

Reply to Short Interactive Comment by M. Penning de Vries marloes.penningdevries@mpic.de

Dear Authors,

First of all, let me say that I think your manuscript is very interesting to scientists using OMI aerosol data (and possibly others as well, by serving as a warning!). I don't have any important issues with the paper at all, but rather I'd like to address a concern that has been growing in me for the past few years. In that sense, rather than expecting to resolve this issue before publication of your manuscript, I'd like to kick off a more general discussion on the definition of UVAI. To me, the UVAI is a quantity whose definition is (relatively) simple, and for which only surface pressure and (depending on the used wavelengths) the total ozone column are required as a priori information. This, in my opinion, is one of the strengths of the UVAI. This most simple UVAI version is full of artefacts — for example, the viewing angle dependence that you address in your paper. But its advantage is that those data can easily be reproduced by others, modeled using RT calculations, and compared with UVAI from other satellite instruments. This is exceedingly more difficult if input parameters for the UVAI calculation include surface reflection and cloud height databases, and possibly additional information in the future. To me, the UVAI appears to be turning more and more into a retrieved quantity, instead of the Index as it was defined originally. The obvious solution for this dilemma would be keeping one "original" UVAI version and one "research" edition. As there are several different UVAI versions available any-way (as you know, OMI alone features three different definitions), this would probably not cause too much confusion — as long as everything is well documented. This would benefit the continuity of the UVAI as the longest-standing record of satellite-based aerosol sensing, without standing in the way of progress.

Kind regards,

Marloes Penning de Vries

*Marloes,*

*Thanks for your comment.*

*While we agree that the simplicity of computation is an important advantage of the UVAI, we also think that the accuracy of its interpretation as a genuine aerosol signal should not be sacrificed for the sake of simplicity. By accounting for non-aerosol related effects and removing them from the reported values, the science value of the UVAI is greatly enhanced. The UVAI definition introduced in this manuscript accounts for effects of water clouds that yielded negative values in the previous definition. Those negative values were often misinterpreted as signal associated with non-absorbing aerosols. The removal of those cloud-related effects in the new definition, will facilitate the interpretation of the signal associated with non-absorbing particles. Another important upgrade to the UVAI is accounting for that component of the UVAI arising from the wavelength dependent surface effect of certain surface types. We agree with you on the convenience of keeping both the original and improved definitions. In the OMAERUV algorithm, the original SLER UVAI definition is still reported renamed as*

*'residue', whereas the Mie-based UVAI is reported as the UV aerosol index. Detailed documentation of these changes is currently under development.*