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Geophysical validation of SCIAMACHY Limb Ozone Profiles

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Abstract. We discuss the quality of the two available SCIAMACHY limb ozone profile products. They were retrieved with the University of Bremen IFE's algorithm version 1.61 (hereafter IFE), and the official ESA offline algorithm (hereafter OL) versions 2.4 and 2.5. The ozone profiles were compared to a suite of correlative measurements from ground-based lidar and microwave, sondes, SAGE II and SAGE III (Stratospheric Aerosol and Gas Experiment).
To correct for the expected Envisat pointing errors, which have not been corrected implicitly in either of the algorithms, we applied a constant altitude shift of -1.5 km to the SCIAMACHY ozone profiles.

The IFE ozone profile data between 16 and 40 km are biased low by 3-6%. The average difference profiles have a typical standard deviation of 10% between 20 and 35 km.

We show that more than 20% of the SCIAMACHY official ESA offline (OL) ozone profiles version 2.4 and 2.5 have unrealistic ozone values, most of these are north of 15° S. The remaining OL profiles compare well to correlative instruments above 24 km. Between 20 and 24 km, they underestimate ozone by 15±5%.

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