A decadal regional and global trend analysis of the aerosol optical depth using a data-assimilation grade over-water MODIS and Level 2 MISR aerosol products

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Using the ten-year (2000–2009) Data-Assimilation (DA) quality Terra MODIS and MISR aerosol products, as well as 7 years of Aqua MODIS, we studied both regional and global aerosol trends over oceans. This included both operational and data assimilation grade versions of the products. After correcting for what appears to be aerosol signal drift from the radiometric calibration of both MODIS instruments, we found MODIS and MISR agreed on a statistically negligible global trend of ±0.003/per decade. Our study also suggests that AODs over the Indian Bay of Bengal, east coast of Asia, and Arabian Sea show increasing trends of 0.07, 0.06, and 0.06 per decade for MODIS, respectively. These regional trends are considered as significant with a confidence level above 95%. Similar increasing trends were found from MISR, but with less relative magnitude. These trends reflect respective increases in the optical intensity of aerosol events in each region: anthropogenic aerosols over the east coast of China and Indian Bay of Bengal; and a stronger influence from dust events over the Arabian Sea. Negative AOD trends, low in confidence levels, are found off Central America, the east coast of North America, and the west coast of Africa, which indicate that longer periods of observation are necessary to be conclusive.

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