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Comment

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

N. Hanrieder et al.

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We thank the reviewer very much for reading our paper carefully and for the comments. Detailed responses to the comments are given below.

Response to Comment 1:

You are right that heliostat reflectance has to be considered if a plant simulation is performed. It is well known (see for example Meyen, S., et al., “Optical Characterization of Reflector Material for Concentrating Solar Power Technology” SolarPACES 2009) that the spectral reflectance of mirrors is not constant and dependent on the coating of

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the mirror. However, the effect is small. The spectral irradiance between 2500nm and 4000nm accounts for less than 1% for the atmospheric conditions from ASTM G173 and all air masses. The calculated transmittance for this wavelength interval and non-zero spectral DNI is not zero. If one would calculate the broadband transmittance instead of from 250nm to 4000nm but for 250nm to 2500nm for the example displayed in Fig. 3 from the paper, it would result in a broadband transmittance of 0.8998 for a slant range of 1km instead of 0.8958. That means it would account for a difference of 0.4%. Furthermore the reflectance of the heliostat is also not zero, but around 10% above 3000nm (between 2500nm and 3000nm almost no spectral DNI present). Hence, the effect of the heliostat reflectivity will be much smaller than 1%. Therefore, the correction algorithm will deliver nearly the same result even if the heliostat's spectral reflectance is considered. For the verification of the method the heliostat reflectance doesn't have to be considered. In this publication, we intended to keep the results independent on specific design and material of the heliostats. For a plant simulation, the specific heliostat reflectance might play a role in the MOR correction.

Response to Comment 2:

An uncertainty analysis (including uncertainty caused by the spectral reflectance of heliostats as discussed in comment 1) will be included in the final AMT paper.

Response to Comment 3:

We will consider the paper of Ballestrín and Marzo, (2012) in the AMT paper (between line 13 and 14, page 5 of 32).

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