

## ***Interactive comment on “Aerosol profile information from high resolution oxygen A-Band measurements from space” by A. Geddes and H. Bösch***

### **Anonymous Referee #4**

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This paper describes a retrieval performance of aerosol profile from O2 A band spectrum measured by the current and upcoming satellite instruments. The paper is well written and the topic is suitable for AMT. I recommend it to be published after the following comments are addressed.

1. Viewing angle: I think authors assumed the "nadir-viewing" case. Please clarify. The retrieval performance will change with the viewing angle. Please make some comments in the manuscript.
2. Fluorescence: In p.6030, authors said "an additive intensity offset is also included

C1873

to mitigate the effects of fluorescence". It is unclear for me that whether the synthetic spectra were simulated with fluorescence or not. Please clarify. In p.6031, authors said "systematic errors have then been estimated from the difference of retrieved and true values for the aerosol parameters". If I understand correctly, "an additive intensity offset" is the constant radiance offset for the reflected spectrum at the top-of-the-atmosphere, while the fluorescence spectrum at the top-of-the-atmosphere has O2 absorption structure. This difference will make bias. Please make some comments.

3. AOD: Is AOD at 0.76 micron used in this study? If not, please make some comments about the wavelength dependency of AOD and its influence on the results.
4. Surface albedo: The optical path shortening effect is dominant for dark surface, while the lengthening effect is dominant for bright surface. For both cases, you can extract some aerosol information from the spectrum. Please make some comments for intermediate albedo case.
5. P.6038, L.22 "low SZA and high SZA" => "low albedo and high SZA" ?

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C1874