Atmos. Chem. Phys. Discuss., 10, C13484–C13485, 2011
www.atmos-chem-phys-discuss.net/10/C13484/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical sensor resolution requirements for near-surface measurements of turbulent fluxes" *by* M. D. Rowe et al.

Anonymous Referee #2

Received and published: 11 February 2011

Rowe et al. further develope the approach by Businger & Delany (1990) for estimating the sensor resolution required to limit the contribution of the concentration measurement uncertainty to the flux uncertainty to a certain level (10% in this case). This is a very useful and well-written contribution for those planning to conduct flux measurements, in particular if "experimental" or less-proven sensors are used. Having said this there are few other comments I want to make - in my view the paper can be accepted for ACP provided the following minor comments are tackled by the authors.

(1) Title: I am wondering whether the use of "chemical sensors" in the title and elsewhere in the paper is not too restrictive because it would for example exclude particle

counters used for particle flux measurements. Why not say just "Sensor resolution requirements ..." or "Scalar sensor resolution requirements ..."?

(2) The authors appear somewhat biased towards water-atmosphere flux applications (while I am biased towards land-based studies ...). In oder to provide some more balance I suggest to assure that in particular references reflect both fields - this will make the paper more appealing to a wider community. For example on p. 24410 l. 22 I would suggest citing for land-atmosphere eddy covariance CO2 flux measurements Baldocchi et al. (1988), Baldocchi (2003) and Aubinet et al. (2001).

(3) I find the use of two-letter symbols such as AP and CP in equations awkward - maybe the authors can do with a single letter or a (greek) symbol instead.

(4) The authors cover the eddy covariance, conditional sampling and modified BREB methods. For many compounds virtual disjunct EC is the preferred method and I wonder whether the authors can say something about this method too.

(5) The autors make use of several equations that rely on empirical data - depending on which parameterisation is chosen results will be different. It would be very instructive too indicate the magnitutde of systematic uncertainty due to these choices.

References: Aubinet, M., et al. (2000), Estimates of the annual net carbon and water exchange of forest: the EUROFLUX methodology, Adv. Ecol. Res., 30, 113-175.

Baldocchi DD. 2003. Assessing ecosystem carbon balance: problems and prospects of the eddy covariance technique. Global Change Biology 9, 479-492

Baldocchi, D.D., B.B., Hicks, and T.P. Meyers (1988), Measuring biosphere atmosphere exchanges of biologically related gases with micrometeorological methods, Ecology, 69, 1331-1340.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24409, 2010.