

***Interactive comment on “A case study on biomass burning aerosols: effects on solar UV irradiance, retrieval of aerosol single scattering albedo” by A. Bagheri et al.***

**Anonymous Referee #1**

Received and published: 16 October 2008

A case study on biomass burning aerosols: effects on solar UV irradiance, retrieval of aerosol single scattering albedo A. Bagheri, B. Kjeldstad, and B. Johnsen Atmos. Chem. Phys. Discuss., 8, 17987-18005, 2008 SRef-ID: 1680-7375/acpd/2008-8-17987

General comments

The manuscript discusses the effects of aerosols from biomass burning, that passed over the generally clean site of Trondheim, on UV irradiance, and compares the single scattering albedo of these aerosols (derived from local measurements) with the SSA of more typical aerosols at the site. The content of the manuscript falls within the scope of

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



ACP. The report is of a case study, and as such does not present any particularly new ideas or techniques, but illustrates the effects of an unusual event for the location. The general techniques appear sound (though not all are described), but the significance of the results depends on the validity of the measurements on which they are based. There are no uncertainties associated with either the measurements or the products derived from them. This is a flaw that needs to be corrected.

#### Specific comments

17990 What is the uncertainty in the data from each instrument? Include the reduction of GUV data to a single 1 nm FWHM line, as presumably this was used in the retrieval of the SSA (for the DDR).

17991 GUV calibration in 2005, how stable is it? Has it been compared to anything since (eg the Bentham?). The channels can change independently, giving different results in the retrievals for different wavelengths.

17991 I assume the GUV data was one-minute averaged and the nearest minute average to the spectral data was selected (see technical corrections) &#8211; if not the sentence should be changed further.

17992 Please give (brief) details of AOD retrieval, and the uncertainty in the results.

17993 AOD refers to the integrated columnar aerosol load in the same way that we refer to columnar ozone amount. It is not a function of SZA (though the SZA must be known to derive it).

What is meant by the closest average SZA for both days? Do you mean matching SZA because the direct scans were taken at regular (clock) time intervals?

17994 The DDR method is only independent of calibration if the same instrument is used to measure both parameters. In this case two different instruments (and calibrations) have been employed so the statement is false (see also comment on GUV calibration). What is the agreement between the Bentham and the GUV when both

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

measuring global irradiance at the GUV wavelengths? This will give an indication of the uncertainty involved in using the two systems for the DDR.

17995, 11 Why are the shorter wavelengths not mentioned?

17995, 20 replace 'very good' by 'within x%' or similar quantitative measure.

17995, 27 Why is a wavelength of 319 nm used for diffuse radiation when 320 nm is used for global? the curves are smooth, I doubt there is a significant difference between 319 and 320 nm. On page 17996 the phrase 'about 319 nm' is then used. For simplicity I suggest using 320 nm for both global and diffuse.

17996, Point vi) is a general statement and well known. If you mean the aerosol induced effect on the direct and diffuse, then say so. Otherwise delete the point.

17996, 12 and also (probably) aerosols with different properties.

17996, 24 / Figure 3 I do not think the SSAs are significantly different, except at 305 and 380 nm, thus the generalized statement is incorrect, and you need to show (earlier comment) that this is not a feature of the measurements used in the retrieval.

17997 What is the measurement uncertainty? How do the measurement uncertainties influence the retrieved SSA?

17997 Query the validity of a comparison with different wavelengths, UV vs. VIS / IR.

Technical corrections 17998,4 observed as far away as the Arctic.

17998,5,7 State what data is simulated. It is then odd to say the simulated data were used to assess the effect on surface UV when you have surface UV measurements.

17998, 10 wavelengths

17998, 15 and how do these values compare? A brief statement would give continuity from the previous sentence for those not familiar with background SSA for Trondheim.

17989, 15 affect (not effect)

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



17989, 27 reductions of up to

17990, 6 Suggest: using spectral data to highlight the wavelength dependence The sentence as written does not really make sense.

17990, 8 wavelengths

17990, 14 sea

17991, 13 the

17991, 19 corresponding channels of one-minute averaged GUV data were selected

17991, 23-24 effects are, or effect is, not effect are

17992, 1 during the two days

17992, 10 assumptions

17992, 20-23 Repetitive, and could be deleted. Just mention the 8 streams on line 15.

17993, 14 was assigned

17994, 16 Suggest deleting first clause of sentence (what does 'narrow effect' mean?).

17994, 18 and a day which showed a clear increase in AOD from biomass aerosol

17995, 3 measured

17995, 6 reductions

17995, 15 SZA

17995, 18 model

17995, 24 region

17998, 3 with an increase

17998, 4-5 Suggest re-ordering sentences: Biomass aerosol is a very effective scat-

## ACPD

8, S8309–S8313, 2008

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



terer at all wavelengths, but the smoke aerosol over Trondheim had more absorption in the UV than the background aerosol.

Figure 1 caption. data used for each day; lower panel; irradiance

---

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17987, 2008.

**ACPD**

8, S8309–S8313, 2008

---

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

S8313

