

Supplementary Material to:

Design and performance of a Nafion dryer for continuous operation at CO₂ and CH₄ air monitoring sites

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Summary

This document contains plots of the dry-air and wet-air experimental data not shown in the published manuscript, but summarized in Table 1.

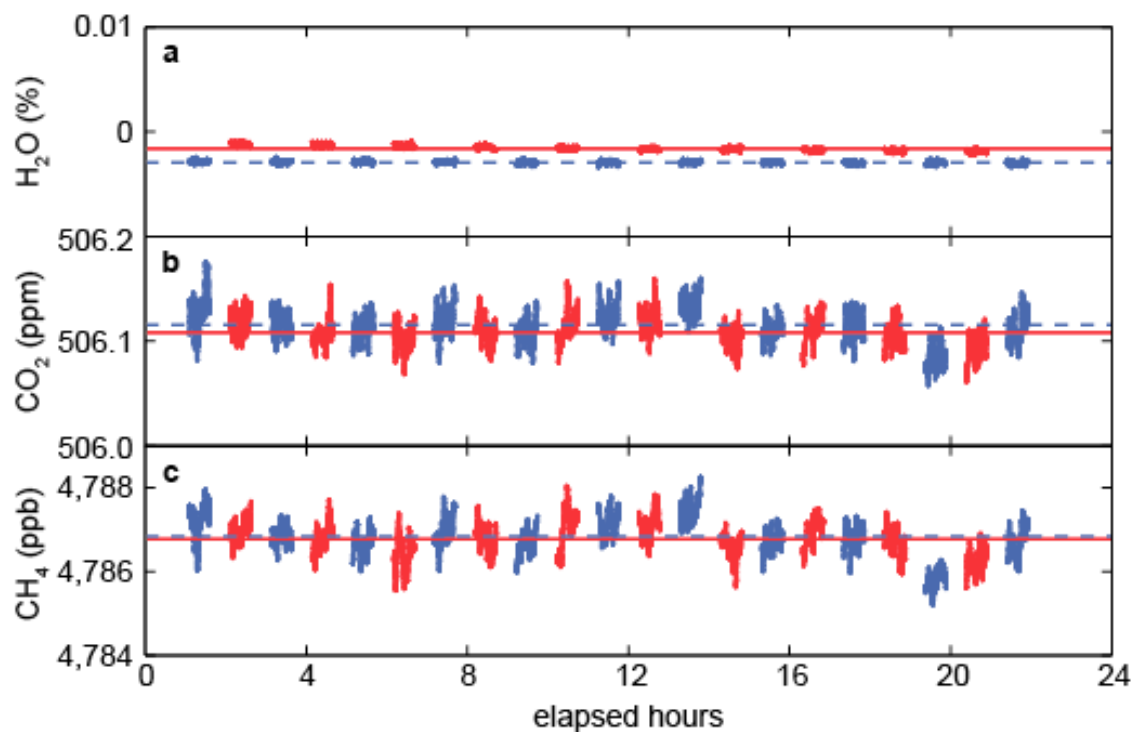


Figure S1: Dry-air Exp. 1.1 on 29 July 2011 using the test setup. The cryotrap treatment is shown in blue and the Nafion treatment is in red for (a) H₂O, (b) CO₂, (c) CH₄. The first 30 minutes of data were excluded for each treatment. The straight lines are mean values for the cryotrap (blue dashed) and Nafion (solid red) over the entire experiment. H₂O values are less than zero because the H₂O factory calibration is not perfect. No water vapor correction was applied. Results are summarized in Table 1.

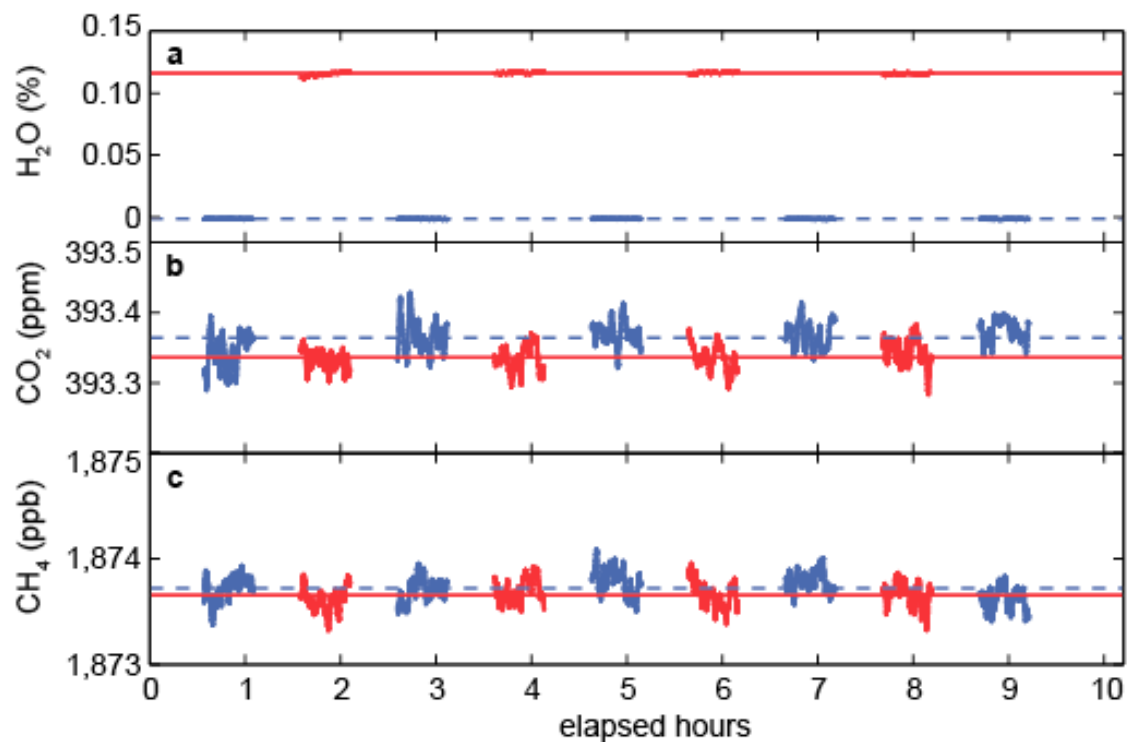


Figure S2: Wet-air Exp. 1.2 on 1 August 2011 using the test setup. The cryotrap treatment is shown in blue and the Nafion treatment is in red for (a) H₂O, (b) CO₂, (c) CH₄. The first 30 minutes of data were excluded for each treatment. The straight lines are mean values for the cryotrap (blue dashed) and Nafion (solid red) over the entire experiment. The secondary cryotrap was not installed, so the water vapor correction was applied to this data. Results are summarized in Table 1.

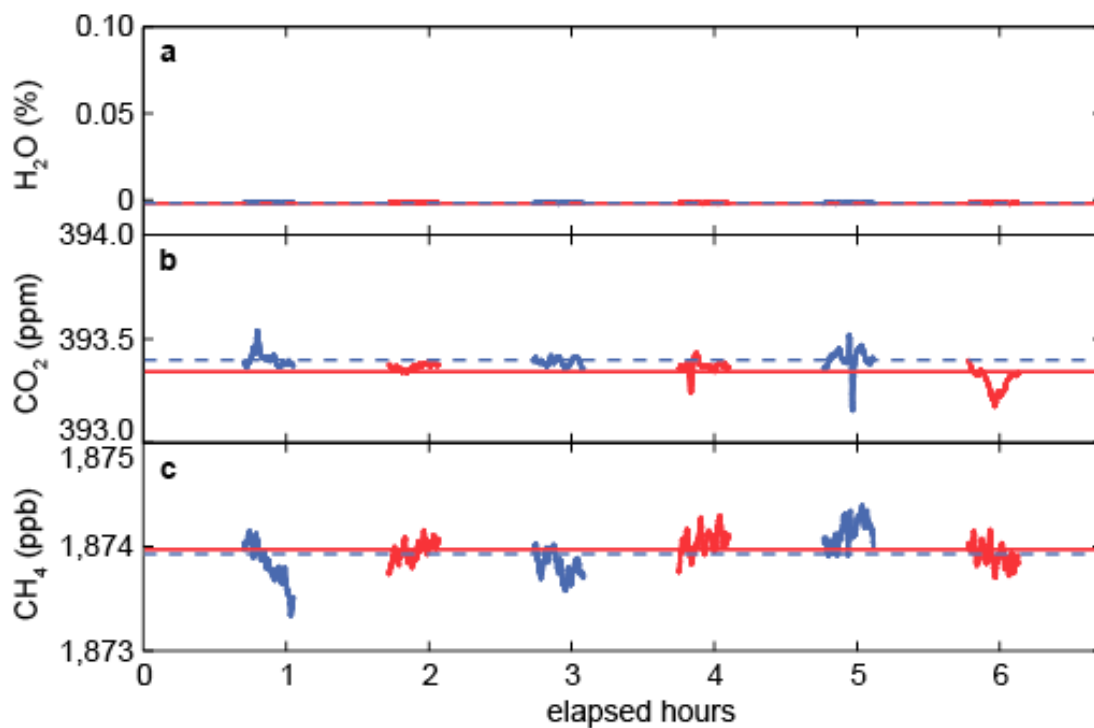


Figure S3: Wet-air Exp. 1.4 on 18 August 2011 using the test setup. The cryotrap treatment is shown in blue and the Nafion treatment is in red for (a) H₂O, (b) CO₂, (c) CH₄. The first 30 minutes of data were excluded for each treatment. The straight lines are mean values for the cryotrap (blue dashed) and Nafion (solid red) over the entire experiment. The secondary cryotrap was installed, so no water vapor correction was applied to this data. Results are summarized in Table 1.

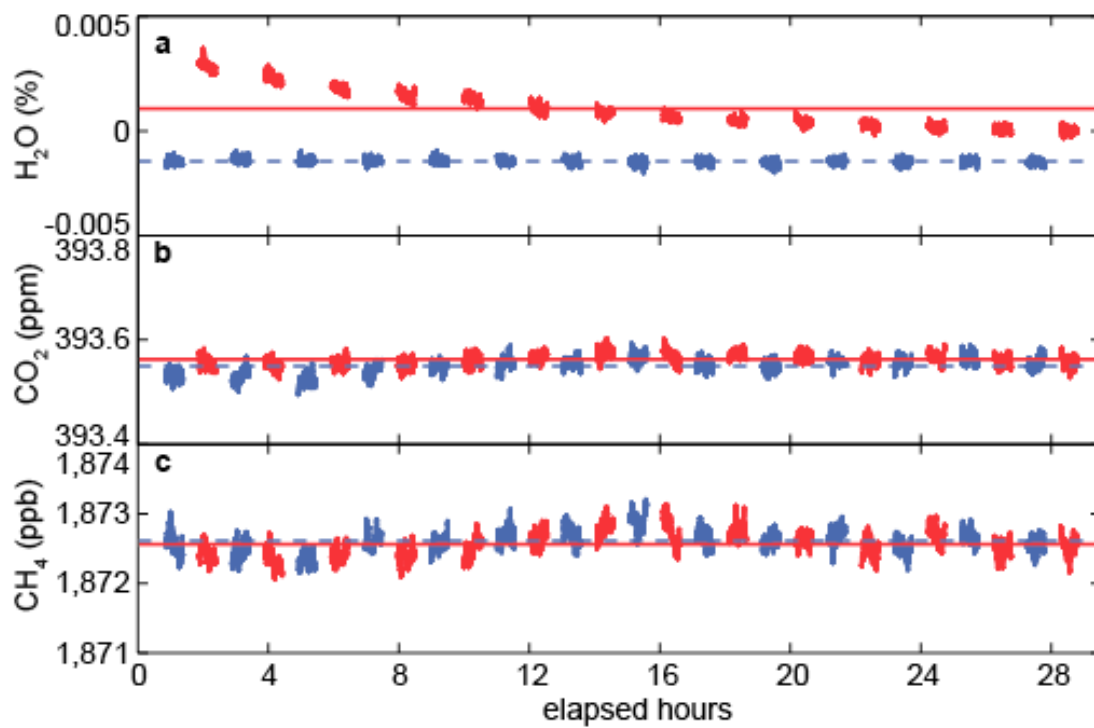


Figure S4: Dry-air Exp. 2.1 on 24 May 2012 using the test setup. The Nafion retained some residual moisture and thus added a small amount of H₂O to the dry tank gas. The secondary cyrotrap was not installed, so the water vapor correction was applied to the Nafion treatment data. Results are summarized in Table 1.

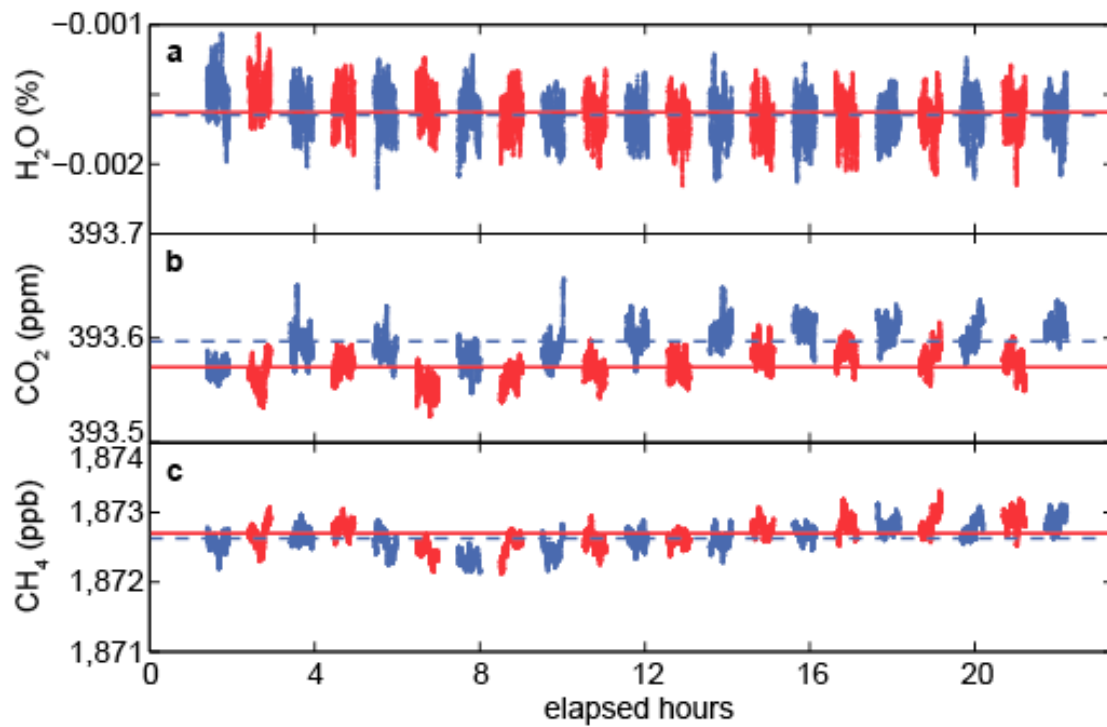


Figure S5: Wet-air Exp. 2.2 on 30 May 2012 using the test setup.

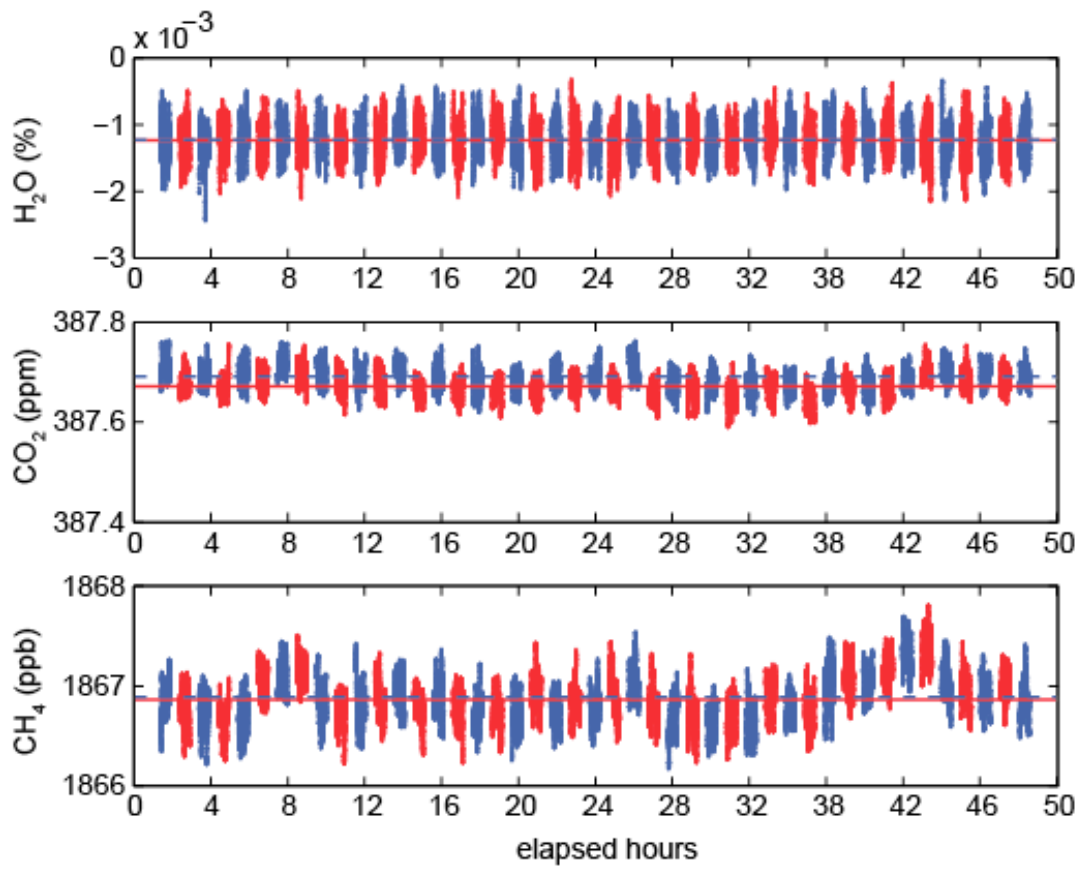


Figure S6: Dry-air Exp. 3.1 on 23 Feb 2013 using the Earth Networks sample module at room temperature ($\sim 25^{\circ}\text{C}$).

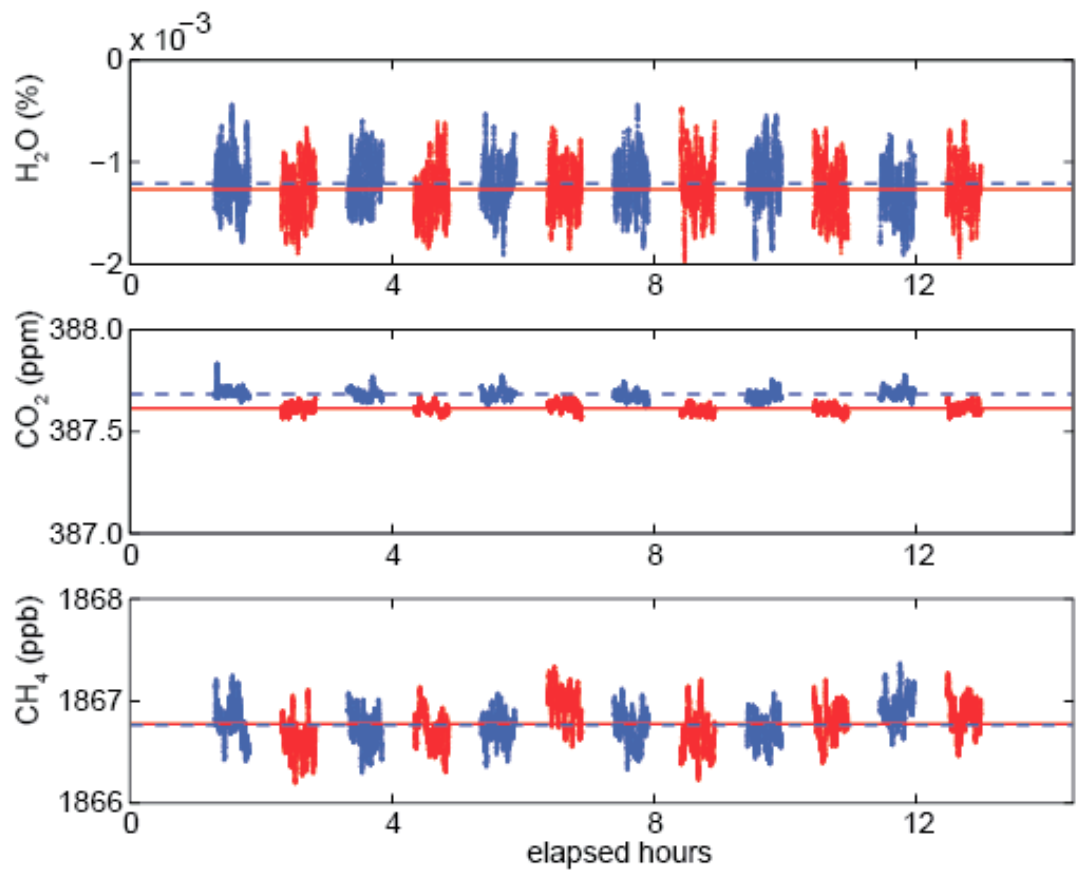


Figure S7: Wet-air (2.0% H₂O) Exp. 3.2 on 18 Feb 2013 using the Earth Networks sample module at room temperature (~25°C).

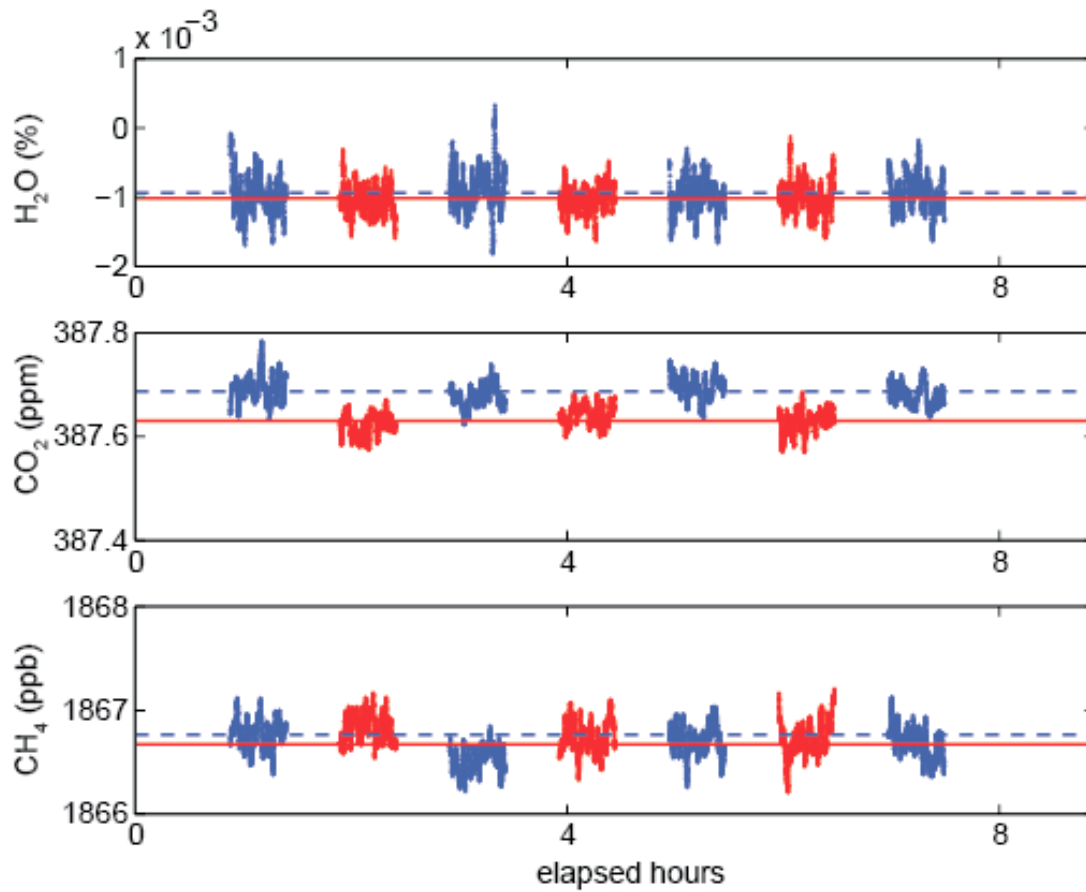


Figure S8: Wet-air (2.0% H₂O) Exp. 3.2 on 19 Feb 2013 using the Earth Networks sample module at room temperature (~25°C). An ethanol and dry ice slush (-72°C) was used in place of the -97°C chiller.

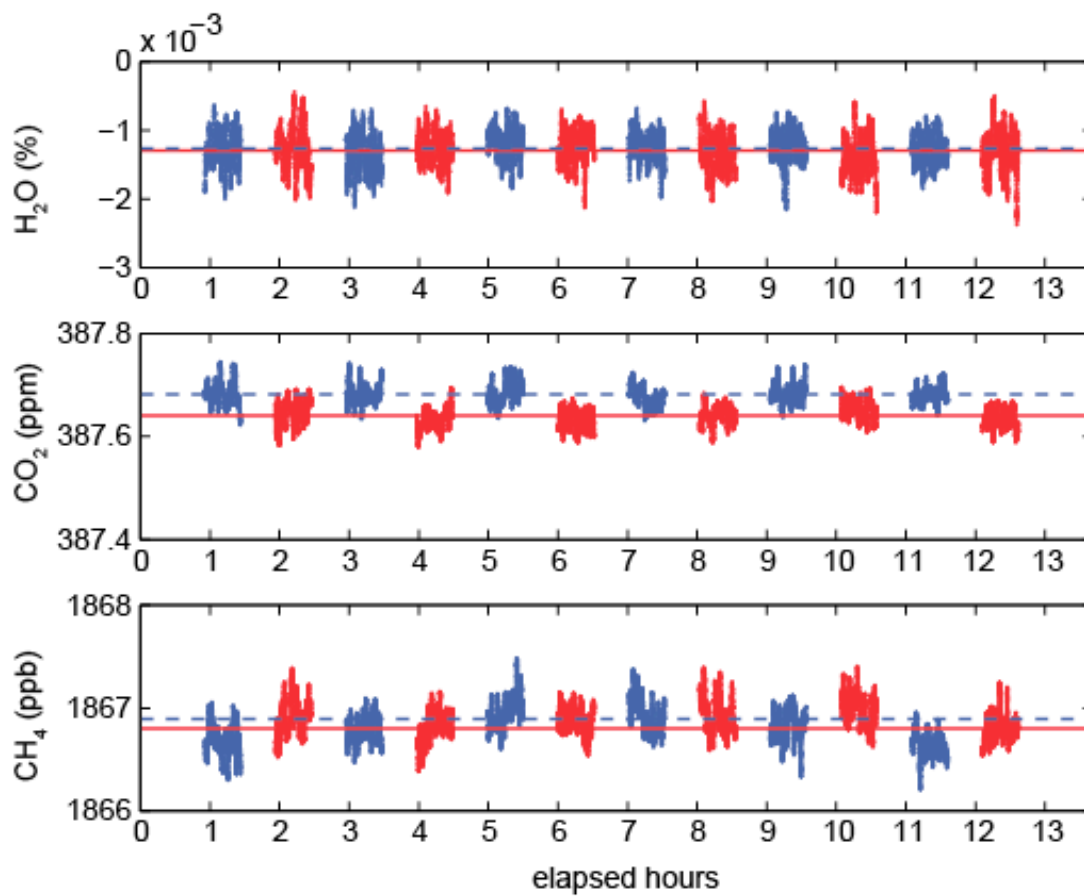


Figure S9: Dry-air Exp. 3.4 on 22 Feb 2013 using the Earth Networks sample module at elevated temperature ($\sim 35^{\circ}\text{C}$).

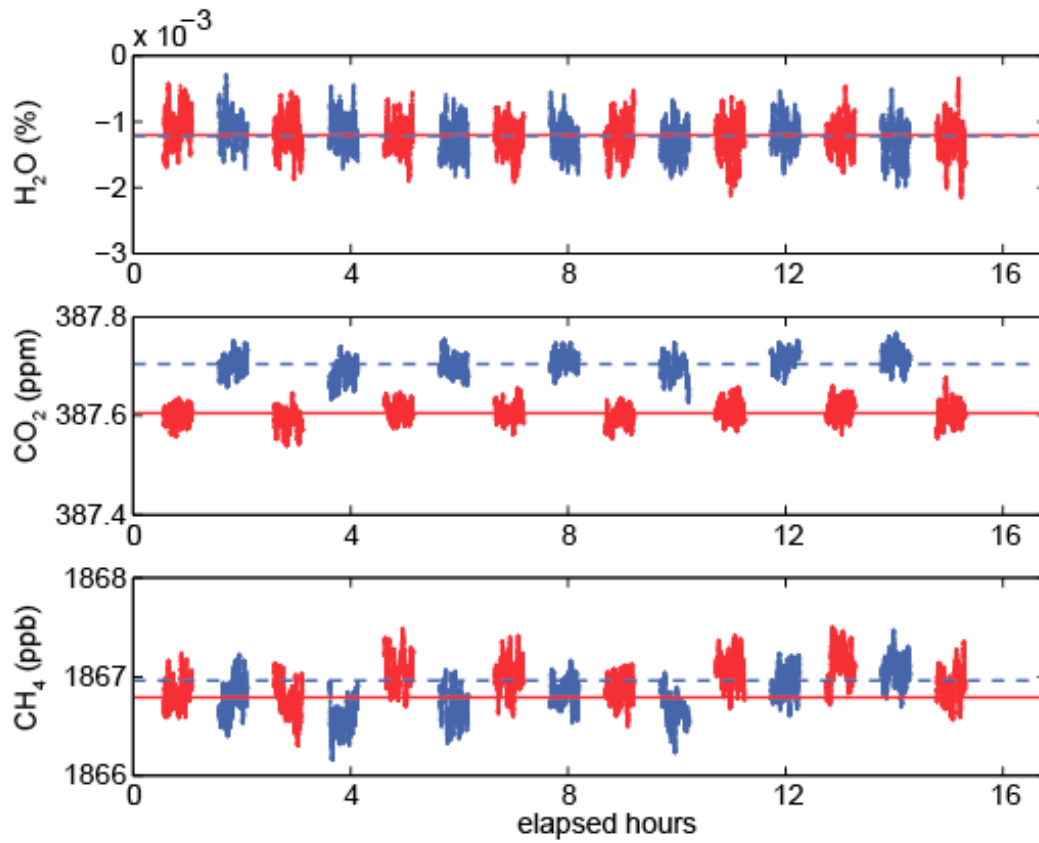


Figure S10: Wet-air (2.0% H₂O) Exp. 3.5 on 20 Feb 2013 using the Earth Networks sample module at elevated temperature ($\sim 35^{\circ}\text{C}$).