

Erratum

Corrigendum to ‘Water vapor continuum: Absorption
measurements at 350 GHz and model calculations’
[JQSRT 2002;74:545–62]

Stefan A. Buehler^{a,*}, Thomas Kuhn^b, Agnes Bauer^c

^a*Department of Space Science, Luleå University of Technology, P.O. Box 812, SE-98128 Kiruna, Sweden*

^b*Institute of Environmental Physics, University of Bremen, P.O. Box 330440, D-28334 Bremen, Germany*

^c*Laboratoire de Physique des Lasers, Atomes et Molécules, Unité Mixte de Recherche CNRS,
Université des Sciences et Technologies de Lille, CERLA, F-59655 Villeneuve d’Ascq Cedex, France*

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In [1], we presented water vapor continuum parameterizations, based on laboratory measurements of absolute absorption coefficients of pure water vapor and mixtures of water vapor and nitrogen. The parameterizations were derived for different underlying spectroscopic line databases. Unfortunately, the paper contains an error in the treatment of one of the databases, HITRAN00 [2], which is corrected here.

While the current version of HITRAN has self-broadening parameters for water vapor lines in the frequency region of our study, the version that was available at the time of the study had not. The missing self-broadening parameters had to be guessed, so we assumed them to be equal to the air broadening parameters. However, it has been pointed out to us since that this assumption yields resonant line absorption values that are too low when used for pure water vapor under laboratory conditions. As a result, the curve for the HITRAN00 model in [1, Fig. 6], and the HITRAN00 values in [1, Table 4] are questionable.

A better solution would have been to assume a constant ratio of 5.089 for $G_{\text{H}_2\text{O},k}^{\text{H}_2\text{O}}/G_{\text{H}_2\text{O},k}^{\text{N}_2}$, to be consistent with [3]. Fig. 1 is a correction of [1, Fig. 6], based on this assumption. It shows the spectral line absorption term for pure water vapor, where the HITRAN00 calculation has been performed using a constant ratio of 5.089 for $G_{\text{H}_2\text{O},k}^{\text{H}_2\text{O}}/G_{\text{H}_2\text{O},k}^{\text{N}_2}$ for all the transitions. This overall scaling of the self-broadening parameter leads to an increased line absorption compared to that obtained with MMHIT00-A and MMHIT00-B.

Table 1 summarizes the parameters for the H₂O and H₂O–N₂ components of the continuum for the HITRAN00 database and the modified setup. It can be directly compared to [1, Table 4].

Note that this was just a workaround for the missing self-broadening parameters in HITRAN at the time of the study. For calculations with the current HITRAN version, we recommend to use the available self-broadening parameters, together with matching continuum terms.

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*Corresponding author. Fax: +46 980 79050.

E-mail address: sbuehler@ltu.se (S.A. Buehler).

URL: <http://www.sat.ltu.se> (S.A. Buehler).

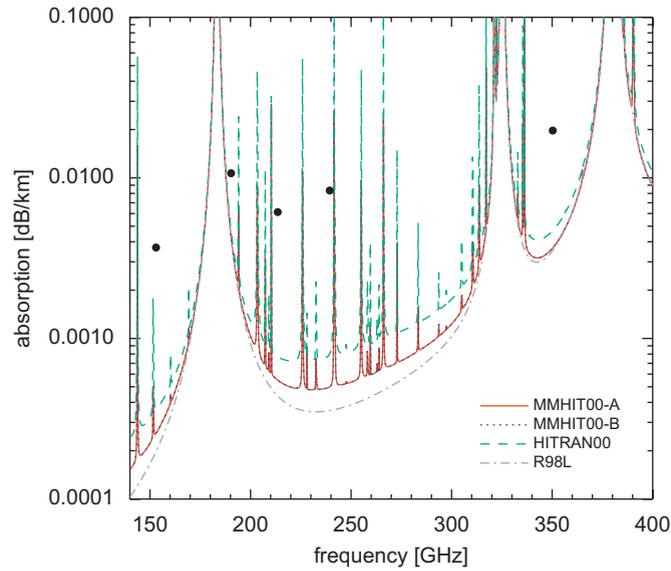


Fig. 1. Comparison of measured pure water vapor absorption (dots) with the calculated spectral line absorption (lines), using a Van Vleck–Weisskopf line shape function for the line databases MMHIT00-A, MMHIT00-B, and HITRAN00 and a Van Vleck–Weisskopf function with a cutoff of 750 GHz for R98L. The pressure is $P_{\text{H}_2\text{O}} = 1.33$ hPa and the temperature is 306 K.

Table 1

Values of the fitted parameters $C_{\text{H}_2\text{O}}$, n_s , C_{N_2} , and n_f . Only the data at 153, 213, 239, 350 GHz were considered for the fit

Line database	$C_{\text{H}_2\text{O}}^{\text{o,fit}} \left[\frac{10^{-8} \text{ dB/km}}{\text{h Pa}^2 \text{ GHz}^2} \right]$	$n_s^{\text{fit}} [1]$	$C_{\text{N}_2}^{\text{o,fit}} \left[\frac{10^{-9} \text{ dB/km}}{\text{h Pa}^2 \text{ GHz}^2} \right]$	$n_f^{\text{fit}} [1]$
α_t with Van Vleck–Weisskopf line shape function				
HITRAN00	8.53	5.4 ± 0.2	2.38	1.7 ± 0.4
α_t with Van Vleck–Weisskopf line shape function with cutoff, $u_c = 750$ GHz				
HITRAN00	8.87	5.1 ± 0.2	3.07	1.4 ± 0.3

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