

Interactive comment on “Flux correction for closed-path laser spectrometers without internal water vapor measurements” by R. V. Hiller et al.

Anonymous Referee #1

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The manuscript reflects a poor physical understanding. The authors try to suggest that the so-called Webb flux correction has somewhat to do with open-path and closed-path instruments. That is not the case. The papers of Webb & Pearman (1977) and Webb et al. (1980) do not reflect any specific application. These papers are only dealing with a correction regarding the air density. Following the arguments of Webb and co-authors, this correction should result in a mean vertical velocity, and it is suggested that this velocity contributes to an enhanced vertical flux component in case of trace gases like carbon dioxide.

From the beginning on, this flux correction was always a matter of an controversial discussion as reflected by many papers that can be found in the respective literature. The authors, however, completely ignored these discussion. Papers link that of Bakan

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(1978), Bernhard & Piazena (1988), Kramm et al. (1995), Kramm and Meixner (2000), Paw U et al. (2000), Fuehrer and Friehe (2002), Kramm and Dlugi (2006) are completely excluded.

The review paper of Fuehrer & Friehe (2002) already discussed the pros and cons of this flux correction. Kramm & Meixner (2000) and especially Kramm & Dlugi (2006) argued that "the conventional Webb correction is based on elements of a Boussinesq approximation. Such elements, however, should not be considered while any kind of flux correction equation is derived because

flux correction equations that are, completely or partly, Boussinesq approximated violate conservation laws like the equation of continuity and the balance equations for water vapor and trace species derived for turbulent systems." These are enough reasons for discarding the Webb flux correction. In front of this aspect, it is highly awkward to discuss the difference between open-path and closed-path instruments. The Webb flux correction is the problem, but not the kind of sensor.

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