

## Comparison of Primary Standards/Scales of Key Greenhouse Gases Between NOAA and NIST

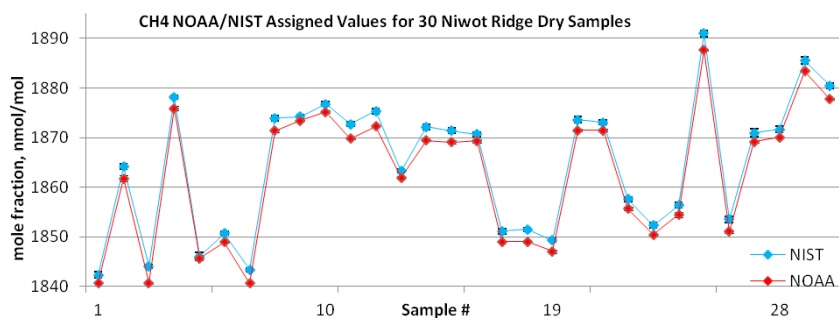
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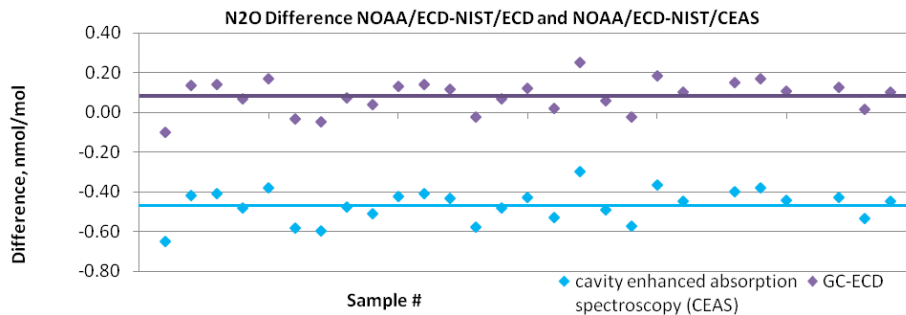
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The Gas Metrology Group of the Analytical Chemistry Division at NIST and the Global Monitoring Division of NOAA/ESRL have been collaborating on comparison of standards for key greenhouse gases: CH<sub>4</sub>, N<sub>2</sub>O, CO and CO<sub>2</sub>. These collaborations help to support NOAA as well as providing a solid link to the Gas Analysis Working Group of the Consultative Committee on the Quantity of Material (CCQM) – Metrology in Chemistry consisting of National Metrology Institutes worldwide, with NOAA being the World Meteorological Organization representative laboratory to the CCQM. Data on recent comparisons of current standards/scales indicate agreement to within 2.5 ppb (0.14 % relative) for CH<sub>4</sub> and 0.07 ppb (0.02 %) for N<sub>2</sub>O. Based on the current NOAA 2005 CH<sub>4</sub> scale and applying a correction to previous comparisons (1998), the agreement between NIST/NOAA has been consistent for years. NIST's historical CH<sub>4</sub> analytical data set demonstrates 40 years of consistency for CH<sub>4</sub> in their primary standards and Standard Reference Materials (SRM). The current (2011) NIST N<sub>2</sub>O primary standards suite has led to hard evidence as the reason for a 1.2 % disagreement between NIST/NOAA reported in 2004. Differences in N<sub>2</sub>O values obtained by NIST using different analytical instrumentation will be discussed. Data for comparison of CO and CO<sub>2</sub> standards will hopefully be available for discussion. NOAA has also provided cylinders of Niwot Ridge dry air which has been analyzed for these species by both laboratories and will eventually be dual-certified as a NIST SRM. The CH<sub>4</sub> and N<sub>2</sub>O data for these cylinders show very good cylinder-to-cylinder consistency between NIST and NOAA.



**Figure 1.** CH<sub>4</sub> NOAA/NIST assigned values for 30 Niwot Ridge dry samples.



**Figure 2.** N<sub>2</sub>O difference NOAA/ECD-NIST/ECD and NOAA/ECD-NIST/CEAS.