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Validation and Comparison of AATRS AOD L2 Products over China

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The Advanced Along-Track Scanning Radiometer (AATSR) aboard on ENVISAT has been used to observe the Earth for more than 10 years since than 2002. One of main applications of AATSR instrument is to observe atmospheric aerosol, especially in retrieval of aerosol optical depth (AOD), taking advantage of its dual-view that helps to separate the contribution of aerosol from top of atmosphere reflectance (A. A. Kokhanovsky and de Leeuw, 2009). The project of Aerosol_CCI, as part of European Space Agency's Climate Change Initiative (CCI), has released new AATSR aerosol AOD products by the of 2015, including the SU v4.21 product from Swansea algorithm, ADV v2.3 product from the ATSR-2/AATSR dual view aerosol retrieval algorithm (ADV) and ORAC v03.04 product from the Oxford-RAL Retrieval of Aerosol and Cloud algorithm. The previous versions of these three AOD level 2 (L2) products in 2008 have been validated over mainland China (Che and Xue, 2015). In this paper, we validated these AATSR AOD products with latest versions in mainland China in 2007, 2008 and 2010 by the means of comparison with the AErosol RObotic NETwork (AERONET) and the China Aerosol Remote Sensing Network (CARSNET). The combination of AERONET and CARSNET helps to make up for the disadvantages of small number and uneven distribution of AEROENT cites. The validation results show different performance of these AOD products over China. The performances of SU and ADV products seem to be the same with close correlation coefficient (CC) about 08∼0.9 and root mean square (RMS) within 0.15 in all three years, and sensitive to high AOD values (AOD >1): more AODs and more underestimated. However, these two products do exist difference, which is that the SU algorithm retrieves more high AODs, leading to more space-time validation matches with ground-based data. The ORAC algorithm is different from the others, it can be not only used to retrieve low AODs but also high AODs over different landcover types. Even though ORAC algorithm has ability in retrieving AODs in different values, it shows largest uncertainty in retrieving different AODs.