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Interactive comment on "Effects of total solar eclipse of 29 March 2006 on surface radiation" *by* S. Kazadzis et al.

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As the authors are aware, we have developed a three-dimensional radiative transfer code which has already been published in the very same Special Issue of ACP on "The total solar eclipse of 2006 and its effects on the environment". Our model allows to quantitatively simulate irradiance and radiance during totality and we encourage the authors to reference our publication as some of the issues raised in the manuscript have already been discussed in our paper. In particular:

The observations in the manuscript are analyzed with the 1D radiative transfer model STAR following the approach of [Koepke et al., 2001]. The authors have attempted to find a correction for the solar limb darkening in their ozone retrieval, but the results show that this correction is not sufficient to explain the measurements close to totality.

One of the major conclusions of the paper is that the large decrease in total ozone column derived from the standard Brewer measurements is an "artefact in the measured irradiance due to the increasing contribution of diffuse radiation against the direct irradiance caused by the eclipse". I agree with this conclusion. In fact, Figure 14 [Emde and Mayer, 2007] quantifies the uncertainty in the 1D approximation used by the authors of this manuscript. The 3D calculations show that the radiation decreases much more for shorter wavelengths than the 1D model would suggest due to limb darkening. This is exactly what is observed in the measurements.

In addition I would like to point out that several studies of surface radiation during solar eclipses have been preformed in the 1960s and 1970s. Among them are measurements [e.g. Sharp et al. 1971] and model calculations [Shaw, 1978], which take into account second order scattering processes and solar limb darkening. Although these studies are not done explicitely for UV radiation, we think they should be mentioned in a paper about surface radiation during a solar eclipse.

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