Atmospheric Chemistry and Physics
An Interactive Open Access Journal of the European Geosciences Union

Atmos. Chem. Phys., 8, 1119-1126, 2008
www.atmos-chem-phys.net/8/1119/2008/

Technical Note: Intercomparison of ILAS-II version 2 and 1.4 trace species with MIPAS-B measurements

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Abstract. The Improved Limb Atmospheric Spectrometer (ILAS)-II sensor aboard the Japanese ADEOS-II satellite was launched into its sun-synchronous orbit on 14 December 2002 and performed solar occultation measurements of trace species, aerosols, temperature, and pressure in the polar stratosphere until 25 October 2003. Vertical trace gas profiles obtained with the balloon version of the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS-B) provide one of the sparse data sets for validating ILAS-II version 2 and 1.4 data. The MIPAS-B limb emission spectra were collected on 20 March 2003 over Kiruna (Sweden, 68° N) at virtually the same location that has been sounded by ILAS-II about 5.5 h prior to the sampling of MIPAS-B. The intercomparison of the new ILAS-II version 2 (Northern Hemispheric sunrise) data to MIPAS-B vertical trace gas profiles shows a good to excellent agreement within the combined error limits for the species O_3, N_2O, CH_4, H_2O (above 21 km), HNO_3, $ClONO_2$, and CFC-11 (CCl_3F) in the compared altitude range between 16 and 31 km such that these data appear to be very useful for scientific analysis. With regard to the previous version 1.4 ILAS-II data, significant improvements in the consistency with MIPAS-B are obvious especially for the species CH_4 and H_2O, but also for O_3, HNO_3, $ClONO_2$, NO_2, and N_2O_5. However, comparing gases like NO_2, N_2O_5, and CFC-12 (CCl_2F_2) exhibits only poor agreement with MIPAS-B such that these species cannot be assumed to be validated at the present time.

Final Revised Paper (PDF, 364 KB) Discussion Paper (ACPD)

Citation: Wetzel, G., Sugita, T., Nakajima, H., Tanaka, T., Yokota, T., Friedl-Vallon, F., Kleinert, A., Maucher, G., and Oelhaf, H.: Technical Note: Intercomparison of ILAS-II version 2 and 1.4 trace species with MIPAS-B measurements, Atmos. Chem. Phys., 8, 1119-1126, 2008. Bibtex EndNote Reference Manager