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An algorithm for estimating aerosol optical depth from HIMAWARI-8 data over Ocean

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The paper presents currently developing algorithm for aerosol detection and retrieval over ocean for the next generation geostationary satellite, HIMAWARI-8. Enhanced geostationary remote sensing observations are now enables for aerosol retrieval of dust, smoke, and ash, which began a new era of geostationary aerosol observations. Sixteen channels of the Advanced HIMAWARI Imager (AHI) onboard HIMAWARI-8 offer capabilities for aerosol remote sensing similar to those currently provided by the Moderate Resolution Imaging Spectroradiometer (MODIS). Aerosols were estimated in detection processing from visible and infrared channel radiances, and in retrieval processing using the inversion-optimization of satellite-observed radiances with those calculated from radiative transfer model. The retrievals are performed operationally every ten minutes for pixel sizes of $\sim$8 km. The algorithm currently under development uses a multichannel approach to estimate the effective radius, aerosol optical depth (AOD) simultaneously. The instantaneous retrieved AOD is evaluated by the MODIS level 2 operational aerosol products (C006), and the daily retrieved AOD was compared with ground-based measurements from the AERONET databases. The results show that the detection of aerosol and estimated AOD are in good agreement with the MODIS data and ground measurements with a correlation coefficient of $\sim$0.90 and a bias of 4%. These results suggest that the proposed method applied to the HIMAWARI-8 satellite data can accurately estimate continuous AOD.

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