

Interactive comment on “Eddy-covariance flux errors due to biases in gas concentration measurements: origins, quantification and correction” by G. Fratini et al.

Anonymous Referee #3

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General comments:

This discussion paper describes how non-linear calibrations of gas analyzers affect eddy covariance flux measurement of CO₂ and water vapour using numerical simulations and field data, and shows strategies we should take in post-experiment data processing and in field measurement. Since the effect of non-linear calibrations of gas analyzers has been ignored, I believe this paper provides flux communities with new and useful information. Detailed description on theoretical background of the calibrations of NDIR gas analyzers (Sections 1) and how drifts of absorptance of the gas analyzers affect measured gas densities and their fluctuations (Section 2.1.1) are also useful for flux communities. These introductory parts of the paper are essential to un-

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derstand the following results and discussion, though readers may feel boring a little. In addition, this paper contains various suggestions, which should be considered in experimental design and data processing of eddy covariance measurement. For these reasons, I recommend the paper is published as a journal paper after the following minor revisions.

Specific comments:

- 1) P13682, L10-P13687, L8. In this part of Introduction, the authors describe theoretical background of the issue the paper deals with. I, however, wonder long description in introduction makes readers feel boring, and therefore recommend that the authors separate this part from Introduction and place it prior to Section 2.1.1.
- 2) P13687, L9-11. Since both numerical simulations and analysis using field data are important contributions to the paper, it is curious for me that results of numerical simulation were placed in “2. Materials and methods” while results of analysis using field data were placed in “3. Results and Discussion”. Both sections should be reorganized so that readers can easily understand the whole structure of the paper.
- 3) P13696, L15-24. More description on the field experiment is desired, especially on measurement height as well as vegetation, soil moisture conditions, and which kind of field operations were made during the experiment.

Technical comments:

- 4) P13685, L4. Is “P” here the same as P in equations (2) and (3), the total pressure including water vapour pressure?
- 5) P13692, L12-15. How much the population of calibration curves?
- 6) P13702, L17-19. I agree with this statement, but how to?

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