



Temperature dependent O₃ absorption cross sections for GOME, SCIAMACHY and GOME-2: Re-analysis of Flight Model Data and Retrieval Tests.

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For a long term coverage of global ozone measurements from SCIAMACHY (SCanning Imaging Absorption spectroMeter for Atmospheric CHartography), GOME1, and GOME-2 (Global Ozone Monitoring Experiment), high quality absorption cross section spectra is a pre-requisite. Laboratory measurements of cross section spectra of ozone (at 203K, 223K, 243K, 273K and 293K) were performed using CATGAS (Calibration Apparatus for Trace Gas Absorption Spectroscopy) under representative in-flight conditions with SCIAMACHY and GOME-2 spectrometers to obviate the need of an instrumental slit function correction. For the data acquired from the CATGAS campaigns, a re-analysis is carried out to improve the overestimation in the total ozone retrieval by SCIAMACHY and GOME-2 using the flight model (FM) reference data from SCIAMACHY and GOME-2, respectively, with respect to GOME1. The reanalysis attempts to re-evaluate the concatenation of ozone optical density measurements obtained from CATGAS measurements and applying new ways to absolutely calibrate the cross-sections using absolute reference cross-section data at reference wavelengths. Finally, a satellite retrieval error analysis will be performed to validate the updated satellite reference cross-sections.

The updated reference data can be used for combining the data from the three instruments (plus the two upcoming GOME-2) generating a consisting long-term dataset of total ozone.