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Comment on amt-2021-428

Lena Pfister (Referee)

Referee comment on "Quantifying the coastal urban surface layer structure using distributed temperature sensing in Helsinki, Finland" by Sasu Karttunen et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-428-RC2>, 2022

Review of "Quantifying the coastal urban surface layer structure using distributed temperature sensing in Helsinki, Finland"

Authors: S. Karttunen, E. O'Connor, O. Peltola, L. Järvi

The manuscript focuses on observing the urban surface layer using distributed temperature sensing (DTS) in Helsinki, Finland. The main focus was on showing the performance of DTS measurements compared to standard eddy-covariance (EC) measurements during different conditions. The manuscript shows through careful and convincing analysis that the DTS system can have a low signal-to-noise ratio especially during near-neutral conditions. Nevertheless, as shown in two different case studies, even under these conditions DTS measurements can give insights into internal boundary layers beyond the capability of EC or tower measurements. The main benefit of DTS measurements are the (mostly) spatially-continuous profiles which in combination with at least one EC instrument can give useful insights into the development of the near-surface boundary layer during condition when MOST can not be applied. Accordingly, DTS will help in developing parametrisations for surface layer flows which are required for improving the prediction of near-surface temperatures by numerical weather forecast and climate models.

The manuscript is well structured, explains the analysis accurately, leads the reader nicely, and is well written. Figures are well explained and give good insights into the

results. I enjoyed reading the manuscript. Thank you!

I only have very minor suggestions below. Accordingly, I recommend accepting as is.

Minor suggestions:

- L2: the word "coastal" is used twice within the sentence, maybe use "such" for the second one
- L91: "...above sea level (ASL)." □ since a lot of parameter are abbreviated using capital letters, I would recommend using lowercase letters: asl or a.s.l., but I am unsure if the journal recommend using ASL, in this case, I of course have no saying here.
- L100: Written sectors are also fine, but I always like visualizations: Maybe a pie chart? But this is only a suggestion, the written absolutely works.
- L477: "...This was the first time thatthe EC mesasurements..." □ there is a space missing between "that" and "the"