

Revision of the NOAA 2006 N₂O Scale

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NOAA/ESRL/GMD serves as the World Meteorological Organization/Global Atmosphere Watch Central Calibration Laboratory for five trace gases (CO₂, CH₄, CO, N₂O, and SF₆). Traceable, stable calibration scales are critically important for the atmospheric science community. From 2004-2009 the NOAA 2006 N₂O scale showed an apparent upward drift of 0.03 ppb yr⁻¹. The cause of the drift was determined to be downward drift in a secondary standard used for routine calibration. This secondary standard is drifting at a rate of -0.051 ± 0.014 ppb yr⁻¹. All secondary standards have been replaced and the N₂O 2006 scale was recently revised. The updated scale, NOAA 2006A, appears to be stable since 2006. The average difference between the 2006 and 2006A scales is -0.09 ppb. Actual differences are time-dependent. While the conventional wisdom holds that N₂O drift in compressed gas cylinders is rare, these and other results suggest that N₂O drift (at low rates) may be more common than previously thought.

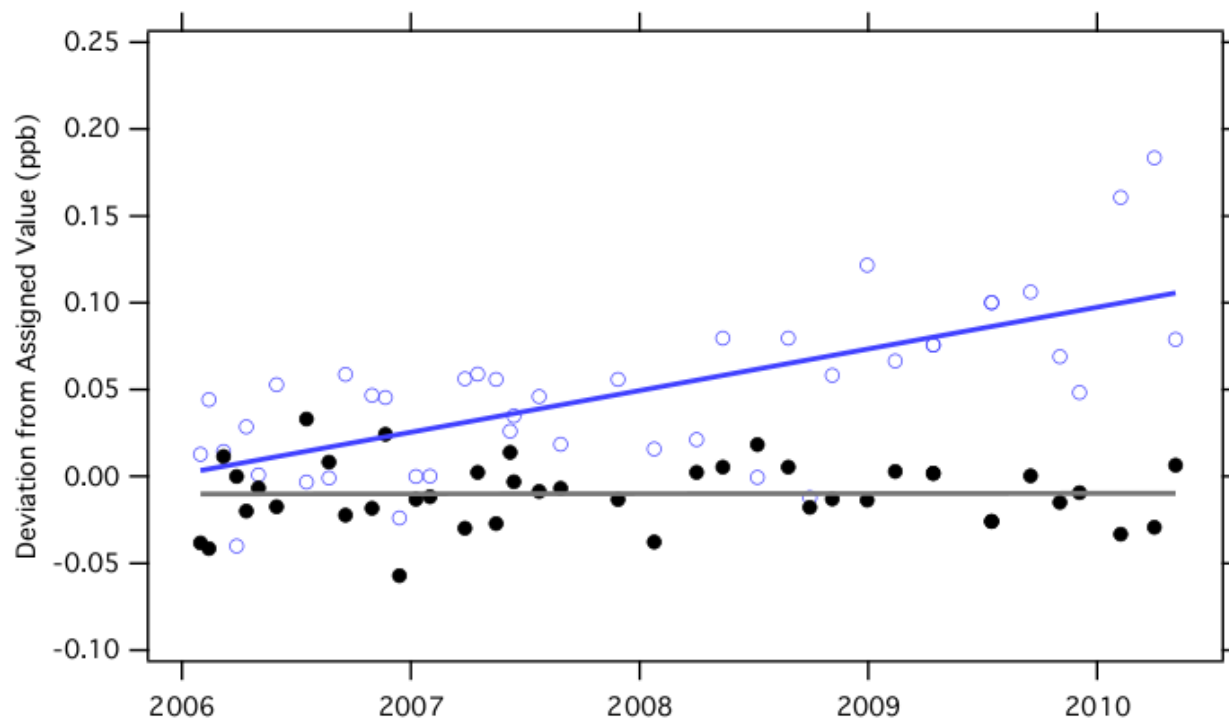


Figure 1. Apparent drift of the NOAA 2006 N₂O scale before (open symbols) and after (filled symbols) a drifting secondary standard was discovered and excluded from the calibration procedure. The downward drift in the secondary standard induced an upward drift in the N₂O scale of 0.03 ppb yr⁻¹. The scale has been updated and drift is no longer apparent.