



Comparison of single- and multi-channel aerosol optical depth retrievals from MAPSS data

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The Clouds and the Earth Radiant Energy System (CERES) data products report two aerosol optical depth values for the wavelengths of 644 nm and 1632 nm. One of these is obtained from the multi-channel MODIS aerosol retrievals and other one is derived by a single-channel algorithm applied to MODIS radiances averaged to CERES footprints. Comparisons of these products showed systematic differences between the two AOD. These results included the effect of different cloud-screening applied in the two processing. It is interesting to know how much the differences are when differences due to cloud-detection are not present. This requires applying the two aerosol algorithms (multi-channel and single-channel) to the exact same clear radiances. In this study this is accomplished by retrieving AOD with the single-channel channel algorithm at 25 oceanic locations from the 10-km reflectances in the MODIS Atmosphere Parameters Subset Statistics (MAPSS) dataset for the period of 2000-2004, and then by comparing them to level 2 MOD04 AOD data in MAPSS. Comparisons of AODs are performed from MODIS on both the Terra and Aqua platforms and include retrievals for both 10-km and 50-km areas. On average, the multi-channel and single-channel retrievals lead to similar AOD at 1632 nm, but at 644 nm the single-channel ones are ~30% larger than those from the multi-channel algorithm. Slight dependence of the difference on scattering angle is observed, possibly related to differences in the retrieved/assumed aerosol models.