



## ***Interactive comment on “Atmospheric correction of thermal-infrared imagery of the 3-D urban environment acquired in oblique viewing geometry” by F. Meier et al.***

**F. Meier et al.**

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### General reply

We thank the Referee #2 very much for the review of our manuscript and the overall positive assessment. We will consider the comments in a revised version of the manuscript.

### Reply to specific comments

RC: p 5675, Eq. (1): You should consistently write "tau(theta\_j, z\_cam, z)", i.e. not ne-

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glect "z\_cam" in the first and second term on the equation right hand side. It would be good to add an index "surf" to epsilon, to avoid confusion with atmospheric emissivity.

AC: We agree with the Referee that the altitude of the observer has to be included in the general equation regardless of our particular experimental setup.

RC: p. 5676, l. 8-11: Clearly, it would cause significant complications in the analysis if scattered background radiance from the environment should be taken into account. On the other hand, a surface emissivity of unity is probably not really realistic. At least a simple attempt should be made to estimate the errors caused by this assumption. This could be done, e.g., based on downward radiance fluxes obtained from climatological atmospheric profiles. I was also wondering if scattered solar radiation needs to be taken into account?

AC: We intend to expand Section 2 in order to estimate the error caused by the assumption  $\epsilon = 1$  for a plausible range of surface emissivities and downward long-wave radiation.

RC: p. 5677, l. 3-4: It would be helpful to mention the spectral range covered by the TIR camera at this point.

AC: We will insert this information in the text of the revised version. This information was already provided in Eq. 5.

RC: p. 5678, l. 21-22: Is there a reference for the EXCUSE research program?

AC: No. The EXCUSE research program intends to foster experimental and theoretical atmospheric research on quantification of energy as well as associated momentum and mass exchange processes in the urban boundary layer. We will remove the reference to the EXCUSE program.

RC: p. 5687, sec. 4.4: This section might be improved a bit by reorganizing the contents. I suggest to discuss the dip in in-situ brightness temperatures at 9am in a single paragraph. It was not completely clear to me if the "micro-scale temperature

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"patterns" are indeed the cause of this dip? Also, it would be good to point out in numbers the bias between the KT15 device and the TIR camera.

AC: We agree with the Referee. The temperature differences between TIR camera and KT 15 will be discussed in more detail in a separate section. The surface temperature drop at 9am measured by the KT 15 device is caused by the experimental setup. The KT 15 sensor itself casts a shadow over the roof tiles being measured. This small-scale shadow is not captured by the TIR camera due to the spatial resolution. The surface temperature drop in the morning was also measured for other clear-sky days.

RC: p. 5694, Fig. 1: On my print-out the black and gray colors look almost the same. Please select colors which allow to better discriminate between wall A and wall B.

AC: We will revise Fig. 1.

RC: p. 5697, Fig. 4: I think this Figure is too busy and does not really help to better understand the correction procedure, which is clearly explained in the text. I suggest to eliminate it from the paper.

AC: We would like to keep Fig. 4 since a number of readers may prefer a graphical representation of the algorithmic workflow.

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