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Aerosol properties from OMI using the multi-wavelength algorithm: algorithm improvements and validation results

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The Ozone Monitoring Instrument (OMI) is an imaging UV-VIS solar backscatter spectrometer. It is a Dutch-Finnish instrument on board the NASA satellite EOS-Aura which has been launched in July 2004. So far, the OMI mission has yielded more than 3 years of science data including global data sets of various atmospheric parameters with high spatial resolution on a daily basis.

One of the science goals of the Ozone Monitoring Instrument (OMI) on board of EOS-Aura is to help answer the question "What is the role of aerosols in climate change?" To this end, aerosol parameters are retrieved from OMI radiance measurements using the multi-wavelength algorithm. This retrieval algorithm uses up to 14 wavelength bands between 342.5 nm and 483.5 nm. The aerosol optical thickness is retrieved from OMI spectral reflectance measurements and a best fitting aerosol type is determined. The single-scattering albedo, the layer height and the size distribution associated with the best fitting aerosol type are provided. A principle component analysis shows that OMI measurements have 2 to 4 degrees of freedom of signal, which for cloud-free scenes can be attributed to aerosol parameters. The algorithm is capable of distinguishing between absorbing aerosol types, such as desert dust and biomass burning on the one hand, and weakly absorbing aerosols like sea-salt and sulfates on the other.

The present contribution focuses on improvements of the algorithm and validation results using data from other space-borne sensors (MODIS, PARASOL, CALIOP) and ground based observations (AERONET) as a reference.