PRESSURE-DEPENDENT LINE INTENSITY AND CONTINUUM ABSORPTION FOR PURE CO_2: EXPERIMENTAL RESULTS

M. BIRK, C. RÖSKE, G. WAGNER, *Remote Sensing Technology Institute, German Aerospace Center (DLR), D-82234 Wessling, Germany*; **H. TRAN**, *LMD, IPSL, Sorbonne Universite, Ecole Polytechnique, CNRS, Paris, France*

Fourier-transform measurements of pure CO_2 in the 1.6 μm region covering bands from ground state to 30011, 30012, 30013, and 30014 states at ambient temperature and 212 K with pressures up to 1 bar have been recorded. Line parameters have been retrieved by multispectrum fitting. An intensity depletion parameter quantifying linear intensity dependence on pressure was introduced and fitted. From the fitted baseline polynomials the self continuum was determined for the 30012 and 30013 bands. The depleted intensity was found to be transferred to the continuum for both temperatures, thus the band intensity is conserved. The intensity in the continuum at 1 atm was about 1% of the total band intensities for ambient temperature and about 3% at 212 K. For both temperatures the depleted intensity/continuum area was found in excellent agreement with values calculated from the second virial coefficient.

The experimental work is accompanied by rCMDS calculations[1].

The results presented here have significant impact on CO_2 retrieval from atmospheric measurements. For OCO/CO2M-type observations it was calculated that in case of the 2 μm band retrieved CO_2 columns are too large by about 3% when omitting depletion and continuum. A new spectroscopic database was produced. Systematic line intensity uncertainties are well below 0.1%.

[1] Ha Tran et al., Pressure dependent line intensity and continuum absorption for pure CO2: predictions by requantized molecular dynamics simulations, this conference.

p-number: p039 **Submitted on Tue, 06 Jun 2023 12:15:54 +0200**