

Interactive comment on “Error sources in the retrieval of aerosol information over bright surfaces from satellite measurements in the oxygen A-band” by Swadhin Nanda et al.

Anonymous Referee #1

Received and published: 2 October 2017

Review comments on manuscript “Error sources in the retrieval of aerosol information over bright surfaces from satellite measurements in the oxygen A-band”

Author(s): Swadhin Nanda et al.

MS No.: amt-2017-323

MS Type: Research article

General comments:

This paper presents a comprehensive analysis on the potential error sources in aerosol height and optical thickness retrieval over different surface brightness. By breaking

C1

down the top of atmosphere reflectance into contribution from surface (R_s) and from the atmospheric column (R_p), the authors are able to analyze the mechanisms behind the potential retrieval bias/errors. The manuscript is organized and presented very well. It provides the community a detailed documentation on the problems facing aerosol property retrieval with oxygen A-band observations. I definitely recommend publication of the paper. I have several minor comments for the authors to consider.

One general suggestion I have is to add some discussions on TOA reflectance sensitivity to layer height for optically thin aerosols. The manuscript uses thick aerosol layers ($\tau = 1.0$) for this purpose (Figure 3 left panel). Since most aerosol layers are optically thin, a similar figure with aerosol optical thickness of 0.2 maybe more telling. I'm thinking a thinner layer would make the problem even harder.

Specific comments:

- 1) P8, Line 31: Figure 2 does show R_s is more significant than R_p , but that's for albedo = 0.4, not for a dark surface. Maybe just remove “(Figure 2, blue line)”.
- 2) Figure 6: what would be the physical reasons for the retrieval algorithm getting a positively biased optical thickness over brighter surfaces?
- 3) P11, Line 15: “larger over land than the over the ocean” may be “larger over land than over ocean”.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-323, 2017.

C2