Supporting Information for: Oceanic source strength of carbon monoxide on the basis of basin-wide observations in the Atlantic

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Since the quoted uncertainty in the concentration of standard gases prepared by the gas specialty company was too large (±10%), these concentrations were calibrated against two NOAA standards and one secondary standard (HGC-001). The latter was prepared in the laboratory at Max Planck Institute for Chemistry. The concentrations of company-supplied standards, NOAA standards, and HGC-001 are listed in Table S1.

Table S1. Concentrations of standard gases.

ID	Mole fraction (ppb)	Manufacturer
DS-01	198	DEUSTE Steininger GmbH
DS-02	503	DEUSTE Steininger GmbH
DS-03	996	DEUSTE Steininger GmbH
NOAA-1	101.84	NOAA
NOAA-2	172.1	NOAA
HGC-001	54.44	Max Planck Institute for Chemistry

By means of the combination of two sample loops (0.49668±0.00015 mL and 1.95671±0.00058 mL at 50 °C), the NOAA standards are capable of calibrating standard up to 678 ppb by interpolation. DS-03 needed to be extrapolated. In order to minimize the uncertainty of the concentration of DS-03, linear regression was applied for the data of the NOAA standards and HGC-001, which were determined using two sample loops (Figure S1). When the linear regressions were separately applied for the data from each sample loop, the slopes were the same within the uncertainty (±2σ), but there was an offset between the two lines. One of the reasons is probably a matrix effect on the detector. This speculation could be supported from the same experiment using the company-supplied standards (Figure S2). Since the reason is not yet known, we used a linear regression curve obtained for all the data to determine the concentrations of the company-supplied gases (Figure S1). The calibrated concentrations are listed in Table S2.

Table S2. Concentrations of the standard gases supplied by the company (Unit : ppb)

Nominal concentration	Calibrated concentration	Standard deviation	Confidence level 95%
198(±10%)	164.4	1.1	0.99
503(±10%)	459.4	2.5	2.4
996(±10%)	948.6	10.4	8.7

Using these concentrations, the calibration lines were plotted in Figure S2. In this case, not only was there no offset between the regression lines obtained from different sample loops, but the regression lines are identical, but with different uncertainties. The company-supplied standards were a mixture of CO in synthetic air, whereas the NOAA standards and HGC-001 were ambient dry air. Thus, unknown chemicals which react with mercuric oxide may cause the offset to appear.

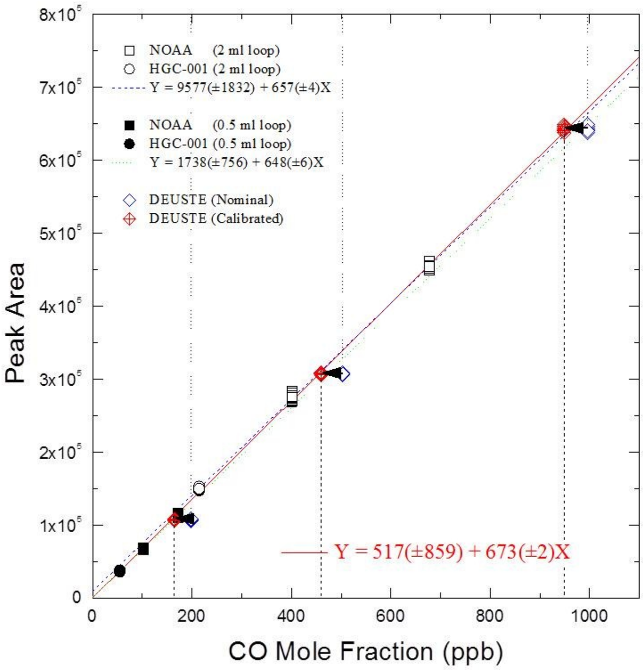

Figure S1. Calibration curves for NOAA standards and HGC-001. Three different calibration curves are drawn from the data for the ~2 mL sample loop (heavy dot), the ~0.5 mL sample loop (light dot), and both (red solid). Using the calibration curve obtained from both case, the company-supplied standards were calibrated as indicated by the arrow in the plot.

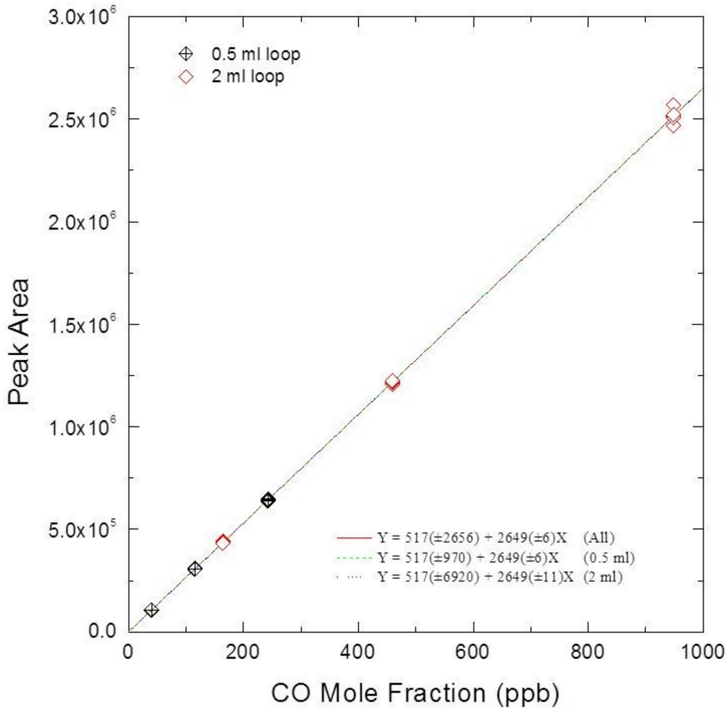

Figure S2. Calibration curves for the company-supplied standards after scaled to the NOAA standards and HGC-001. The linear fits were separately derived from the data using ~0.5 mL and ~2 mL sample loops and both. As indicated by the equations of the linear regression curves, these three curves are identical.