IMPROVED SPECTRAL PARAMETERS FOR HNO_3: VALIDATION OF MIPAS SATELLITE MEASUREMENTS

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Using new and accurate experimental results concerning the spectroscopic properties of the HNO_3 molecule in term of line positions, line intensities and line air-broadening parameters it has been possible to generate an improved set of line parameters for this molecule both in the spectral region covered by the MIPAS instrument (Michelson Interferometer for Passive Atmospheric Sounding) operating on ENVISAT and in the far infrared spectral region. The validation of satellite measurements like MIPAS is aimed at identifying possible systematic errors. In order to identify those of them which are due to the spectroscopic parameters, it is required to perform retrievals using a different instrument operating in a different spectral region. Therefore HNO_3 profiles measured at 11 μm by MIPAS were validated with the IBEX (Infrared Balloon EXperiment) measurements performed in the far infrared region. An agreement of $\pm$ 5% is obtained between the profiles achieved by these two instruments after that significant improvements are made to the spectroscopic databases in both spectral regions [a]. [b]. These new parameters differ significantly from the parameters which are presently available in HITRAN [c]

[a] J.M.Flaud, C.Piccolo, B.Carli, A.Perrin, L.H.Coudert, J.L.Teffo, and L. R. Brown, J. Atm. and Ocean Optics, 16, 172-182 (2003).

[b] A.Perrin, C.Puzzarini, J.-M.Colmont, C.Verdes, G.Wlodarczak, G.Cazzoli, S.Buehler, J.-M.Flaud, and J.Demaison J. of Atmos. Chemistry (2005) 51, 161-205

[c] L. H. Rothman, et al. http://cfa-www.harvard.edu/HITRAN/