

# VALIDATION OF THE IMK/IAA MIPAS CLONO<sub>2</sub> DATA PRODUCT

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## ABSTRACT

Altitude profiles of ClONO<sub>2</sub> retrieved with the IMK/IAA (Institut für Meteorologie und Klimaforschung/Instituto de Astrofísica de Andalucía) science-oriented data processor from MIPAS/Envisat (Michelson Interferometer for Passive Atmospheric Sounding on Envisat) mid-infrared limb emission measurements between July 2002 and March 2004 have been validated by comparison with balloon-borne (Mark IV, FIRS2, MIPAS-B), airborne (MIPAS-STR), ground-based (Spitsbergen, Thule, Kiruna, Harestua, Jungfraujoch, Izaña, Wollongong, Lauder), and spaceborne (ACE-FTS) observations. With few exceptions we found very good agreement between these instruments and MIPAS with no evidence for any bias in most cases and altitude regions. For balloon-borne measurements typical absolute mean differences are below 0.05 ppbv over the whole altitude range from 10 to 39 km. In case of ACE-FTS observations mean differences are below 0.03 ppbv for observations below 26 km. Above this altitude the comparison with ACE-FTS is affected by the photochemically induced diurnal variation of ClONO<sub>2</sub>. Correction for this by use of a chemical transport model led to an overcompensation of the photochemical effect by up to 0.1 ppbv at altitudes of 30–35 km in case of MIPAS-ACE-FTS comparisons while for the balloon-borne observations no such inconsistency has been detected. The comparison of MIPAS derived total column amounts with ground-based observations revealed no significant bias in the MIPAS data. Mean differences between MIPAS and FTIR col-

umn abundances are  $0.11 \pm 0.12 \times 10^{14} \text{ cm}^{-2}$  ( $1.0 \pm 1.1\%$ ) and  $-0.09 \pm 0.19 \times 10^{14} \text{ cm}^{-2}$  ( $-0.8 \pm 1.7\%$ ), depending on the coincidence criterion applied.  $\chi^2$  tests have been performed to assess the combined precision estimates of MIPAS and the related instruments. When no exact coincidences were available as in case of MIPAS - FTIR or MIPAS - ACE-FTS comparisons it has been necessary to take into consideration a coincidence error term to account for  $\chi^2$  deviations. From the resulting  $\chi^2$  profiles there is no evidence for a systematic over/underestimation of the MIPAS random error analy-

Key words: MIPAS; Envisat; Validation; Chlorine Nitrate.

## 1. REFERENCE TO PAPER

This work has been published by Höpfner et al. [1].

## REFERENCES

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