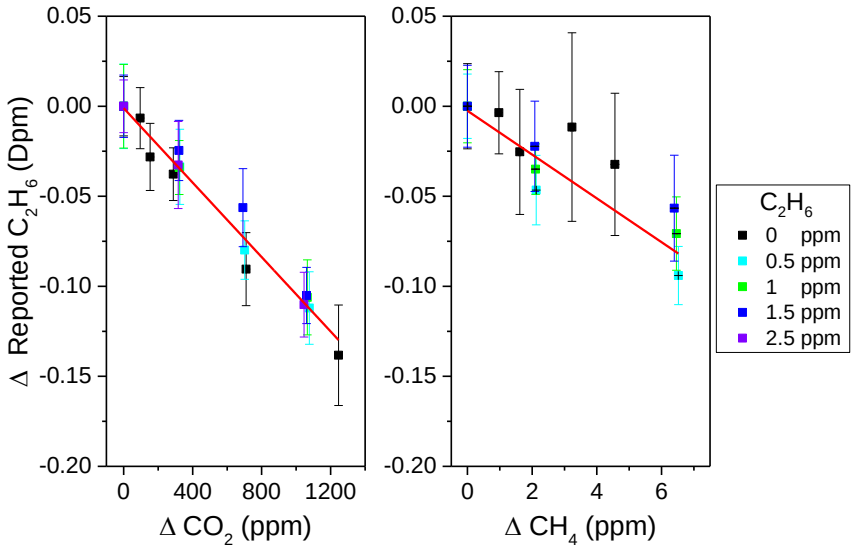
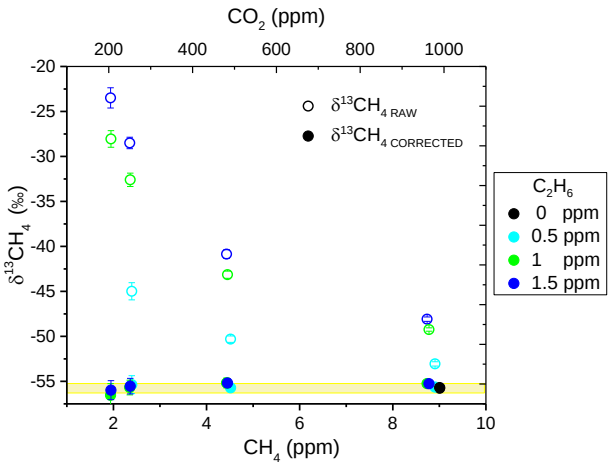


Figure S3: Relationship between the reported C_2H_6 and concentration changes of CO_2 (left) and CH_4 (right) at 5 C_2H_6 concentrations for instrument CFIDS 2072. The concentration change (from background levels) of the targeted gas is plotted on the x-axis, while the change in reported C_2H_6 is plotted on the y-axis. Markers represent a 20 minute average, with error bars denoting the standard deviation. For each dilution series, C_2H_6 concentration was kept constant at different concentrations, represented by the coloured markers. The CH_4 correction was examined up to 1.5 ppm C_2H_6 to sustain a C_2H_6:CH_4 ratio <1, well above the upper range expected from natural gas sources. At all C_2H_6 concentrations examined, for both ΔCO_2 and ΔCH_4, the response function agreed within the uncertainties to that calculated at 0 ppm C_2H_6. The red line represents the linear fit taking into account both X and Y error; Pearson's R is -0.99 and -0.89 for concentration changes of both CO_2 and CH_4 respectively.



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15 Figure S4: Isotopic signal (raw and corrected) from the CRDS for varying mixtures of CH4, CO2 and C2H6 at ~0%
16 H2O. The top and bottom x-axis represent the CO2, and CH4 concentration respectively. The y-axis represents the
17 methane isotopic signal before and after correction, shown by empty and filled markers respectively. For each
18 dilution series, CO2 and CH4 were altered while C2H6 concentration was kept constant at different concentrations
19 (ppm), represented by the coloured markers. The raw δ13CH4 signal is subject to large biases, while the corrected
20 δ13CH4 maintains the standard value, -55.7 +/- 0.2 (highlighted in yellow).

21