

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

Anonymous Referee #1

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The authors formulate a new approach to specifying the required resolution for a chemical sensor to measure a scalar flux to an uncertainty of 10% by eddy covariance, gradient, and relaxed eddy accumulation techniques. For eddy covariance measurements, they estimate the required resolution to be a factor of 40 less than previously published, because they assume sensor white noise uncorrelated with the scalar fluctuations, whereas the previous estimates assumed the noise to be well correlated with the scalar fluctuations. The authors then provide current empirical Monin-Obukhov similarity functions for water vapor fluctuations as required by their required-resolution formula, assuming equality with the turbulent fluctuations of any passive scalar. Finally, the paper discusses the behavior of their formulas with several examples of common

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scalar-flux measurement examples.

This paper is relevant, well-written, and a fairly complete discussion of the topic. As stated by the authors, the paper will be very useful to plan field measurements of atmosphere-surface-exchange fluxes of scalar species.

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