

***Interactive comment on* “Temporal and spectral variation of desert dust and biomass burning aerosol scenes from 1995–2000 using GOME” by M. de Graaf et al.**

Anonymous Referee #2

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Review of “ Temporal and spectral variation of desert dust and biomass burning aerosol scenes from 1995-2000 using GOME. ” by M. de Graaf et al.

General Comments

This manuscript provides a new and interesting analysis of absorbing aerosols based on Global Ozone Monitoring Experiment (GOME) observations. In general the paper is clear, method and results are well presented. The major issue of the paper is to attempt an aerosol type classification, i.e. distinction between desert dust aerosol and biomass burning aerosol using the GOME spectral information. This approach is

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interesting, and the authors clearly report the difficulty related to several factors, like high surface albedo over lands in visible and near-IR or high hygroscopicity of biomass burning aerosols over ocean. The main limitation of the paper is that the results of their approach on aerosol type classification seem not so good, at least for certain cases like biomass burning particles over oceans. Thus, it would certainly improve the paper to mention specifically if: (1) Overall the criteria proposed by the authors for their classification are valid or not? (2) other approach should be considered or if their method based on spectral fingerprints in UV, visible and near-infrared remains a good tool but need to be improved using other sensors (SCIAMACHY) or other criteria?

In my opinion the conclusion of the paper is not sufficiently clear concerning these two points and should provide not only a summary of the results but also more answers and be more conclusive on the efficiency of GOME spectral information to distinct aerosol types. So my main suggestion is to reinforce and enlarge the conclusion on this important topic.

Specific comments

Section 3.1., figure 2: (i) Over Europe, the authors mention that due to cloud cover, the residue is reduced in winter. I do not understand this since Figure 2 shows an opposite seasonal cycle, with maximum residue in winter.

(ii) Over Alaska, western Canada and the north Pacific a seasonal variability with high residues in the boreal winter is observed. The authors argue that forest wildfires are not uncommon here. Is that really the case during the winter season? Although I am not completely sure, it seems to me that forest fires would occur preferably during the boreal summer in this region.

Figure 2: Over Hong-Kong region for the year 2000, the residue seems very noisy (also over SW-Africa for the second half of the year). Is that related to the radiometric degradation of the instrument? Then why is it almost absent over the other regions?

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Technical corrections

References: The references Bonasoni et al. 2004 and Tsunematsu et al. 2005 should be suppressed from the list as they do not appear in the main text.

Section 3.1., page 1328 lines 4 and 5: Suppress “over the Sahara” which appears twice in the sentence.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1321, 2006.

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