

Interactive comment on “SAGE II measurements of stratospheric aerosol properties at non-volcanic levels” by L. W. Thomason et al.

Anonymous Referee #2

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This paper analyzes the robustness of SAGE II extinction measurements in the 1020 nm and 525 nm channels during the low-aerosol period since 2000. It also performs an analysis of the surface area density (SAD) product to determine reasonable bounds on it during the same period. The conclusion is that the 1020 nm extinction is quite robust even in the current low-aerosol period with maximum bias of less than 5%. The 525 nm extinction contains potential biases of less than 10% in most of the lower stratosphere, approaching 20% at 30 km. The SAD containing significant uncertainties, reasonably represent by a factor of two. This is a well-written paper comprehensively covering the significant sources of uncertainty in SAGE II retrievals and add to our understanding of aerosols during non-volcanic periods. I recommend publications after the following relatively minor comments are addressed.

Abstract, line 9: Add "during" in "On the other hand, during background periods"

Introduction: page 6962, line 6-7: Can the authors justify the statement that 80% of the seasonal cycle at 18 km in the tropics must be due to differences in H₂SO₄ entering the stratosphere? Could some of the difference be related to other aerosol components, such as organics?

Section 2: page 6965, line 28: Figure 6 is said to refer to 25 subtropical events from December 2003. In the Figure 6 caption, it refers to events between October 2001 and September 2002.

page 6969, line 15: remove "that" from "in the ozone cross section for (that) the 525-nm channel."

page 6969, line 19: remove "also" from "was also changed by 1%" as this make it sound like both the 1020-nm and 525-nm channels were changed simulataneously.

Section 3: page 6972, line 22: "Fig. 11a" should be "Fig. 10a"

page 6974, line 1: The statement that aerosol number density tends to be around 10/cm³ needs to be qualified, since this number can be larger by several orders of magnitude in nucleation regions near the tropopause and at high latitudes in winter. It may be more accurate to state that the number of particles greater than 10 nm radius is of order 10. And it should be made clear that the methods discussed to bound SAD are not appropriate in nucleation regions. This is stated in the summary (section 6) but should be stated early on in section 3 as well.

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