**Supplemental File (online only)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | UCIAMS# | UCID # | Uvox date | Storage (d) | Treatment | DOC [µM] | 14C(‰) | 13C(‰) | DOC[µM] | |DOC| | 14C (‰) | |14C| (‰) | 13C (‰) | |13C| (‰) |
| P6-1A | 86420 | 13023 | 9/22/10 | 1 | frozen | 33.8 | -509.5 | -21.1 | 1.3 | 1.3 | 2.8 | 2.8 | -0.2 | 0.2 |
| P6-1B | 86421 | 13024 | 9/23/10 |  | frozen | 35.1 | -506.7 | -21.3 |  |  |  |  |  |  |
| P6-2A | 86206 | 13032 | 10/19/10 | 176 | frozen | 40.1 | -377.2 | -20.9 | 1.5 | 1.5 | 9.3 | 9.3 | -0.2 | 0.2 |
| P6-2B | 95245 | 13361 | 4/13/11 |  | frozen | 41.6 | -367.9 | -21.1 |  |  |  |  |  |  |
| P6-3A | 86207 | 13033 | 10/29/10 | 173 | frozen | 32.6 | -528.0 |  | 2.1 | 2.1 | -10.3 | 10.3 |  |  |
| P6-3B | 95248 | 13365 | 4/20/11 |  | frozen | 34.7 | -538.3 | -22.0 |  |  |  |  |  |  |
| P6-4A | 104843 | 15741 | 10/27/11 | 148 | frozen | 44.8 | -352.5 |  | 1.8 | 1.8 | 14.8 | 14.8 |  |  |
| P6-4B | 109248 | 16252 | 3/23/12 |  | frozen | 46.6 | -337.7 | -21.5 |  |  |  |  |  |  |
| P6-5A | 104851 | 15749 | 11/14/11 | 1 | frozen | 42.4 | -415.6 | -21.6 | -1.0 | 1.0 | 5.4 | 5.4 | 0.1 | 0.1 |
| P6-5B | 104852 | 15750 | 11/15/11 |  | frozen | 41.4 | -410.2 | -21.5 |  |  |  |  |  |  |
| A10-1A | 109063 | 16249 | 3/16/12 | 5 | frozen | 39.8 | -474.1 | -21.4 | -4.8 | 4.8 | 1.5 | 1.5 | 0.0 | 0.0 |
| A10-1B | 109064 | 16250 | 3/21/12 |  | frozen | 35.0 | -472.6 | -21.4 |  |  |  |  |  |  |
| A10-2A | 109050 | 16206 | 1/31/12 | 1 | frozen | 38.0 | -476.7 | -21.2 | -0.1 | 0.1 | -5.6 | 5.6 | 0.0 | 0.0 |
| A10-2B | 109051 | 16207 | 2/1/12 |  | frozen | 37.9 | -482.3 | -21.2 |  |  |  |  |  |  |
| A10-3A | 115058 | 16713 | 9/12/12 | 1 | frozen | 60.6 | -261.4 | -21.9 | -2.2 | 2.2 | 4.4 | 4.4 |  |  |
| A10-3B | 115059 | 16714 | 9/13/12 |  | frozen | 58.4 | -257.0 |  |  |  |  |  |  |  |
| A10-4A | 115052 | 16697 | 8/21/12 | 21 | frozen | 35.3 | -484.4 | -21.3 | 2.1 | 2.1 | 8.0 | 8 | -0.5 | 0.5 |
| A10-4B | 115062 | 16712 | 9/11/12 |  | frozen | 37.4 | -476.4 | -21.8 |  |  |  |  |  |  |
| A10-5A | 115060 | 16709 | 9/6/12 | 1 | frozen | 37.9 | -468.4 | -20.7 | 0.0 | 0.0 | 3.4 | 3.4 | -0.3 | 0.3 |
| A10-5B | 115061 | 16710 | 9/7/12 |  | frozen | 37.9 | -465.0 | -21.0 |  |  |  |  |  |  |
| A10-6A | 113829 | 16398 | 5/29/12 | 80 | frozen | 48.7 | -286.8 | -20.5 | 1.4 | 1.4 | -9.1 | 9.1 | -0.9 | 0.9 |
| A10-6B | 117302 | 16696 | 8/17/12 |  | frozen | 50.1 | -295.9 | -21.4 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | ***avg*** | ***0.2*** | ***1.7*** | ***2.2*** | ***6.8*** | ***-0.3*** | ***0.3*** |
|  |  |  |  |  |  |  |  | ***±*** | ***2.2*** | ***1.3*** | ***7.8*** | ***3.9*** | ***0.3*** | ***0.3*** |
|  |  |  |  |  |  |  |  | ***SEM*** | ***0.6*** | ***0.4*** | ***2.3*** | ***1.2*** | ***0.1*** | ***0.1*** |

**Table S1. Updated data table for Druffel et al. (2013) frozen replicate sample DOC concentrations, 14C and 13C values.** Data are as reported in Druffel et al. (2013). Absolute |DOC|, |14C| and |13C| offsets are also reported between sample duplicates. The average (avg), 1σ standard deviation (±) and standard error of the mean (SEM) for DOC, 14C and 13C offsets are reported in bold italics.

**Remineralization of DOC During Storage: Isotopic Mass Balance and Error Propagation**

We used a simple isotopic mass balance to determine the 14C and 13C values of DOC that was remineralized during acidified storage, when the acidified DOC sample had significantly lower concentrations than that of its frozen DOC duplicate. This relationship is expressed in equation (1).

$DOC\_{frozen}∆^{14}C\_{frozen}=DOC\_{acid}∆^{14}C\_{acid}- DOC\_{remin}∆^{14}C\_{remin}$ (1)

and *DOCremin* is defined as:

$DOC\_{remin}=DOC\_{frozen}- DOC\_{acid}$ (2)

Such isotopic mass balances are common place in isotope geochemical studies, and the above relationship can be substituted to solve for the 13C of remineralized DOC.

The isotopic mass balance equations above are most simply expressed as:

$ab=cd+ef$ (3)

where

$e=a-c$ (4)

Where in our case, *a* = *DOCfrozen*, *b* = *14Cfrozen* or *13Cfrozen* is comprised of two DOC concentration isotopic values: *c* = *DOCacid*, *d* = *14Cacid* or *13Cacid*, *e* = *DOCremin* = (*a – c)* and *f* = *14Cremin* or *13Cremin*

*f* = *14Cremin* or *13Cremin* values were then determined using equation (5).

$f=\frac{ab-cd}{a-c}$ (5)

Propagation of errors was carried out following the approach presented in J.R. Taylor “An Introduction to Error Analysis”, 2nd ed. (1997). Briefly, the error of *f* = *14Cremin* or *13Cremin* (e.g. *f*) is determined as the square root of the sum of squares of the partial derivatives of equation (5) for each variable with respect to *f* (e.g. *∂f/∂a, ∂f/∂b… ∂f/∂d*) and the experimentally determined measurement errors (±) for each variable using the following equation:

 $δf=\sqrt{\left(\frac{∂f}{∂a}δa\right)^{2}+\left(\frac{∂f}{∂b}δb\right)^{2}+\left(\frac{∂f}{∂c}δc\right)^{2}+\left(\frac{∂f}{∂d}δd\right)^{2}}$ (6)

Where, *a* = ± *DOCfrozen*, *b* = ±*14Cfrozen* or ±*13Cfrozen*, *c* = ± *DOCacid*, *d* = ±*14Cacid* or ±*13Cacid*. In this study, we used individual measurement errors (Tables 2 and 3) for error propagation of both DOC and 14C values. For 13C we prescribe an error of 0.2‰ for all individual measurements.

For clarity, the partial derivatives of equation (5) with respect to *f* are provided below.

$\frac{∂f}{∂a}=\frac{c(d-b)}{(a-c)^{2}}$ (7)

$\frac{∂f}{∂b}=\frac{a}{(a-c)}$ (8)

$\frac{∂f}{∂c}=\frac{a(b-d)}{(a-c)^{2}}$ (9)

$\frac{∂f}{∂d}=-\frac{c}{(a-c)}$ (10)

Our calculated *14Cremin* and *13Cremin* propagated errors are depicted as error bars in Figure 3 (C-F).

**References:**

Druffel ERM, Griffin S, Walker BD, Coppola AI, Glynn DS. 2013. Total uncertainty of radiocarbon measurements of marine dissolved organic carbon and methodological recommendations. Radiocarbon 55(2-3):1135-41.

Taylor JR. 1997. An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements. Saussalito, CA: University Science Books.