Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
https://doi.org/10.5194/hess-2021-24-RC1, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on hess-2021-24

Anonymous Referee #1

Referee comment on "Adapting potential evapotranspiration from climate stations to the urban canyon for hydrological models" by Merle Koelbing et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-24-RC1, 2021

This paper presents an FAO56-based analysis of so-claimed "potential evapotranspiration" at an urban street scale using mobile measurements. Although the mobile measurements look interesting and may be valuable to understand the urban micrometeorology, the major flaw, improper use of FAO56 framework, prohibits this paper from publication in its current form:

- 1. the assumption of FAO56 for a reference crop with "a height of 0.12 m, a fixed surface resistance of 70 s m^{-1} and an albedo of 0.23" fails on (almost) all urban surfaces, which are usually characterised with impervious surfaces and rather patchy greenery: it is thus inappropriate to use such a surface to represent urban canyons. Besides, the FAO56 assumed reference crop is inherently positioned in a more homogeneous context, where the measurements take at screen level (e.g., 2 m agl) is within the inertial sublayer (or above roughness sublayer). As such, the study area of this work can by no means be considered suitable for FAO56 applications.
- 2. Moreover, even if FAO56 can be boldly applied to the urban canyons using the mobile measurements, the surface heat flux (i.e., Q_G in eqn 1) seems missing, leading to questionable estimates of available energy (i.e., Q^*-Q_G) as well as E_P.

Given the concerns above, I cannot recommend publication of this paper in HESS.

However, as I said, the mobile measurements look promising and should/can be be more properly used: e.g., to evaluate human thermal comfort at the street level; and I believe the refined analysis would be suitable for journals on urban environment (e.g., Urban Climate, Building and Environment, etc.).