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Atmospheric Chemistry and Physics Discussions

Interactive comment on "AERONET-based microphysical and optical properties of smoke-dominated aerosol near source regions and transported over oceans, and implications for satellite retrievals of aerosol optical depth" *by* A. M. Sayer et al.

Anonymous Referee #1

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General comments:

This paper is very interesting and well written. The authors first look at aerosol optical properties obtained from AERONET irradiance/radiance measurements taken near biomass burning sites. Because of the widespread nature of the AERONET network, the authors can examine a range of biomass burning regimes, from tropical to boreal. The optical properties of these biomass aerosols are noted. Then the authors

look at the optical properties of biomass smoke plumes that are relatively far from their sources, and again note the aerosol optical properties at these more distant sites. Generally, with a few exceptions as noted in the paper, the aerosol optical properties do not change much with time.

From this observation, it is concluded that "close in" surface observations of biomass burning aerosols might suffice for these aerosol properties a much greater distances from the sources. The implications of this conclusion are examined with regard to satellite retrievals of aerosol optical depth (AOD) over the oceans (see Figures 14 and 15). The authors then conclude that existing retrievals may need to account for greater aerosol absorption than they new do, to alleviate the tendency of these methods to underestimate AOD.

I really enjoyed reading this paper. The conclusions stated in the paper seem relatively unassailable because of well-established AERONET retrievals are used at both the "near source" and "far source" sites (and the error of these retrievals is discussed in the paper). The techniques applied in the paper are straightforward and easy to understand. The authors even provide a brief tutorial of AERONET retrievals, which means the reader doesn't have to consult past references – this can save the overworked reviewer/reader a lot of time and trouble.

Specific Comments:

I recommend that this paper be published with one minor change: What in the world is a "narrow" particle? The authors often refer to "smaller, narrower" particles. I think they mean that the size distribution is narrower. They should clarify what is meant by "narrower".

Changes made in response to the comments of other readers will strengthen the paper.

Technical Comments:

Usually I find many typos, but I couldn't find any in this paper. I learned that "artefact"

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is the British spelling of “artifact”, so just leave it as “artefact”.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 25013, 2013.