Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Supporting information for:

Assessing the prevalence, products, and pathways of dissolved organic matter partial photo-oxidation in arctic surface waters

Collin P. Ward[1*] *& Rose M. Cory*[2*]

[1]Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543, USA

[2]Department of Earth and Environmental Sciences, University of Michigan, 1100 North University Avenue, Room 2354, Ann Arbor, Michigan 48109, USA

*Corresponding authors:
Phone: +1 508 289 2931; email: cward@whoi.edu
Phone: +1 734 615 3199; email: rmcory@umich.edu

Table S1. Sensitivity analysis of the partial photo-oxidation (PPO) of DOM. The goal is to test the impact of photo-decarboxylation reactions on the magnitude of PPO of DOM. In this analysis, photo-decarboxylation reactions are assumed to require 0.5 mol O_2 per mol CO_2 produced, rather than the commonly assumed requirement of 1 mol O_2 per mol CO_2. The y-axis shows the proportion of CO_2 production from photo-decarboxylation reactions, ranging from 0 to 100%. The x-axis shows a range of photochemical O_2 consumption to CO_2 production ratios from 1 to 5. The control scenario (highlighted in yellow) is that the ratio of photochemical O_2 consumption to CO_2 production is 1, 1 mol of O_2 is required per mol of CO_2 produced, and no CO_2 production comes from photo-decarboxylation. In this scenario, all O_2 consumption is assumed to be required for CO_2 production, and thus no partial photo-oxidation occurs. All values are reported in μM of partially oxidized C.

		Photochemical O_2 Consumption to CO_2 Production					
		1	**1.5**	**2**	**3**	**4**	**5**
Proportion of CO_2 production from photo-decarboxylation	**1.0**	30	40	50	70	90	110
	0.9	27	37	47	67	87	107
	0.8	24	34	44	64	84	104
	0.7	21	31	41	61	81	101
	0.6	18	28	38	58	78	98
	0.5	15	25	35	55	75	95
	0.4	12	22	32	52	72	92
	0.3	9	19	29	49	69	89
	0.2	6	16	26	46	66	86
	0.1	3	13	23	43	63	83
	0.0	0	10	20	40	60	80