

Interactive comment on “A large-area blackbody for inflight calibration of an infrared interferometer deployed on board a long-duration balloon for stratospheric research” by Friedhelm Olschewski et al.

A. Kleinert

anne.kleinert@kit.edu

Received and published: 8 May 2018

This paper presents a large-area blackbody designed for application on a stratospheric balloon. It is temperature stabilized using a phase change material. Some more explanations on the characterization measurements and their results would increase the value of the paper for the scientific community:

P.1 l.18: "... the spectral and spatial radiance distribution of the blackbody was determined."

C1

Can you give some results of the spectral distribution?

P.4 Tab.1: Here the required spatial temperature uniformity is < 0.15 K, while elsewhere in the text the requirement is given as < 0.1 K.

P.6 Fig.4: In the left plot, the plateau is at -30 °C, while it is at -32 °C in the right plot. What is the reason for this difference?

P.6, l.15/16: "Due to its large optical surface, the blackbody faces a thermally non-uniform environment inside the RBCF with temperatures in the range between -120 °C and 23 °C."

Can you explain where these large temperature differences come from? Generally some more words on the RBCF and the measurement setup would be helpful.

P.7, Fig.5a: Can you add some labels to the figure? Where is the source chamber, where is VIRST? And how is the temperature distribution inside the RCBF (see also comment above)?

P.7 l.2: "The collinearity of radiance temperature and contact temperature is obvious."

This is true, but there is a systematic difference of about 50 mK. Is this expected?

P.7 l.12: "the corresponding radiance temperature is given as well by the calibration in terms of radiance temperature"

What is meant by "the calibration in terms of radiance temperature"?

P.8 Fig.6: At the beginning of the measurement, the temperature of the external chiller is just around the freezing temperature of the PCM. Are you sure that the PCM is completely frozen?

As soon as the chiller temperature is raised, the temperature of the blackbody rises rather fast for about half an hour before reaching the melting plateau. I would expect the melting to start immediately. Can you comment on this behaviour?

C2

The temperature gradient in this figure is about 75 mK/h which is more than twice as strong as in the lab (Fig. 4a) although the pressure is much lower and the ambient temperature is the same or lower. Is this expected?

P.9 Fig.7: The figure shows only 70 mm x 70 mm of the 125 mm x 125 mm optical surface. How is the temperature distribution outside the range shown?

Is the systematic gradient between upper and lower part of the optical surface expected? Is this gradient also reflected in the data of the 10 PRTs which are mentioned on p.3 l.11?

During the measurement of the lateral distribution (gap in Fig. 6), the overall blackbody temperature rises by about 100 to 150 mK. How is this temperature rise taken into account in order to make sure that the distribution shown in Fig. 7 is really a lateral effect and not interfering with an effect in time?

Typos:

P.1 l.18: A comma is missing after "institute"

P.3, l.1: "influence" without "s"

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-417, 2018.