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Increasing Accuracy in Environmental Measurements

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Human activity is increasing the concentrations of green house gases (GHG) in the atmosphere which results in temperature increases. High precision is a key requirement of atmospheric measurements to study the global carbon cycle and its effect on climate change.

Natural air containing stable isotopes are used in GHG monitoring to calibrate analytical equipment. This presentation will examine the natural air and isotopic mixture preparation process, for both molecular and isotopic concentrations, for a range of components and delta values. The role of precisely characterized source material will be presented. Analysis of individual cylinders within multiple batches will be presented to demonstrate the ability to dynamically fill multiple cylinders containing identical compositions without isotopic fractionation. Additional emphasis will focus on the ability to adjust isotope ratios to more closely bracket sample types without the reliance on combusting naturally occurring materials, thereby improving analytical accuracy.