

Interactive comment on
**“CO₂-gradient measurements using
a parallel multi-analyzer setup” by L. Siebicke et al.**

Anonymous Referee #1

Received and published: 13 October 2010

(I) Overall quality of the discussion paper ("general comments"):

This manuscript describes a new approach to characterize horizontal advection using multiple gas analyzers, and to correct for the differences between the analyzers.

The proposed method seems sound and novel. The derivations and assumptions are adequate for number of potential study sites, and parameters are definable from standard tower measurements.

The practicality of the method may be restricted at present time by the two factors: (1) large number of expensive instruments required for each set of measurements; (2) complicated mathematical derivations, and accessibility of the method to researchers

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without micrometeorological background (for example, in horticulture, biology, fishery).

However, with further development of the method and instrumentation, the proposed approach may significantly improve ecosystem flux estimates, especially at nighttime in forests, urban terrains and perhaps over water surfaces.

I would recommend a publication after few technical corrections.

(II) Individual scientific questions/issues ("specific comments"):

(II.1) Abstract: page 4384 lines 17-18: the sentence seems to suggest that validity of assumptions was verified by a model. This seems strange and potentially self-fulfilling. The main body of the text does not actually validate one model with another model.

It may be recommended to re-phrase this sentence.

(II.2) In the first part of the MM (Section 2.4), complicated things explained very well in a simple manner. The second part (Section 2.5) is a little bit more difficult to read. And the third part (Sections 2.6, 2.7, and 2.8) is quite difficult to follow.

It would be good to provide same thorough and simple explanations in the latter sections of MM, as were provided in the first portion of MM.

(II.3) Section 2.8 is very brief. The equation 7 could seem unfamiliar to a reader. It may be better to start with full flux equation, including all flux and advection terms and then narrow it down to equation 7. This also will help reader to appreciate the importance of these HA measurements.

(III) Technical corrections (typing errors, etc.):

Figures 2,3,6,7 and 9 are very small and difficult to read.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4383, 2010.

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