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Atmospheric Measurement Techniques Discussions

Interactive comment on "MAMAP – a new spectrometer system for column-averaged methane and carbon dioxide observations from aircraft: retrieval algorithm and first inversions for point source emission rates" *by* T. Krings et al.

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I plan to write a formal review in the forthcoming days, but would like to post one significant question I have which may deserve discussion with the authors. I will post my formal review later on.

I would like to thank the author for this excellent paper as it clearly shows the potential and difficulties in measuring CO2 emission from localized and intense source from atmospheric measurements. The paper is particularly relevant in the context of the

preparation for the Carbonsat mission, selected by ESA last year. I have one problem however with the way an average wind speed is computed from the wind speed vertical profile (eq 27). The wind speed is an essential parameter to infer the emission from the column concentration. Indeed, the column concentration is inversely proportional to the wind speed (see eq 13). From the wind speed vertical profile (in fact, two layers with different wind speeds), the authors compute an averaged value Ua, weighted by the fraction of the emission in each of two layers (w1 and w2). Ua = w1 U1 + w2 U2 I argue that, as the vertical column is proportional to the inverse of the wind speed, the averaged wind speed should be computed as 1/Ua = w1/U1 + w2/U2

This has large consequences; In the case of Janschwalde, the values are w1=56%, w2=44%, U1=3.6; U2=6.5 Which leads to averaged wind speeds of either 4.88 (authors method), or 4.48 (present) In the case of Schwarze, w1=55%, w2=45%, U1=2.5; U2=5.6 Which leads to averaged wind speeds of either 3.9 (authors method), or 3.33 (present)

Thus, it seems that the effective wind speed is overestimated by about 10%, with an equivalent impact on the power plant emission estimate.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 2207, 2011.