



Himawari-8/AHI and MODIS Aerosol Optical Depths in China: Evaluation and Comparison

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The newly released next-generation geostationary earth orbit satellite—Himawari-8 loaded with the Advanced Himawari Imager (AHI) has greatly enhanced our capacity of dynamic monitoring in Asia-Pacific area. The Himawari-8/AHI hourly aerosol product is as a promising complementary to MODerate Resolution Imaging Spectroradiometer (MODIS) daily aerosol product to observe air pollutions timely. However, current comprehensive evaluation of AHI AOD is still limited, and the performance between AHI and MODIS remains uncertain. In this study, we first evaluated Himawari-8/AHI Level 3 hourly aerosol product and MODIS Terra/Aqua Collection 6.0 aerosol product using 15 sites of AOD measurements from AERosol RObotic NETwork (AERONET) and then performed an explicit spatiotemporal comparison between satellite-based AOD products from July 2015 to June 2017 in China. Results showed that AHI AOD achieved a good agreement with AERONET with a correlation coefficient of 0.84 and a root-mean-square-error of 0.24, but it was identified to be underestimated, especially during heavy aerosol loading conditions. We also identified an obvious difference in retrieval accuracy of AHI AOD that spatially, it had higher accuracies in Beijing-Tianjin-Hebei and Hong Kong regions; and temporally, it yielded comparably poor accuracies in winter and in the morning. The dependency analysis further revealed the bias of AHI AOD was highly dependent on aerosol loading and Ångström exponent. Despite of the slightly lower accuracy than MODIS AOD, AHI AOD still demonstrated a more consistent temporal trend with AERONET and a similar spatial distribution with MODIS, which showed great potential for characterizing local and regional aerosol particles.