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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Model-aided radiometric determination of photolysis frequencies in a sunlit atmosphere simulation chamber" *by* B. Bohn and H. Zilken

**R. Scheirer (Referee)**

ronald.scheirer@dlr.de

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This paper provides a comprehensive description of methods to calculate the solar spectral actinic flux and photolysis frequencies within a complex shadowing and reflecting environment. In this case the calculations are conducted for the sunlit atmosphere simulation chamber (SAPHIR) at Forschungszentrum Jülich. To get a reasonable estimate of the internal mean actinic flux-field, the authors suggest to account for several types of influence on actinic fluxes by applying a set of correction factors on measurements of the external actinic flux.

This work shows a set of powerful tools to combine theoretical and experimental data in a nontrivial environment.

I recommend to accept this article after some minor improvements.

There are a few matters on which an additional, more detailed explanation could be very helpful.

1. One could wonder, if it wasn't an easier approach just to close the chamber completely and use an artificial internal UV source with well known spectral properties instead of the sun. This way problems with broken clouds and other external disturbances would vanish. The authors should add a brief discussion or explanation of the reasons for their choice.

2. The proposed method seems to be strictly limited to homogeneous overcast or clear sky cases. What uncertainties are expected for neglected anisotropic illumination situations (e.g. sub-visible clouds or inhomogeneous stratus mistaken as uniform overcast)?

3. It would make reading much easier if there was an overview on what the correction factors will be used upon and how to combine them.

4. How much time do you need for the calculation ?

Further remarks:
Within the conclusions it is noted that it is planned to monitor the UV radiance distributions by a sky imager with the aim to assess the effects of broken and inhomogeneous clouds. This seems to be a high-flying objective. I don't think that it is possible to calculate the internal actinic flux under such cloud conditions, but the sky imager could be very helpful in identifying homogeneous conditions.



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Interactive Comment

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6967, 2004.