



Validation and error analysis of AATSR's Aerosol Optical Depth

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The Advanced Along-Track Scanning Radiometer (AATSR) has a long-term (2002-2012) Aerosol Optical Depth (AOD) products which contributes to the global climate and environmental research. AODs of 8 AERONET site are used to validate the satellite ADV product during the year of 2011 in China. The generally correlation coefficient R square between satellite and the AERONET AODs is 0.77, and the satellite AOD overestimated about 20% averagely which is different with the long-term validation of the ATSR, ATSR-2 and AATSR. The overestimation agrees the validations of AATSR-ATSR2, AATSR-MERIS, AATSR-POLDER. Every validation shows the AATSR AOD is overestimated. The time series validation did not show a obvious change of the AOD accuracy. With the validation over every AERONET site, the only underestimated site is Sacol, which is a arid mountain site and has bright surface in the northwestern China. The dust could be a error source considering the ADV retrieval method is not good at dusty aerosol.

Then, considering the retrieval method, the related factors like reflectance of 1610 nm band, k ratio (ADV principle), solar and viewing angles are jointly analyzed with the AOD error. With analysis, solar zenith angle is an factor affecting the AOD accuracy. The solar zenith angle is greater, the AOD error is smaller.

Using the AERONET Fine Mode Fraction (FMF), the AATSR AOD has the similar accuracies on both fine and coarse aerosols. The AATSR FMF is the first time to be validated, and the result shows not well.

Generally, AATSR AOD has a good agreement with AERONET but overestimated in 2011 in China area.