

***Interactive comment on “The Zugspitze radiative closure experiment for quantifying water vapor absorption over the terrestrial and solar infrared. Part II: Accurate calibration of high spectral resolution infrared measurements of surface solar radiation” by Andreas Reichert et al.***

**Anonymous Referee #1**

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This paper is clearly written, and describes an experiment and technique that will be of interest to many in the atmospheric physics community.

I think there are a few opportunities to improve the description of the motivation and context.

In the Introduction, page 1 line 31, it would be useful to add a brief comment about why accurate laboratory studies cannot be performed at atmospheric temperatures.

C1

On page 2, line 11-13, it would be helpful for the reader if you were to clarify explicitly why installing high temperature blackbody sources is drastically more challenging in remote or polar observatories.

These two items are key motivators of the technique described in the paper. I feel the reader's understanding of the work's usefulness would benefit from brief comments explaining the reasons this is needed.

In section 3, the Calibration section, there are a couple of places where I felt minor revisions for clarity would help.

On page 4, line 5, what are the "short time intervals"? An order-of-magnitude timescale of an hour? (n page 4 line 28 you note that the expected IWV variability is  $\sim 1$  mm during 1-2 hours. I assume this is how you've decided on the magnitude intended by short time interval.

Page 4, line 11, says the FTIR measurements selected for the Langley plot were averaged over 4 scans. Earlier, page 3 line 4, you said the Zugspitze FTIR averages over 4 to 8 scans. Were only 4 scan measurements an explicit selection criterion for consistency or was this coincidental?

In 3.1.3 has a nice discussion of the importance of accurate solar tracking for this technique.

Some FTIR instruments, such as AERIs, have two blackbodies for calibration. I was surprised to not see a mention of this. Would there be any additional value in adding a second blackbody?

Overall, this was an interesting and useful paper.

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C2