Atmos. Meas. Tech. Discuss., 6, C1252–C1253, 2013
www.atmos-meas-tech-discuss.net/6/C1252/2013/

Atmospheric Measurement Techniques Discussions

Interactive comment on "McClear: a new model estimating downwelling solar radiation at ground level in clear-sky conditions" *by* M. Lefèvre et al.

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Received and published: 12 June 2013

General Comments

The authors are presenting a new radiative transfer model (RTM) approach that is based in an existing RTM (libradtran) code. The idea is not something new but the approach includes some innovative features. In order to state that this approach is better than other models a more thorough discussion about advantages and disadvantages of this and other models have to be considered.

Since we are talking about a cloudless sky model and the libradtran code, Eo values and solar angle dependent parameters are well known, all the weight on the quality of the model is related with other input parameter values such as AOD, WV e.t.c. The final comparison with the BSRN stations include uncertainty related with: a. Difference

on the input atmospheric parameters as derived here with the real atmospheric parameters b. Deviations due to the ground based uncertainty (more pronounced in direct beam data and their absolute calibrations) c. Deviations due to the approach of fitting the libradtran outputs in a specific atmospheric case. It is essential to try to estimate and quantify separately these three sources of uncertainties.

Concerning the AOD data. For this cloudless sky model approach aerosol data play an important role in certain regions on earth. Mostly desert aerosols from Sahara, fires from the Amazon and urban pollution at China are the first ones that play the most important role in solar irradiance changes with no clouds, globally. In this comparison only limited data from such areas exist, here. Authors need to exhibit the performance of the model to such cases. Meaning isolating such aerosol cases from the sites within such areas.

RMSE should increase with increasing solar zenith angle. Do you mean that relative RMSE is constant?

Figures from more complex sites than the one chosen here could be useful to discuss the results.

Other comments

P5 line 22 : Profiles of what quantity ?

The Monte Carlo approach needs some clarifications.

P3373, L10-12: what exactly do you mean by the uniform law ?

Xianghe results are poor in terms of correlation and similar to other stations in other statistical parameters. How is this possible, is not shown or explained.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 3367, 2013.