

Interactive comment on “SAGE version 7.0 algorithm: application to SAGE II” by R. P. Damadeo et al.

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We would first like to thank the reviewer for their time going over this rather lengthy paper. The reviewer presents a number of comments annotated in the original paper. A number of small fixes mentioned throughout will be included in the revised version of the paper. In addition, we also plan on a general revisit of the figures presented for increased legibility. However, there were also a number of detailed questions/comments that will be addressed here.

Paraphrased questions and comments:

“Why do the authors use the term ‘beta angle’ instead of ‘obliquity angle?’”

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Obliquity angle refers to the angle between an object’s rotational axis and its orbital axis. Beta angle refers to the elevation of an object of interest relative to the orbital plane of a different object.

“When transitioning from MERRA to GRAM-95 meteorological data, do the authors apply a procedure in order to ensure validity of the hydrostatic equilibrium?”

Yes.

“When discussing the edge-time refinement derivation, is the quantity epsilon (in equation 1 in section 3.5) independent of time?”

$\varepsilon(\lambda)$ will be rewritten as $\varepsilon(p(t), z(t), \lambda)$

“When discussing uncertainties in the derived transmission profiles, are the uncertainties correlated in altitude as a result of smoothing and interpolation?”

While there are certainly correlations in the uncertainties between adjacent points in an individual scan, there are no correlations between scans, except for those uncertainties in the original I-zero curves, which are accounted for in the final uncertainties. Since SAGE II looked at each altitude across multiple scans, any correlation between points within an altitude bin are mitigated by using the data from multiple scans.

“When discussing the sunset/sunrise NO₂ ratio, the authors claim that the ‘data are more consistent in the mid-stratosphere in version 7.0 than in version 6.2 (Fig. 20c).’ To the reviewer’s point of view, this is “not observed (not evident).”

This comment in the paper simply states that the sunset/sunrise NO₂ ratio is more constant with altitude in the mid-stratosphere in version 7.0 than in version 6.2. This fact is clearly shown in Fig. 20c.