Atmos. Chem. Phys. Discuss., 7, S4196–S4198, 2007
www.atmos-chem-phys-discuss.net/7/S4196/2007/

Atmospheric Chemistry and Physics Discussions

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

Anonymous Referee #1

Received and published: 20 August 2007

General The paper "Effects of total solar eclipse of 29 March 2006 on surface radiation" by S. Kazadzis et al. investigates the spectral effect of the total solar eclipse of 29 March 2006 to the surface solar radiation (global, direct and actinic flux). The paper is clearly written and represents a substantial contribution to scientific progress within the scope of ACP. The scientific approach and applied methods are valid based on both measurements and modelling. The results are presented in a clear and concise way while considering related work and including appropriate references. I suggest the publication of the paper after minor revisions (see below).

Specific

Abstract 1. Page 9236, line 11: Add "(ET)" after "Extraterrestrial".

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Campaign information, instruments and modelling tools

1. Page 9238, line 18: Explain the acronym “FWHM”.

2. Page 9240, line 3 (end of sub-section 2.2): It may be useful to provide the standard and random errors of the measurements.

3. Page 9240, sub-section 2.3: In terms of modeling, the STAR model is used and its results are discussed in the body text of the paper. However, apart from mentioning STAR model in the Introduction and Conclusions, this is not described at all. Even though details can be found in the relevant reference, a very brief description would be useful to the reader.

Total ozone column

1. Page 9241, lines 8-11: “For the period between 09:00 and 13:00 UT” through to “about 290 DU to 305 DU”. Please, explain more clearly this difference between the two days.

Spectral measurements of solar irradiance during the eclipse

1. Page 9241 (discussion of Fig. 2): It would be interesting to remove the effect of solar zenith angle in order to show the decrease of GI and DI due to the eclipse only. Moreover, it would be also interesting to express this change (decrease) in relative percentage terms with respect to the levels of 28/03 (as done in Fig. 1).

2. Page 9241 (discussion of Fig. 2): It would be interesting to discuss the variability in blue curve of bottom panel (i.e. in DI) around 10-10.5 UT and 12 UT, which is not apparent in the top panel (GI).

3. Page 9242, line 24: Replace “90:30 UT” with “09:30 UT”.

4. Page 9243, lines 19-21: Remove all three lines, which have been put in the text obviously by mistake.

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Extraterrestrial flux and solar effective temperature calculations

1. Page 9245, lines 15-18, “The derived transmittance” through to “the course of the eclipse.”: Even if the analysis is restricted to the first part of the eclipse (before totality) cirrus clouds were still present as mentioned in page 9238, lines 8-13. Moreover, as also stated in lines 11-13 of page 9238, some cumulus clouds were present as well. Therefore, how safe is to assume a constant sky transmittance under these conditions? Would it be possible to quantify these effects of clouds in order to characterize them as too small?

2. Page 9246 (discussion of Fig. 7): There is a difference between the ratios of calculated ET spectra derived by Bentham and CCD measurements. Thus, the former ratios decrease with increasing wavelength whereas the latter (CCD) either increase or keep about constant. Is there any explanation for this different behaviour?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9235, 2007.