

Comment on amt-2021-106

Thomas Foken (Referee)

Referee comment on "Field testing two flux footprint models" by Trevor W. Coates et al.,
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Footprint models are widely used, but there has been little validation of the models (Leclerc and Foken, 2014). Such publications are very rare, as experimental validation is very costly. This publication is the description of such an experiment. It compares an analytical model (Kormann and Meixner, 2001) and a Lagrangian model (Flesch, 1996; Flesch et al., 2004) – both well-known model concepts – with a tracer experiment. Although the paper is brief, no methodological shortcomings could be identified. It should be published in the present version, unless the following comments make it possible to add to it.

Thankfully, the measurement data were published in the supplement. A first look at the data showed me that with stable stratification the analytical model agrees particularly badly with the validation data, while the Lagrangian model delivers significantly better results. A similar result was found by Göckede et al. (2005) when comparing the models of Schmid (2002) and Rannik et al. (2004), also mentioned in the paper. Perhaps one could make an addition to the stability dependence analogous to Fig. 2 in Göckede et al. (2005) and thus enhance the contribution somewhat.

At least in the further discussion of the data, attention should be paid to the positions of the maximum of the footprint. A possible explanation for the different agreement depending on fetch could be that the maxima of the footprint fit better with short fetch. This would be an investigation similar to that of Markkanen et al. (2009) for other model types and altitude ranges.

For the quality test of the eddy-covariance data, no programme documentation should be cited, but either the original paper (Foken and Wichura, 1996) or the identical book publication (Foken et al., 2012).

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