

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

Anonymous Referee #2

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The paper describes the preparation procedure of a new hydrogen scale, which has been approved by WMO/GAW.

This is a well written instrumental paper and a piece of very good and solid science. Meticulous care was taken to cover different aspects of the preparation of the standards and to cover the whole range of possible errors, which could affect the quality of the scale. An additional excellent finding is the difference in behaviour of the detector for standards in N₂ and in air. This shows that matrix effects have to be known and understood before accurate measurements can be performed.

I have only some small remarks which I would be happy if the authors could address them before it will be finally published in AMT. Therefore, it goes without saying that I

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strongly suggest that the paper should be published in AMT.

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

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

P.4933 Line 15: Already Simmonds et al. (JGR, 2000) say that the difference is 3.0 +/-1.0 ppb. I suggest adding this reference as well.

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.

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.

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.