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Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "Calibration of non-ideal thermal conductivity sensors" *by* N. I. Kömle et al.

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General Remarks: Please note that this paper was considered as an add-on to the previous paper by Hütter and Kömle (2012), which is also cited here. In this paper modelling results using finite element computations have been extensively presented and discussed. We did not want to repeat this here. We admit that by now we have only experimentally tested the calibration curve between the ideal and the non-ideal sensors in the range 0.2 – 2 W/m/K. It is a necessary (and planned) task for the future to do the same type of comparisons also for powders under vacuum in order to extend the calibration curve towards lower conductivities. However this was beyond the scope of the present paper. Nevertheless we have included this aspect in the conclusions section of the revised version.

P6/88: We agree. In the revised version the Huygens THC sensor is mentioned as one

of the predecessors actually used on a space mission, which has done extra-terrrestrial measurements (although for gases, not for solids). An appropriate Reference is cited: Hathi B., Daniell P.M., Banaszkiewicz M., Hagermann A., Leese M.R., Zarnecki J.C. Thermal conductivity instrument for measuring planetary atmospheric properties and data analysis technique. Journal of Thermal Analysis and Calorimetry 87, 585-590 (2007).

Fig. 5.: The dotted lines in the old version represented simply the linear connections between the respective measurement points. However we agree that this looks misleading. For the revised version Fig. 5 has been changed in order to make it more clear and informative. The measurement points are plotted with error bars (although these are only clearly visible for the agar-ice, for the other materials they are almost below figure resolution). The dotted line (there is only one line now) is the linear fit to all data points (from both LNP sensors).

Conclusions: It s true that for the short thick sensors (LNP-A ang LNP-B) the axial heat loss (via the wires) plays a significalt role and is probably the main reason why the measured THC values are different for the two types of sensors used. This has balso been demonstrated by the modelling results shown in Hütter and Kömle (2012) and seems to be confirmed by our calibration measurements. Figure 5 demonstrates the suitability of a linear fit at least for the investigated THC range.

p. 646: Typo has been corrected in the revised version.

Figures: An additional figure was included in the revised version to show deviations from the constant calibration factor.

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 685, 2012.

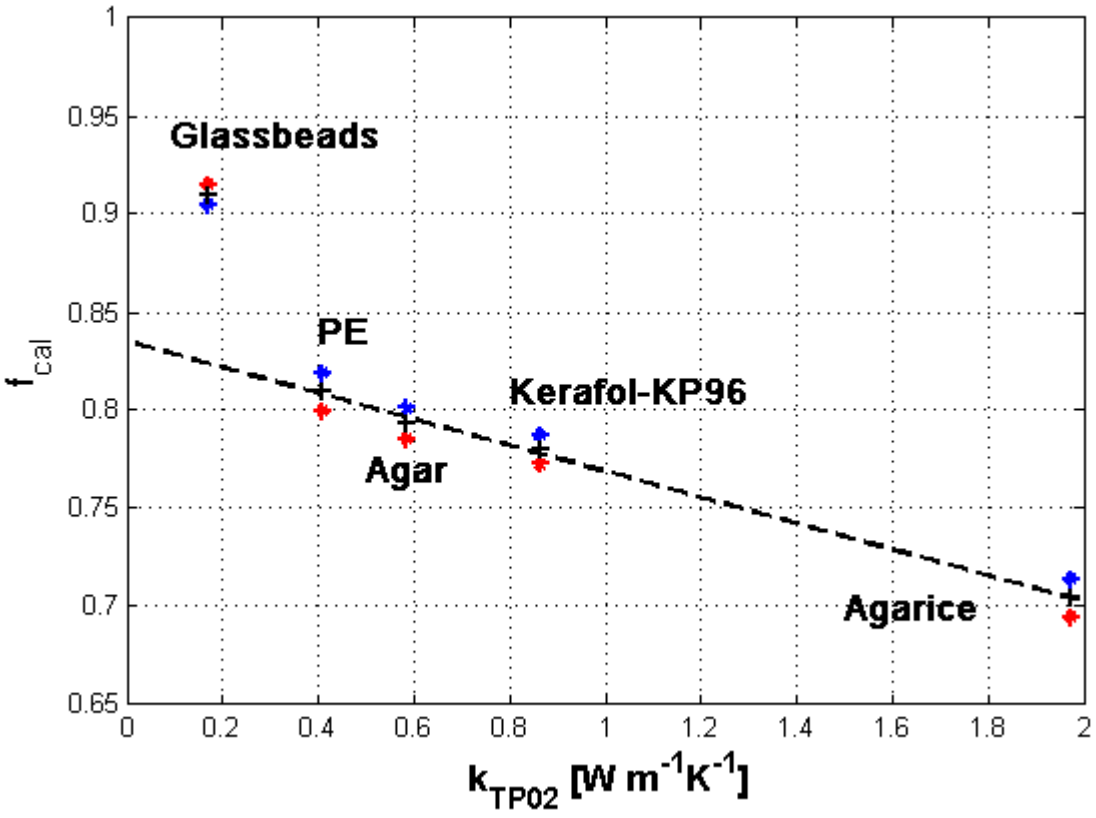

Fig. 1. AddedFigure6

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