

Interactive comment on “Emission ratio and isotopic signatures of molecular hydrogen emissions from tropical biomass burning” by F. A. Haumann et al.

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Dear Referee #1 and to whom it may concern,

we thank the anonymous Referee #1 for the very positive and careful review of our manuscript. Please find our responses to his or her comments below:

Referee #1: p11220 | 0-15: please check the tenses

Response: Thank you for spotting these inconsistencies. We have changed all verb forms describing the measurements and the simulation to past tense for consistency and use present tense for our analysis presented in the paper (p11219-p11222):

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p11219 | 9: 'is bracketed' -> 'was bracketed'

p11219 | 10: 'is determined' -> 'was determined'

p11219 | 13: 'have not been corrected' -> 'were not corrected'

p11220 | 2: 'follows' -> 'followed'

p11220 | 3: 'is purified' -> 'was purified'

p11220 | 4: 'is filled' -> 'was filled'

p11220 | 5: 'is exposed' -> 'was exposed'

p11220 | 6: 'condense' -> 'condensed'

p11220 | 7: 'are flushed' -> 'were flushed'

p11220 | 11: 'separates' -> 'separated'

p11220 | 14: 'It is reported' -> 'Here, it is reported'

p11220 | 20: 'is preceded' -> 'was preceded'

p11221 | 2: 2x 'is' -> 'was'

p11221 | 3: 'might be' -> 'might have been'

p11221 | 9: 'do' -> 'did'

p11221 | 13: 'is' -> 'was'

p11221 | 14-15: 'if we apply [...], there is [...]' -> 'if we had applied [...], there would have been [...]

p11221 | 16: 'has' -> 'had'

p11221 | 17: 'is' -> 'was'

p11221 | 18: 'is further motivated' -> 'was further motivated'

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p11221 | 19: 'could be determined' -> 'had been determined'
p11221 | 20: 'had been made' -> 'were made'
p11221 | 21: 'has been determined' -> 'had been determined'
p11221 | 21: 'have tested' -> 'tested'
p11221 | 22: 'find' -> 'found'
p11222 | 4: 'have performed' -> 'performed'
p11222 | 6: 'are using' -> 'used'
p11222 | 10: 'is forced' -> 'was forced'
p11222 | 12: 'are fixed' -> 'were fixed'
p11222 | 12: 'do' -> 'did'
p11222 | 14: 'is' -> 'was'

Referee #1: p11220 | 20: please add the value of the VSMOW

Response: The value of VSMOW is 155.76 ± 0.08 ppm. We have changed the sentence accordingly:

'The international standard D/H ratio is the one of Vienna Standard Mean Ocean Water (VSMOW) with a value of 155.76 ± 0.08 ppm (de Wit et al., 1980; Gonfiantini et al., 1993).'

Referee #1: p11223 | 10-17: Do you or do you not use the background for the calculations afterwards? Please clarify.

Response: Indeed we were not fully clear on this point here. We did not use the background values to determine the $\Delta H_2/\Delta CO$ ratio, instead we used the slope of the regression line (see p11223 | 18-25). We did use the CO background and the regression line hereafter to provide an estimate of the H₂ background value (see p11225 |

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8-11). We changed the part (p11223 | 10-17) of the paragraph accordingly and it now reads:

'Values are commonly reported as elevations over a typical background mixing ratio, thus as $\Delta H_2 = H_2 - H_{2,bg}$ and $\Delta CO = CO - CO_{bg}$, respectively. In this study, however, we do not use the background mixing ratio to estimate the $\Delta H_2/\Delta CO$ ratio but the slope of the regression line through the measured mixing ratios of H₂ and CO. Therefore, we need to assume that any deviations from the background mixing ratio of the considered species almost solely result from biomass burning and all other source and sink terms are minor. We will later discuss to what extent this assumption is valid for our set of samples and how we can reduce potential interferences. Moreover, the assumption of a single source in the samples translates to a constant background value for both species. During the BARCA-A campaign the background mixing ratio of CO is about 79 ± 7 ppb (cf. Andreae et al., 2012). There is no estimate for the background mixing ratio of H₂ for the BARCA-A period. Here, we will thus use the CO background mixing ratio and our value for the $\Delta H_2/\Delta CO$ ratio to estimate the H₂ background concentration as well.'

Referee #1: p11229 | 0: 'latitude due to variance'

Response: Changed.

All these corrections will be included in the final version of the manuscript.

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