Addendum: Microbial decomposition of marine dissolved organic matter in cool oceanic crust

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Here we report revised values for the carbon isotopic composition of dissolved organic carbon (DOC) (Table 1) and parameters calculated from revised values (Table 2). These values are updated to reflect new estimates of process blank carbon associated with the UV oxidation method of converting DOC to CO2 prior to graphitization and measurement at the National Ocean Sciences Accelerator Mass Spectrometry (NOSAMS) Facility. Revised blank mass and isotopic composition were determined by a retrospective investigation of secondary standards conducted by NOSAMS in 2018 (NOSAMS personal communication) after which corrected $\delta^{13}C$ and $\Delta^{14}C$ values were provided for previously measured samples with new facility accession numbers. Original and new accession numbers are provided in Table 1. Table 2 presents revised values for calculated parameters that were included in the manuscript. In both tables, revised values in **bold** are different from original values by more than the uncertainty reported in the original manuscript. Values in ***bold italics*** are values for which the difference between the original and revised values exceed the propagated uncertainty reported with revised data or calculations. In all cases, the revised data are similar enough to the original data that the interpretation of the DOC isotopic data does not change from the original manuscript.

Table 1: For $\delta^{13}C$ values, all samples except DOC from the deepest horizon at U1383C fall within the envelope of the originally reported uncertainty. Revised $\Delta^{14}C$ values and radiocarbon ages fall outside the originally reported uncertainty, but the difference between the values is smaller than the revised uncertainty for all but bottom-water DOC. The average difference between original and reported radiocarbon values is 8‰ or 160 radiocarbon years (Table 1).

Calculated values were reported with propagated error and conservative assumptions in the original manuscript. Half of the revised estimates for age-corrected DOC $\Delta^{14}C$ values were within the originally reported uncertainty. Of the three that were not, all fall within the uncertainty of revised values in Table 2. Estimates of the radiocarbon content of DOC removed in the crust changed modestly, well within the uncertainty that they were initially reported with.

Originally reported values can be directly compared with other published DOC $\Delta^{14}C$ values measured at NOSAMS that were reported before the revised blank correction. Revised

Table 1 | Updated carbon isotopic composition of DOC—measured values

Location description	Latitude (N)	Longitude (W)	Depth (m)*	Sampling year	Revised $\delta^{13}C$ (‰, ±0.5‰)	Revised $\Delta^{14}C$ (‰)	Revised radiocarbon age (years)	Revised NOSAMS accession no.	Original NOSAMS accession no.
Bottom water	22° 47.3200'	46° 03.6700'	4465	2014	−22.8	***−433±20***	***4500±160***	OS-146131	OS-129812
U1382A	22° 45.3531'	46° 04.8911'	146-189	2012	−24.5	**−601±20**	**7310±280**	OS-149258	OS-112869
U1382A	22° 45.3531'	46° 04.8911'	146-189	2014	−23.4	**−516±20**	**5770±240**	OS-149258	OS-129812
U1383C - shallow	22° 48.1241'	46° 03.1662'	76–129	2012	−24.9	**−681±30**	**9140±710**	OS-149256	OS-111533
U1383C - shallow	22° 48.1241'	46° 03.1662'	76–129	2014	−23.1	**−612±30**	**7540±530**	OS-146129	OS-129810
U1383C - middle	22° 48.1241'	46° 03.1662'	204-248	2012	−26.3	**−675±30**	**8960±700**	OS-146130	OS-111534
U1383C - deep	22° 48.1241'	46° 03.1662'	204-248	2014	***−23.8***	**−591±30**	**7110±450**	OS-146132	OS-129811

*For bottom water, depth is meters below the sea surface. For CORK fluids, depth is meters below the seafloor. Water depth is 4483 m at U1382A and 4414 m at U1383C.

Table 2 | Updated carbon isotopic composition of DOC—calculated values

Location description	Depth (m)*	Sampling year	Revised age-corrected $\Delta^{14}C$ (‰)	Revised $\Delta^{14}C$ of removed DOC (‰)	Revised radiocarbon age of removed DOC (years)
Bottom water	4465	2014			
U1382A	146-189	2012	**−574±20**	190±300	Bomb
U1382A	146-189	2014	**−498±40**	−250±110	2300±2000
U1383C - shallow	76–129	2012	−587±40	−230±90	2100±1000
U1383C - shallow	76–129	2014	**−480±40**	−400±90	4100±1000
U1383C - middle	204-248	2012	−576±40	−260±100	2400±1000
U1383C - deep	204-248	2014	−381±50	−480±100	5200±1000

*For bottom water, depth is meters below the sea surface. For CORK fluids, depth is meters below the seafloor. Water depth is 4483 m at U1382A and 4414 m at U1383C.

DOC $\Delta^{14}C$ values can be compared with DOC $\Delta^{14}C$ values measured at NOSAMS after 2019.

Original and revised carbon isotopic composition of DOC are available in BCO-DMO Data Repository for Project #650059: "Collaborative Research: A multidimensional approach to understanding microbial carbon cycling beneath the seafloor during cool hydrothermal circulation", available at https://www.bco-dmo.org/project/650059.