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Tropospheric ozone from IASI: comparison of different inversion algorithms and validation with ozone sondes in the northern middle latitudes

C. Keim^{1,*}, M. Eremenko¹, J. Orphal¹, G. Dufour¹, J.-M. Flaud¹, M. Höpfner², A. Boynard³, C. Clerbaux³, S. Payan⁴, P.-F. Coheur⁵, D. Hurtmans⁵, H. Claude⁶, H. Dier⁷, B. Johnson⁸, H. Kelder⁹, R. Kivi¹⁰, T. Koide¹¹, M. López Bartolomé¹², K. Lambkin¹³, D. Moore¹⁴, F. J. Schmidlin¹⁵, and R. Stübi¹⁶

¹Laboratoire Interuniversitaire des Systèmes Atmosphériques (LISA), CNRS/ Univ. Paris 12 et 7, Créteil, France

²Institut für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe, Germany

³UPMC Univ Paris 06, CNRS UMR8190, LATMOS/IPSL, Paris, France

⁴Laboratoire de Physique Moléculaire pour l'Atmosphère et l'Astrophysique, Université Pierre et Marie Curie-Paris 6, Paris, France

⁵Spectroscopie de l'Atmosphère, Service de Chimie Quantique et de Photophysique, Université Libre de Bruxelles (U.L.B.), Brussels, Belgium

⁶Meteorological Observatory Hohenpeißenberg, DWD, Hohenpeißenberg, Germany

⁷Richard-Aßmann-Observatorium, DWD, Lindenberg, Germany

⁸NOAA/ESRL, Boulder, CO, USA

⁹Department of Applied Physics, Eindhoven University of Technology, Eindhoven, The Netherlands

¹⁰Finnish Meteorological Institute, Sodankylä, Finland

¹¹Ozone Layer Monitoring Office, Japan Meteorological Agency, Tokyo, 100-8122 Japan

¹²Agencia Estatal de Meteorología (AEMET), Madrid, Spain

¹³Met Éireann, The Irish Meteorological Service, Valentia Observatory, Cahirciveen, Kerry, Ireland

¹⁴Met Office, Exeter, UK

¹⁵NASA Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, USA

¹⁶Federal Office of Meteorology and Climatology, MeteoSwiss, Aerological Station, Payerne, Switzerland

* now at: Astrium GmbH, Germany

Abstract. This paper presents a first statistical validation of tropospheric ozone products derived from measurements of the IASI satellite instrument. Since the end of 2006, IASI (Infrared Atmospheric Sounding Interferometer) aboard the polar orbiter Metop-A measures infrared spectra of the Earth's atmosphere in nadir geometry. This validation covers the northern mid-latitudes and the period from July 2007 to August 2008. Retrieval results from four different sources are presented: three are from scientific products (LATMOS, LISA, LPMAA) and the fourth one is the pre-operational product distributed by EUMETSAT (version 4.2). The different products are derived from different algorithms with different approaches. The difference and their implications for the retrieved products are discussed. In order to evaluate the quality and the performance of each product, comparisons with the vertical ozone concentration profiles measured by balloon sondes are performed and lead to estimates of the



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systematic and random errors in the IASI ozone products (profiles and partial columns). A first comparison is performed on the given profiles; a second comparison takes into account the altitude dependent sensitivity of the retrievals. Tropospheric columnar amounts are compared to the sonde for a lower tropospheric column (surface to about 6 km) and a "total" tropospheric column (surface to about 11 km). On average both tropospheric columns have small biases for the scientific products, less than 2 Dobson Units (DU) for the lower troposphere and less than 1 DU for the total troposphere. The comparison of the still pre-operational EUMETSAT columns shows higher mean differences of about 5 DU.

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