



Ozone profiles retrieved from TROPospheric Ozone Monitoring Instrument

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Atmospheric ozone has different roles depending upon its altitude, and ozone profiles from surface to about 60 km are derived from TROPospheric Monitoring Instrument (TROPOMI) ultraviolet radiances using an optimal estimation method. The wavelengths between 314-340 nm and Gaussian-type slit functions are used in this study. To optimize the retrieval and improve the accuracies of the spectral fitting residuals, we apply soft calibration to TROPOMI radiances before the fitting starts. The mean fitting residuals without soft calibration are $\pm 1\%$, $\pm 0.6\%$ and $\pm 0.5\%$ for high-latitude, mid-latitude and tropics regions respectively. Our soft calibration remarkably improves the fitting accuracy for all latitudes, especially at tropics and mid-latitudes. Fitting residuals are most within 0.5 % between 314-325 nm and 0.2 % at wavelengths longer than 325 nm over the tropics and mid-latitude regions. In high latitudes, however, it is not significantly improved and large remaining systematic biases can still be found. We compare our TROPOMI retrievals with ozonesonde observations between 60°S and 60°N and Fourier Transform Spectrometry (FTS) observation station (117.17°E, 31.7°N). The mean biases with ozonesonde Tropospheric Column Ozone (TCO) are within 6.9 DU and the correlation coefficient is greater than 0.78. The mean biases with FTS TCO are with 4.5DU and the correlation coefficient is 0.88.