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Bias determination and precision validation of ozone profiles from MIPAS-Envisat retrieved with the IMK-IAA processor

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Abstract. This paper characterizes vertical ozone profiles retrieved with the IMK-IAA (Institute for Meteorology and Climate Research, Karlsruhe – Instituto de Astrofisica de Andalucia) science-oriented processor from high spectral resolution data (until March 2004) measured by the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) aboard the environmental satellite Envisat. Bias determination and precision validation is performed on the basis of correlative measurements by ground-based lidars, Fourier transform infrared spectrometers, and microwave radiometers as well as balloon-borne ozonesondes, the balloon-borne version of MIPAS, and two satellite instruments (Halogen Occultation Experiment and Polar Ozone and Aerosol Measurement III). Percentage mean differences between MIPAS and the comparison instruments for stratospheric ozone are generally within ±10%. The precision in this altitude region is estimated at values between 5 and 10% which gives an accuracy of 15 to 20%. Below 18 km, the spread of the percentage mean differences is larger and the precision degrades to values of more than 20% depending on altitude and latitude. The main reason for the degraded precision at low altitudes is attributed to undetected thin clouds which affect MIPAS retrievals, and to the influence of uncertainties in the water vapor concentration.

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