

Interactive comment on “Where do we need additional in situ aerosol and sun photometer data?: a critical examination of spatial biases between MODIS and MISR aerosol products” by Y. Shi et al.

Anonymous Referee #5

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The manuscript provides an extensive cross-comparison between MODIS (collection 5 and Deep Blue) and collocated MISR AOD products with the goal of identifying regions where additional in-situ and ground-based remote sensing studies are needed to improve retrieval techniques. The paper brings up an important topic of satellite disagreements in regions where variable surface and/or complex aerosol microphysical conditions complicate operational satellite AOD retrievals. The problematic regions certainly need to be clearly identified, and climate modelers should be aware of re-

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gional biases in satellite data. The paper is well written, the motivations are clear, and it is relevant for AMT.

The presented results are interesting and important, however the paper does not clearly explain why and how additional AERONET or in-situ measurements can help improve satellite retrievals. Making additional AOD data available for satellite-AERONET regressions will not necessarily help unless the underlying reasons for satellite disagreements are well understood. The authors attempt to address this issue with a gradient map of AOD differences, however the suggested scenarios are not convincing. For example, why separate high AOD from suspected aerosol optical property assumptions when both can contribute? In-situ measurements of regional aerosol microphysics and surface reflectance are useful for region-specific retrievals that could be developed and applied to MISR or MODIS L1 products, although in many cases global operational satellite retrievals are limited by the size of look-up tables and therefore cannot fully incorporate complex regional aerosol microphysics. Satellite retrievals that use different spectral and angular information, as in case of MISR and MODIS, do not necessarily have to have similar patterns in their regional biases.

I suggest refocusing the discussion to motivate the need for addition surface data in the context of modeling studies in regions problematic for satellite retrievals.

The paper should be published after minor technical revisions that were pointed out by other reviewers.

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