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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Remote sensing of aerosol properties from multi-wavelength and multi-pixel information over the ocean" *by* Chong Shi et al.

Anonymous Referee #2

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This paper presents a flexible physically based algorithm for the retrieval of aerosol optical properties using multi-wavelength, -pixel information over the ocean. The algorithm is evaluated theoretically for several oceanic conditions based on the synthetic data and experimentally using GOSAT/CAI measurement in comparison to other counterpart satellite products, i.e., MODIS, as well as those from AERONET observations. In general, optimal estimation method combined with the spatial smoothness constraints from adjacent pixels is a promising inversion technique for the aerosol/hydrosol retrieval. The methodology, which retrieves the atmospheric and oceanic variables simultaneously, is also interesting. However, some modifications are needed to make the paper clearer.

Major comments: 1: The multiple pixel method shows an advanced skill in the aerosol retrieval, however, some contaminations might be still introduced for the reflected radiance due to the multiple scattering between each pixels, i.e., adjacent effects in the radiative transfer. How do you process such effects in your retrieval?

2: The land-ocean contrast retrieval is interesting, it looks that the soot above ocean can be potentially estimated by benefiting from the retrieval over land, however, it is not clear that how those values (Line 30 - 31) are determined based on Eq. 6?

3: It is better to discuss the perspective of current algorithm on the application to the global ocean.

Minor comments:

1: L9P1, 'thickness' should be 'properties'. 2: L25P1, it is difficult to say whether the 'overestimation' is unreasonable or not without comparison to other products or validation. 3: L14P2, 'an improved two-channel method' should be 'improved two-channel methods'. 4: L24P4, 'a smoothing constraint' should be 'smoothness constraints'. 5: L6P5, 'vector' -> 'vector in two directions'. 6: L8P7, '443nm' should be '443 nm'. 7: L17P7, 'had' should be 'have'. 8: L26P11, 'overestimations' -> 'higher values'. 9: L29P11, similar to L25P1, sentence of 'Nevertheless, . . .' should be reorganized.

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