Supplementary Information for: The impacts of ocean acidification on marine trace gases and the implications for atmospheric chemistry and climate

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Table S1: Response of DMS and/or DMSP to high CO_2 in unialgal culture experiments.

Study	Species	Strain	Response to high CO_2	
Avgoustidi et al. 2012	*E. huxleyi*	CCMP1516 (non-calc)	[DMS]	↓
Spielmeyer & Pohnert 2012	*T. pseudonana*	CCMP1335	[DMSP] +T	↓
	P. tricornutum	CCMP2561	[DMSP] +CO_2	↓
	E. huxleyi	RCC1242 (non-calc)	[DMSP] +T	↑
		RCC1731 (calc)	[DMSP] +CO_2	↑
Arnold et al. 2013	*E. huxleyi*	CCMP373 (non-calc)	[DMS] +CO_2	↓
			[DMS] +T	↑
			[DMS]+TCO_2	↑
Webb et al. 2015	*E. huxleyi*	RCC1229 (calc)	[DMS] [DMSP]	↔
			DMSP/cell vol.	↓
Olson et al. 2017	*E. huxleyi*	CCMP374 (non-calc)	DMSP/cell vol.	↔
		CCMP 2668 (calc)	DMSP/cell vol.	↓

non-calc = non calcifying, calc = calcifying

Table S2. Summary of the results of nine mesocosm studies that have reported the response of DMS to high CO_2

Study	Location	Month (Season)	pCO_2 levels	DMS response to high CO_2 (change from 350µatm) (%)	Integrated DMS (350-750µatm) (nmol L^{-1})	Calculation Basis
Avgoustidi et al. 2012	Bergen, Norway	May (Spring)	300:700	-38%	16.7: 10.4	2 treatment (2 replicates)
Vogt et al. 2008	Bergen, Norway	May (Spring)	300:690	26%	9.3 - 11.7	2 treatments (3 replicates)
Hopkins et al. 2010	Bergen, Norway	May (Spring)	320:760	-40%	8.8 - 5.3	2 treatments (3 replicates)
Webb et al. 2015	Bergen, Norway	May (Spring)	350 - 750	-22%	1.4 - 1.1	Linear fit to pCO2 vs integrated DMS (n=9)
Kim et al. 2010	Korea	Not reported	360 - 730	18%	3.3 - 5.2	2 treatments (3 replicates)
Park et al. 2014	Korea	May (Spring)	350 - 750	-42%	27.4 - 15.8	Linear fit to pCO2 vs integrated DMS (n=6)
Archer et al. 2013	Svalbard	June (Summer)	350 - 750	-13%	7.5 - 8.7	Linear fit to pCO2 vs integrated DMS (n=9)
Webb et al. 2016	Baltic Sea	June (Summer)	350 - 750	-9%	4.3 - 3.9	Linear fit to pCO2 vs integrated DMS (n=9)
Archer et al. 2018	Canary Islands	October (Autumn)	400 - 800	-20%	5.5 - 4.5	Linear fit to pCO2 vs integrated DMS (n=9)

Table S3: Summary of mesocosm studies investigating the effect of increased pCO_2 on the halocarbon emissions in three different locations.

Study	**Hopkins et al. 2010**	**Hopkins et al. 2013**	**Webb et al. 2016**
Location	Bergen, Norway	Kongsfjorden, Svalbard	Tvärminne Storfjärden, Baltic Sea
Character	Temperate coastal	Polar	Brackish
pCO_2 levels (µatm)	380, 750	185 - 1420	600 - 1650
Date	May 2006	June/July 2010	June 2012
Dominant biological community	Picoeukaryotes	Nanoeukaryotes Picoeukaryotes	Chlorophytes Cryptophytes
General biological response to high pCO_2 levels	Reduced under high pCO_2	Increased under high pCO_2 upon nutrient enrichment	Unclear
Bromocarbon response	Insignificant	No clear effect	Insignificant
Iodocarbon response	Unclear	CH_3 reduced with increasing pCO_2	Insignificant