

Interactive comment on “Calibration of atmospheric hydrogen measurements” by A. Jordan and B. Steinberg

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RC: “P.4932 Line 23: : :The main concern about potentially rising: : : (as it is not yet clear that mixing ratios will rise)”

AC: The sentence will be changed accordingly.

RC: Line 25: I think “influence” should be replaced with “increase” as this is the effect that increasing H₂ will have.

AC: The sentence will be changed accordingly.

RC: “P.4933 Line 15: Already Simmonds et al. (JGR, 2000) say that the difference is

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3.0

+/-1.0 ppb. I suggest adding this reference as well.”

AC: Simmonds et al. (JGR, 2000) actually state a difference of 3.0 +/- 1 %. However, this claim is inconsistent with intercomparison data provided by Masarie et al 2001. According to co-authors of the Simmonds et al. (2000) paper the respective sentence should have stated: CSIRO scale gives lower H₂ values, not higher (R. Langenfelds, pers. comm.).

P.4934 Line 14: A new paper has been published by Bond et al.(2011), adding to the background monitoring publications: Bond, S.W., M.K. Vollmer, M. Steinbacher, S. Henne, and S. Reimann, Atmospheric molecular hydrogen (H₂): observations at the high-altitude site Jungfraujoch, Switzerland, Tellus, Ser. B., 63(1), 64-76, 2011.

Line 15: The paper of Vollmer et al. (2007) was about tunnel measurements. A paper by Steinbacher et al. (2007)(Atmos. Environ., 41 (10), 2111-2124, 2007) would be possibly be more suited here. Although the Vollmer et al study could still be mentioned

Line 16: There is a new paper also from Simmonds et al. (2011) on soil uptake.

Estimation of hydrogen deposition velocities from 1995–2008 at Mace Head, Ireland using a simple box model and concurrent ozone depositions, Tellus B, 63 (1), 40–51.

AC: The references list is completed as suggested.

RC: “P4945 Line 9: This is maybe a misunderstanding but why do authors cite a relative uncertainty of 0.3% for the analysis in table 3 and here they cite a total uncertainty of the measurements and the random mixing of 0.12%. Please explain here or make it clear in the paper.”

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AC: We admit that this is maybe confusing and could appear inconsistent. The description of the last column of Table 2 (u_{mix} total) is apparently insufficient.

There are two different things quoted in Table 2 and 3, respectively:

Table 2: for each individual mixture the performance of the analysis is quoted (rsd and n), the random uncertainties of measured quantities for the mixing procedure. The combination of both contributes to the scatter of the experimental results that are apparent in the residuals to a (perfect) fit of the data. Thus, the residuals provide a plausibility check for the uncertainty estimates. Uncertainties that relate to potential systematic biases will not show up in the residuals. Adding the uncertainty estimates for such systematic effects yields the total mixing uncertainty number quoted in the last column of Table 2. We suggest to state more precisely in the footnotes:

^e u_{mix} ... total=combined uncertainty of all parameters that influence the mixing procedure as specified in Table 3”

Table 3: To evaluate the accuracy a more conservative approach is chosen to assess the measurement uncertainty related to GC-HgO analysis. Therefore, not the standard error of the measurement series is applied but the relative uncertainty of 0.3 % cited here rather represents the long-term standard deviation of the daily averages of quality control standard measurements (data displayed in Figure 3).

RC: “P 4961 Figure 4: at least in my copy the orange looks yellow, what is the purpose of the white bar? (Steel cylinders I see from the legend, but it would be good to specify this in the caption as well.)

AC: The white bar summarizes the entire group of all steel and stainless steel cylinders tested. The Figure caption will be updated accordingly.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4931, 2010.