatant'

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