Atmos. Meas. Tech. Discuss., 8, C1140–C1143, 2015
www.atmos-meas-tech-discuss.net/8/C1140/2015/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Atmospheric extinction in solar tower plants: the Absorption and Broadband Correction for MOR measurements" *by* N. Hanrieder et al.

Anonymous Referee #1

Received and published: 14 May 2015

GENERAL COMMENTS

In general, the language is clear and makes the scientific approach comprehensible. The authors provide a response to a current problem that is still not clearly solved. This problem is about the measurement of energy losses due to the atmospheric attenuation in concentrating solar power tower plants (TP). The paper shows a method to correct the monochromatic MOR measurements, to calculate the energy losses in the broadband of interest for the TP by using the libRadtran, an atmospheric radiative transfer code.

SPECIFIC COMMENTS

1# Authors consider the broadband of interest for the TP is from 250 to 4000 nm. Due the protecting glass of mirrors, the heliostats reflectance is not usually high above the 2500 nm, depending on the glass thickness (see attached Fig. 1 Heliostat Reflectance). If possible, it would be interesting to calculate the atmospheric transmittance for the [250, 2500] nm spectral range. The atmospheric attenuation is higher above the 2500 nm. Probably, this new calculation can provide a more realistic estimation.

2# An experimental verification of the atmospheric attenuation estimation is reported. It compares two instruments monochromatic measurements corrected by using the suggested Broadband Correction methodology. However, the method is the same for both instruments as well as the estimation of the spectral transmittance by libRadtran. I consider the verification could be improved through a theoretical uncertainty analysis. In my opinion, without the corresponding error analysis, it is not possible to state that applying this correction method makes both instruments sufficiently accurate to determine the solar broadband extinction.

3# About the bibliographic review, I suggest for consideration to include “BALLESTRÍN, J. (2012) Solar radiation attenuation in solar tower plants. Solar Energy, 86(1), pp. 388-392”. This work compare some of the mentioned models and some of the cited authors reference it. It was also performed at Plataforma Solar de Almería. And finally, it resulted in a transmissivity model that is included in the Tonatiuhray tracing code.

TECHNICAL CORRECTIONS

4# Abstract. “Applying this new correction method, both instruments can now be utilized to determine the solar broadband extinction in tower plants sufficiently accurate” (please revise)

5# Section 2.1.3 - Include the accuracy of CIMEL sun photometer

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6# Section 3.1 - mistake “band bass filter” -> “band pass filter”

7# Table 1, include the integration spectral range

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 4737, 2015.

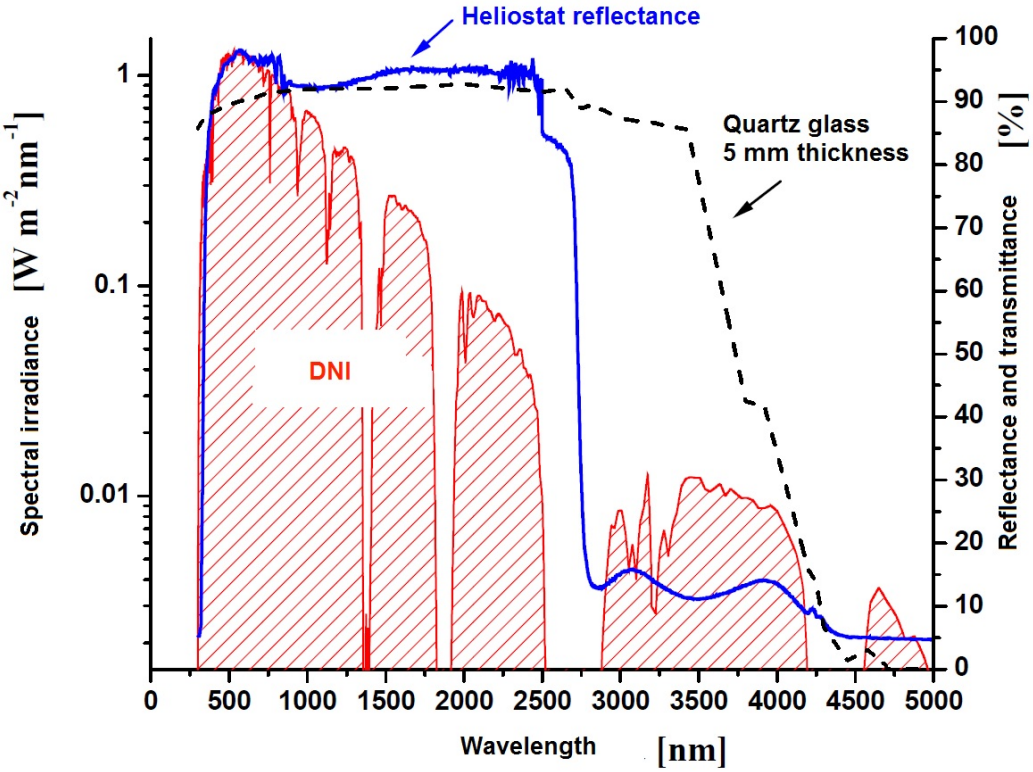

Fig. 1.

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