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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Twilight tropospheric and stratospheric photodissociation rates derived from balloon borne radiation measurements" *by* A. Kylling et al.

Anonymous Referee #2

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Comments to the article "Twilight tropospheric and stratospheric photodissociation rates derived from balloon borne radiation measurements" by Kylling, A., T. Danielson, M. Blumthaler, J. Schreder, and B. Johnson

The paper describes the performance of a new instrument to measure actinic fluxes. The instrument is specifically designed for balloon measurements. The deviation between measured and modelled actinic fluxes is shown for one measurement campaign. The agreement is surprisingly good. The paper is well written and the methodology is clearly presented. It should be published and it is certainly of interest to the scientific community.

However, two major caveats remain:

The first caveat is related to the calibration method (equation 2 and 3). It must be assumed by the broadness of the sensitivity function for each channel (10nm) that the calibration coefficients will change in dependence of the spectral irradiance. Especially the spectral distribution at 312 nm depends on altitude. The calibration coefficients were derived during a measurement campaign at the ground. It is not clear at all how these coefficients will change when the instrumnt is brought to higher altitudes. It is recommended that the authors reexamine this point (e.g. by model calculations) and give an uncertainty estimate.

The other caveat relates to the fact that aerosols are known to greatly influence actinic fluxes especially at high solar zenith angles. The authors state that no aerosol information was available for the flight. The relative good agreement between measurement and modelling may not be representative. A sensitivity study, including different size distributions of aerosols, might help to increase the confidence in the result that a very good agreement between measurements and modelling is achievable for other situations as well.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 715, 2002.