

Supplement of *Clim. Past*, 10, 987–1000, 2014
<http://www.clim-past.net/cp-10-987-2014/>
doi:10.5194/cp-10-987-2014-supplement
© Author(s) 2014. CC Attribution 3.0 License.



Supplement of

High resolution measurements of carbon monoxide along a late Holocene Greenland ice core: evidence for in situ production

X. Fain et al.

Correspondence to: X. Fain (xavier.fain@lgge.obs.ujf-grenoble.fr)

1 **High resolution measurements of carbon monoxide along a late**
2 **Holocene Greenland ice core: evidence for in-situ production**

3 **SUPPORTING INFORMATIONS**

4

5 Xavier Faïn^{a,*}, Jérôme Chappellaz^a, Rachael H. Rhodes^b, Christopher Stowasser^c, Thomas
6 Blunier^c, Joseph R. McConnell^d, Edward J. Brook^a, Suzanne Preunkert^a, Michel Legrand^a,
7 Thibault Debois^e, and Daniele Romanini^e

8

9 **2.2 Detecting CO with OF-CEAS**

10 The OF-CEAS spectrometer was calibrated on dry gas by direct injection of two synthetic standards
11 gas precisely calibrated (CO concentration of 50.2 and 95.4 ppbv respectively, reported as standards
12 1 and 2) onto the NOAA/WMO 2004 scale.

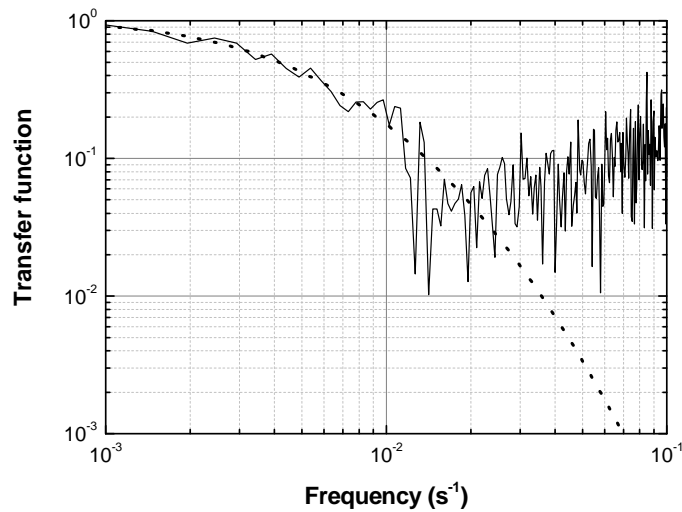
13 Both standards were injected to the OF-CEAS spectrometer using mass flow controller (MFC, 5850E,
14 Brooks Instrument, USA) at the beginning of the analytical campaign. We measured 49.9 ± 0.8 ppbv
15 and 89.0 ± 0.9 ppbv respectively for standard 1 and 2. The linear regression obtained using a chi-
16 square fitting, which takes into account individual standard deviations, is shown in Equation (1) :

17 (1) $[\text{CO}]_{\text{measured}} = a \times [\text{CO}]_{\text{NOAA}} + b$ where $a = 0.86 \pm 0.03$ and $b = 6.47 \pm 1.96$

18 We report a a factor lower than 1 because both standard gas cylinders were accurately recalibrated
19 by the NOAA GMD Carbon Cycle Group after the measurements campaign, revealing CO levels higher
20 than the initial values used for calibration of the OF-CEAS spectrometer before analysis of the NEEM-
21 2011-S1 core. However, this did not affected the precision of our measurements (see Romanini et al.,
22 2006, for more details about OF-CEAS calibration).

23

24 **2.4. Data processing and depth scaling**

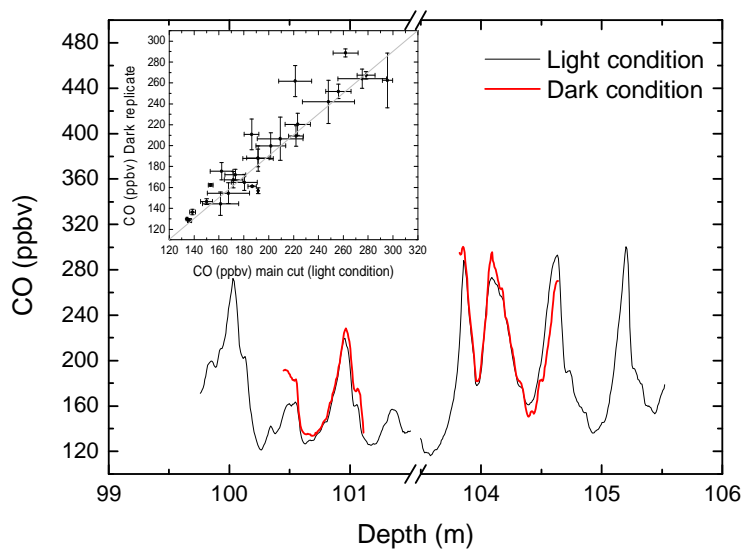


25

26 **Figure S1.** Transfer function of the continuous CO measurements system (full loop) obtained by switching
 27 between two gas standard (continuous line), and of the theoretical case of zero- noise measurements (dashed
 28 line).

29

30 **3.3.2. Does continuous laboratory melting drive CO production?**



31

32 **Figure S2.**

33 Replicate measurements of CO concentrations from the D4 Greenland core (2713 m a.s.l.; 71.4°N, 44.0°W)
 34 under regular (black line) and dark (red line) conditions. Inset displays CO concentrations from regular versus
 35 dark conditions, after averaging data over 5cm long depth intervals. Note that the dark record depth scale has
 36 been slightly adjusted (i.e., a 5cm offset was applied), to perfectly line up both records.

37

38 **Reference**

39 Romanini, D., Chenevier, M., Kassi, S., Schmidt, M., Valant, C., Ramonet, M., Lopez, J., and
40 Jost, H. J.: Optical-feedback cavity-enhanced absorption: a compact spectrometer for real-
41 time measurement of atmospheric methane, *Applied Physics B-Lasers and Optics*, 83, 659-
42 667, doi:10.1007/s00340-006-2177-2, 2006.