

Supplement of Biogeosciences, 17, 163–186, 2020  
<https://doi.org/10.5194/bg-17-163-2020-supplement>  
© Author(s) 2020. This work is distributed under  
the Creative Commons Attribution 4.0 License.



*Supplement of*

## **A meta-analysis of microcosm experiments shows that dimethyl sulfide (DMS) production in polar waters is insensitive to ocean acidification**

**Frances E. Hopkins et al.**

*Correspondence to:* Frances E. Hopkins (fhop@pml.ac.uk)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

### Supplementary material contents:

Table S1: Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured at timepoint 0 during experimental bioassays. See Table 1 in main paper for exact timings of time point sampling.

Table S2. Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured at timepoint 1 during experimental bioassays. See Table 1 in main paper for exact timings of time point sampling.

Table S3. Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured at timepoint 2 during experimental bioassays. See Table 1 in main paper for exact timings of time point sampling.

Figure S1. Bacterial abundance (cells/mL) during experimental microcosms performed in Arctic waters (A - C) and in Southern Ocean waters (D – G). Error bars show standard error. Locations of water collection for microcosms shown in Figure 1 C – F.

Figure S2. DMS, total DMSP and particulate DMSP concentrations ( $\text{nmol L}^{-1}$ ) during experimental microcosms performed in temperate waters at stations *North Sea* and *Iceland Basin* from cruise JR271. Data shown is mean of triplicate incubations, and error bars show standard error on the mean. Locations of water collection for microcosms are given in Table 1 in the main paper.

Table S1. Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured immediately following carbonate chemistry manipulation of experimental bioassays (Time point 0,  $T_0$ ).

Cruise ID	Expt ID	$p\text{CO}_2$ ( $\mu\text{atm}$ ) at $T_0$				$\text{pH}_T$ at $T_0$					
		ambient	550 (nominal)	750 (nominal)	1000 (nominal)	2000 (nominal)	ambient	550 (nominal)	750 (nominal)	1000 (nominal)	2000 (nominal)
D366	E01	342.3	564.1	746.4	969.6		8.1	7.9	7.8	7.7	
	E02	n.d.	533.4	n.d.	862.7		n.d.	7.9	n.d.	7.8	
	E02b	n.d.	n.d.	n.d.	n.d.		n.d.	n.d.	n.d.	n.d.	
	E03	345.4	531.2	673.9	877.8		8.1	7.9	7.9	7.8	
	E04	395.4	533.4	691.4	936.6		8.1	7.9	7.8	7.7	
	E04b	n.d.	n.d.	n.d.	n.d.		n.d.	n.d.	n.d.	n.d.	
	E05	374.7	528.9	730.5	917.5		8.1	7.9	7.8	7.7	
	E05b	n.d.	n.d.	n.d.	n.d.		n.d.	n.d.	n.d.	n.d.	
JR271	NS	286.5	524.7	n.d.	620.1		8.2	7.9	n.d.	7.9	
	IB	280.4	434.3	583.3	673.1		8.2	8.0	7.9	7.9	
	GG	326.8	565.2	741.8	1012.2		8.1	7.9	7.8	7.7	
	GI	312.2	583.9	789.3	948.2		8.1	7.9	7.7	7.7	
	BS	310.6	535.1	649.1	683.6		8.1	7.9	7.9	7.8	
JR274	DP	287.0		598.2			8.2		7.9		
	WS	275.1		533.8			8.2		7.9		
	SG	342.6		n.d.	823.4	1410.4	8.1		n.d.	7.7	7.5
	SS	283.8		n.d.	773.2	1557.5	8.2		n.d.	7.8	7.5

Table S2. Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured at time point 1 ( $T_1$ ) during experimental bioassays. See Table 1 for exact timings of time point sampling.

Cruise ID	Expt ID	$p\text{CO}_2$ ( $\mu\text{atm}$ ) at $T_1$				$\text{pH}_T$ at $T_1$					
		ambient	550 (nominal)	750 (nominal)	1000 (nominal)	2000 (nominal)	ambient	550 (nominal)	750 (nominal)	1000 (nominal)	2000 (nominal)
D366	E01	276.1 ± 2.2	447.1 ± 13.0	620.8 ± 138.9	701.1 ± 31.1		8.2 ± 0.003	8.0 ± 0.01	7.9 ± 0.09	7.8 ± 0.02	
	E02	330.4 ± 12.7	526.2 ± 8.7	678.7 ± 14.8	852.5 ± 24.8		8.1 ± 0.02	7.9 ± 0.01	7.8 ± 0.01	7.7 ± 0.04	
	E02b	336.4 ± 6.9		682.4 ± 14.5			8.1 ± 0.01		7.8 ± 0.01		
	E03	310.5 ± 0.9	516.4 ± 10.0	697.9 ± 9.7	874.4 ± 24.0		8.1 ± 0.001	8.0 ± 0.01	7.8 ± 0.01	7.7 ± 0.01	
	E04	364.4 ± 0.8	506.2 ± 14.7	647.8 ± 17.2	858.0 ± 24.7		8.1 ± 0.001	8.0 ± 0.01	7.9 ± 0.01	7.7 ± 0.01	
	E04b	324.4 ± 7.0		696.5 ± 22.4			8.1 ± 0.01		7.8 ± 0.01		
	E05	394.3 ± 13.3	555.2 ± 30.4	784.5 ± 7.4	1003.5 ± 16.9		8.0 ± 0.01	7.9 ± 0.02	7.8 ± 0.001	7.7 ± 0.01	
	E05b	323.4 ± 13.7		676.7 ± 21.4			8.1 ± 0.02		7.8 ± 0.01		
E06	294.0 ± 2.3		645.5 ± 27.6			8.2 ± 0.01		7.9 ± 0.02			
JR271	NS	284.4 ± 7.2	445.5 ± 150.1	452.6 ± 22.4	688.1 ± 23.1		8.2 ± 0.01	8.0 ± 0.1	8.0 ± 0.02	7.8 ± 0.01	
	IB	270.7 ± 6.6	419.0 ± 4.9	540.2 ± 11.4	622.3 ± 19.4		8.2 ± 0.01	8.0 ± 0.001	7.9 ± 0.01	7.9 ± 0.01	
	GG	289.3 ± 9.7	493.8 ± 49.0	607.6 ± 53.9	824.1 ± 99.5		8.1 ± 0.01	8.0 ± 0.04	7.9 ± 0.04	7.7 ± 0.05	
	GI	281.1 ± 1.8	444.2 ± 9.4	576.3 ± 35.2	803.6 ± 10.5		8.2 ± 0.001	8.0 ± 0.01	7.9 ± 0.03	7.7 ± 0.01	
	BS	291.8 ± 10.6	482.8 ± 4.9	653.7 ± 3.6	763.0 ± 12.4		8.2 ± 0.01	8.0 ± 0.001	7.9 ± 0.001	7.8 ± 0.01	
JR274	DP	237.8 ± 8.3		529.6 ± 80.3			8.2 ± 0.01		7.9 ± 0.07		
	WS	554.2 ± 6.4		1280.8 ± 11.7			7.9 ± 0.01		7.5 ± 0.004		
	SG	342.4 ± 9.1		636.9 ± 13.4	809.1 ± 18.1	1384.1 ± 82.7	8.1 ± 0.01		7.8 ± 0.01	7.7 ± 0.01	7.5 ± 0.03
	SS	231.1 ± 3.3		541.2 ± 73.2	592.7 ± 62.5	1122.3 ± 15.2	8.2 ± 0.01		7.9 ± 0.06	7.9 ± 0.04	7.6 ± 0.01

Table S3. Summary of  $p\text{CO}_2$  ( $\mu\text{atm}$ ) and  $\text{pH}_T$  (total scale) measured at timepoint 2 ( $T_2$ ) during experimental bioassays. See Table 1 for exact timings of time point sampling.

Cruise ID	Expt ID	$p\text{CO}_2$ ( $\mu\text{atm}$ ) at $T_2$				$\text{pH}_T$ at $T_2$				
		ambient	550 (nominal)	750 (nominal)	1000 (nominal)	2000 (nominal)	ambient	550 (nominal)	750 (nominal)	1000 (nominal)
D366	E01	272.6±4.2	407.2±3.8	531.8±3.4	697.8±5.6	8.2±0.01	8.0±0.004	7.9±0.003	7.8±0.004	
	E02	330.2±4.7	518.9±4.0	653.8±7.7	834.3±75.1	8.1±0.01	7.9±0.003	7.9±0.01	7.8±0.04	
	E02b									
	E03	327.6±0.1	517.0±11.0	680.5±6.1	869.5±10.5	8.1±0.000	8.0±0.01	7.9±0.003	7.8±0.01	
	E04	356.3±6.6	462.4±18.3	587.3±1.5	760.7±15.6	8.1±0.01	8.0±0.02	7.9±0.001	7.8±0.01	
	E04b									
	E05	374.6±5.4	545.5±29.5	769.4±26.5	971.6±19.4	8.1±0.01	7.9±0.02	7.8±0.01	7.7±0.01	
	E05b									
	E06									
JR271	NS	302.8±10.1	629.2±26.4	521.5±15.9	889.1±156.4	8.2±0.01	7.9±0.01	7.9±0.02	7.7±0.07	
	IB	289.1±5.6	511.7±109.3	520.7±10.3	558.5±245.0	8.2±0.01	8.0±0.08	7.9±0.01	8.0±0.2	
	GG	251.5±5.1	416.7±18.5	526.1±18.1	668.6±33.6	8.2±0.01	8.0±0.02	7.9±0.01	7.8±0.02	
	GI	201.1±13.4	301.3±8.4	412.6±78.6	483.8±38.1	8.3±0.03	8.1±0.01	8.0±0.07	7.9±0.03	
	BS	289.9±1.5	483.5±18.6	547.0±28.4	673.5±65.7	8.2±0.0	8.0±0.02	7.9±0.02	7.8±0.04	
JR274	DP	244.4±11.2		491.6±116.2		8.2±0.02		8.0±0.01		
	WS	534.4±30.5		1177.6±148.2		7.9±0.02		7.6±0.06		
	SG	352.3±34.7		569.8±36.5	663.5±11.5	1314.1±54.0	8.1±0.04	7.9±0.03	7.8±0.01	7.5±0.02
	SS	187.2±23.3		362.4±30.8	421.4±56.4	796.6±45.0	8.3±0.05	8.1±0.04	8.0±0.06	7.7±0.02

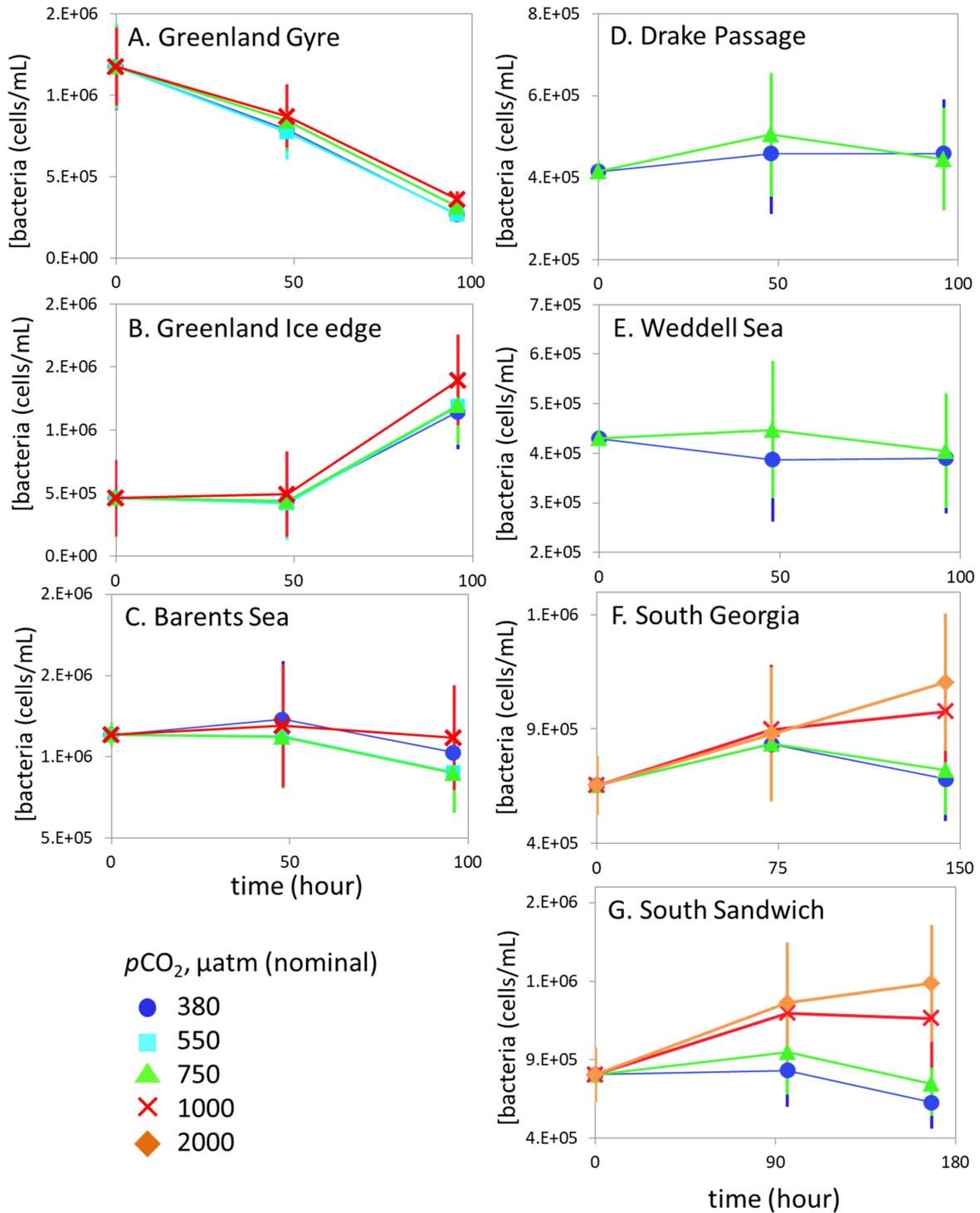


Figure S1. Bacterial abundance (cells/mL) during experimental microcosms performed in Arctic waters (A - C) and in Southern Ocean waters (D – G). Error bars show standard error. Locations of water collection for microcosms shown in Figure 1 C – F. Significant differences between CO<sub>2</sub> treatments were seen at South Georgia (F) at time point 2 (144 h) (ANOVA  $F = 137.936$ ,  $p < 0.001$ ).

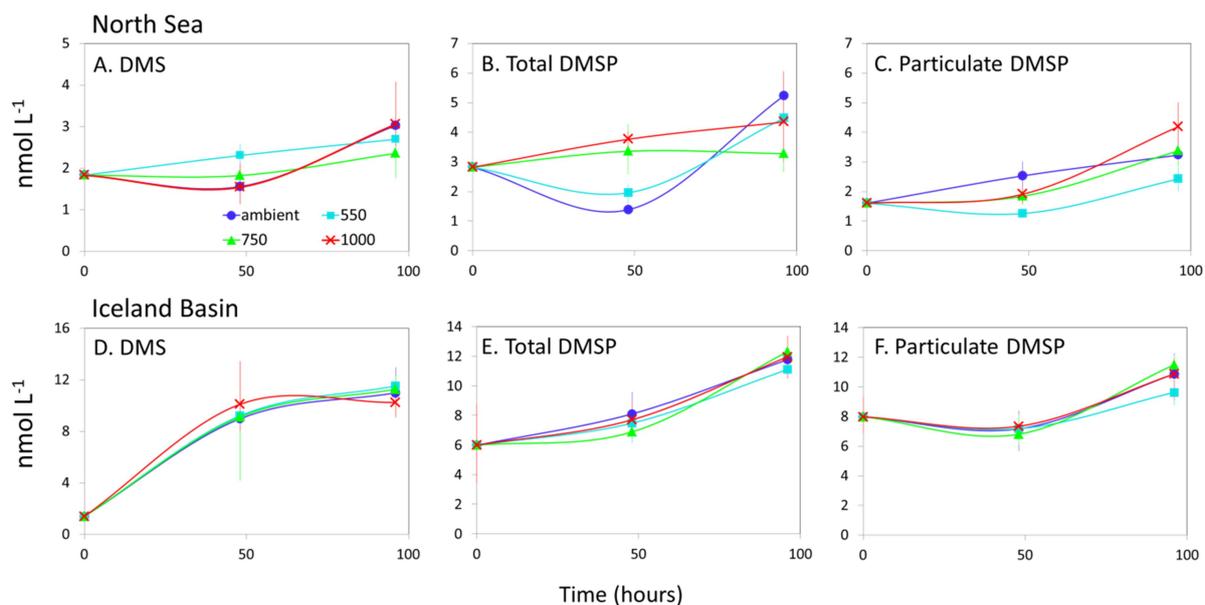


Figure S2. DMS, total DMSP and particulate DMSP concentrations ( $\text{nmol L}^{-1}$ ) during experimental microcosms performed in temperate waters at stations *North Sea* and *Iceland Basin* from cruise JR271. Data shown is mean of triplicate incubations, and error bars show standard error on the mean. Locations of water collection for microcosms are given in Table 1 in the main paper.