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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Toward a combined SAGE II-HALOE aerosol climatology: an evaluation of HALOE version 19 stratospheric aerosol extinction coefficient observations" *by* L. W. Thomason

Anonymous Referee #2

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The paper is well written and suited to be published with some minor corrections (see below). The author provides an evaluation of HALOE aerosol extinction coefficient during a relatively clean period. The author uses an unconventional method to compare SAGE II with HALOE measurements using theoretically measured aerosol ratios. This work is of great significance because of the long record of HALOE measurements and the potential improvement of the indirectly derived aerosol size information by combining SAGE II and HALOE measurements.

General comments:

Most of the analyses presented are confide to the tropical region. Although the observed variability of this region is low, the stratospheric aerosol loading is generally greater than other regions. Does the author see the same bias or measurements quality globally?

Specific comments:

Abstract, line 8, should say, after 1996, should not be used below 17 km under any circumstances.

Section 3, 2nd paragraph, How did you define SAGE II and HALOE good matches?

Fig 5, Perhaps a bimodal aerosol model can show a better agreement with the HALOE measurements prior to 1997 (when the SAGE II ratio is less than 2). I suggest that only measurements after 1996 be shown in fig 5 and 6 or use separate figures before and after 1997 with different aerosol model, bi model vs. single mode log-normal.

Also in Fig 5, although the HALOE/SAGE 2.45 ratio show similar behavior to 5.26, the theoretical model for this wavelength doesn't follow the measurements pattern at all. Does this imply a channel drift or inaccurate refractive index for this wavelength?

Section 3, 4th paragraph, the description of the method used for fig 7 is somehow confusing, can you clarify. Also, I am assuming you used a fixed mode radius, what was the value used?

Same paragraph toward the end p.13944, The author suggest a 10% bias between 3.40 and 3.46 can be fixed by removing NO2 absorption. Any reason given by HALOE team for lack of NO2 removal at this wavelength?

Section 3, the use of a constant single mode log-normal aerosol model might be sufficient enough to model the stratospheric aerosol; however, a more complex model might be needed near and below the tropopause. Perhaps this can explain the observed deviation from the model in fig 7 near and below 17km, or the small correlations with some gas species below 20 km in fig 8.

ACPD

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Technical corrections:

Introduction, p.13935 and p13936, and Tables, swap table number 1 and 2.

Fig 3, add 'deviation' after 'and the median relative standard'

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