

***Interactive comment on “A cloud algorithm based on the O<sub>2</sub>-O<sub>2</sub> 477 nm absorption band featuring an advanced spectral fitting method and the use of surface geometry-dependent Lambertian-equivalent reflectivity” by Alexander Vasilkov et al.***

**Anonymous Referee #1**

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General comments:

This paper presents a cloud retrieval algorithm using the O<sub>2</sub>-O<sub>2</sub> absorption feature centered at 477nm. I am impressed by the detailed description of the algorithm and the results. The paper is well written and relevant to the community. I recommend publication after addressing the minor issues listed below:

A general question I have is how to use this algorithm independently. As stated in the

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paper, the retrieved cloud information is intended for the NO<sub>2</sub> retrieval for OMI and TEMPO mission, yet the cloud algorithm needs NO<sub>2</sub> info for the fitting process. Isn't that a paradox? OMI has the NO<sub>2</sub>, O<sub>3</sub>, and H<sub>2</sub>O retrievals from independent retrieval algorithms for the fitting process described in this paper; will TEMPO also have these trace gas retrievals as input to this cloud algorithm?

Specific comments:

Page 2, Line 5-6: “ Other cloud parameters include the cloud phase, the cloud particle shape, and the particle size distribution that determine the cloud phase scattering function” is not a full sentence. I guess you want to say these parameter are not considered.

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