



Incorporating the VSMOW and VPDB isotope scale into CH₄ to produce isotope reference gases for CH₄ in air

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Measurement accuracy offsets between laboratories and scale contraction effects are technical pitfalls that must be identified and corrected for when isotope data of atmospheric CH₄ that were measured by multiple laboratories are merged for analysis. Measurement agreement can generally be assured by referencing the measurements to certified standard material. Unfortunately, international isotope reference material for CH₄ does not exist, which challenges the compatibility prerequisite between laboratories measuring isotope ratios of CH₄ in atmospheric samples.

We are developing two methods to incorporate the hydrogen of VSMOW and the carbon of VPDB isotope scale material into CH₄, so the CH₄ is then itself representing the VSMOW and VPDB isotope reference scales for $\delta^2\text{H-CH}_4$ and $\delta^{13}\text{C-CH}_4$, respectively. This isotope scale holding CH₄ is then diluted with CH₄-free air to be used as an atmospheric isotope reference gas. We present our approach to produce isotope reference gas for $\delta^2\text{H-CH}_4$ and show our first results.