Atmos. Chem. Phys. Discuss., 8, S370–S372, 2008
www.atmos-chem-phys-discuss.net/8/S370/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term solar UV radiation reconstructed by Artificial Neural Networks (ANN)" *by* U. Feister et al.

A. Lindfors

anders.lindfors@fmi.fi

Received and published: 25 February 2008

This is a general comment to all four papers related to UV reconstruction in this special issue (Staiger et al., Feister et al., Chubarova, and Rieder et al.). First of all, I would like to thank all authors for submitting their papers, it is nice to these UV reconstruction papers here.

The reason for my comment is that we have two very recent papers that may be of relevance for your submitted UV reconstruction work. Therefore, I would like to draw your attention to the following articles:

(i) Lindfors, A. and A. Arola, On the wavelength-dependent attenuation of UV radiation by clouds, *Geophysical Research Letters*, in press, 2008.

This paper continues the discussion started by Seckmeyer et al. (1996) and Kylling et al. (1997) on the wavelength-dependent attenuation of incoming radiation by clouds. Kylling et al. (1997) provided a physical explanation for why short wavelengths make it through the cloud more effectively than long wavelengths: according to them, it is because of multiple scattering between the cloud top and the atmosphere above (which favors shorter wavelengths). Our paper shows that there are other important effects as well, namely the wavelength-dependent radiance distribution at the cloud top (including the direct beam) together with the transmittance of the cloud alone as function of angle of incidence. We furthermore show that this latter effect introduces a solar zenith angle dependence in the wavelength-dependence of the cloud modification factor.

This information is relevant when transferring the cloud effect obtained from pyranometer measurements to a cloud effect in the UV range (e.g., Staiger et al. section 3.1; Rieder et al. section 4.4), or when thinking about the wavelength dependence of the cloud modification factor in general (e.g., Staiger et al. Introduction).

(ii) Lindfors et al., A method for reconstruction of past UV radiation based on radiative transfer modeling: applied to four stations in northern Europe, *Journal of Geophysical Research*, Vol 112, D23201, doi:10.1029/2007JD008454,2007.

This paper has a lot in common with the four UV reconstruction papers in this special issue and may thus be of interest. It presents a pyranometer-based UV reconstruction technique that relies quite a lot on radiative transfer simulations. Reconstructed UV time series are presented for four stations in northern Europe, namely Bergen, Norrkoping, Jokioinen, and Sodankyla.

Paper (i) is available in the Papers in Press section of GRL at http://www.agu.org/journals/pip/gl/2007GL032571-pip.pdf, while paper (ii) can be found at http://www.agu.org/pubs/crossref/2007/2007JD008454.shtml. Electronic

ACPD
8, S370–S372, 2008

reprints are also available from me (anders.lindfors(at)fmi.fi).

Anders Lindfors

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 453, 2008.

ACPD

8, S370–S372, 2008