

I must reveal first that I have posted a community comment before being invited by the reviewer to review this paper.

This is a very detailed study where the calculation methods of multiple footprint-related parameters are presented. It would be very useful to users of the Campbell Eddy Covariance Systems. I have multiple major comments, which should be addressed before the paper being accepted. Some comments from my community comment are also listed below.

Major comments:

1. This study mainly focus on the fast calculation of footprint-related parameters. When doing the calculation, the authors used 1000 bins for each inflection zone. I am curious why so many bins are necessary because the footprint function is smooth within each inflection zone. I suggest perform a sensitivity test using progressively fewer bins to do the calculation and see whether an acceptable precision can be obtained with much fewer bins.

2. This point is related to the last one. The authors keep 8 digits after the decimal point. They also mentioned that 8 digits are the maximum number of digits that can be achieved by a single-precision machine. However, I am curious about whether it is necessary to keep so many digits. Kljun et al. (2015) fitted the LPDM-B results to obtain the equations. As can be seen from their figures, the points are rather scattered, indicating that the fitted model should have substantial uncertainty, even when we assume the LPDM-B results are perfect. In addition, when the footprint-related parameters are used, an error of ~1 m or larger should be sufficient. Therefore, it might be unnecessary to spend resources to calculate so many digits.

3. One particular point that is important in my opinion is that the limitations of the Kljun et al. (2015) model should be explicitly discussed. Further

clarifications at some places may also be important. The specific comments are provided below.

4. As mentioned in my community comment, I suggest clearly discuss the limitations of the footprint model.

Minor comments:

Lines 31-34. Theoretically, it is possible to use the footprint model to optimize the sensor height of an EC system. In practice, this is probably infeasible because the data used to run the footprint model are not available before the establishment of a site. Therefore, it may not be appropriate to state this in the abstract.

Figure 1c. The stability and the friction velocity were simultaneously, making the figure difficult to understand. I suggest showing the impacts of stability and friction velocity separately.

Line 83. I am confused by "...a mean of..."

Line 129. Please consider changing the section title to "A brief introduction of the flux footprint equations by Kljun et al. (2015)"

Eq. (3). Need "=".

Line 143. Please consider revising the section title. Section 2.1 in the present form is not directly related to the dimensional analysis but discusses some definitions. The later sections are directly related to the dimensional analysis.

Line 149. Need "." at the end of the sentence.

Line 173. Remove “,” before the citation. I also suggest removing “positively”.

Eq. (10). The second approximation is  $z \gg z_0 + d$ . The limitation of this assumption should be clearly pointed out. Over forest canopy, this assumption is not valid.

Line 178. ‘u’ to ‘ $\bar{u}$ ’?

Lines 186-187. Eq. (11) shows that the  $k\bar{u}/u_*$  is related to  $\Psi_m$ , which is further related to stability. Since it is  $k\bar{u}/u_*$  instead of  $\Psi_m$  that is used in the calculation, it might be necessary to clearly state that  $k\bar{u}/u_*$  reflects the stability effects.

Line 192. “eddy0covariance”?

Line 306. I suggest change this to “Dividing an inflection zone to 1000 bins is considered adequate”.

Line 309. “in-situ” to “in-field” for consistency with the earlier texts. Please consider change “in a lab” to “in advance”.

Section 4.6. As mentioned earlier, the optimization of sensor height may not be feasible because the data used to run the footprint model are not available before the establishment of a site.