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Supplement of

Impact of trace metal concentrations on coccolithophore growth and morphology: laboratory simulations of Cretaceous stress

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Growth rate				
	Control	Low	Medium	High
r1	0.54	0.57	0.56	0.57
r2	0.50	0.55	0.56	0.56
r3	0.52	0.58	0.56	0.56
Average	0.52	0.57	0.56	0.57

r=replicate

Coccosphere Diameter				
	Control	Low	Medium	High
r1	11.80	12.17	11.89	12.07
r2	11.59	12.01	11.86	12.09
r3	11.72	12.15	11.88	11.81
Average	11.70	12.11	11.88	11.99

Cell Diameter				
	Control	Low	Medium	High
r1	9.36	9.01	8.97	9.01
r2	8.71	8.82	9.00	8.98
r3	9.02	8.96	9.09	8.95
Average	9.03	8.93	9.02	8.98

VCP				
	Control	Low	Medium	High
r1	440.16	577.15	507.49	555.45
r2	473.89	538.06	501.00	551.27
r3	475.14	595.43	494.41	492.81
Average	463.06	570.21	500.97	533.18

Tab.S1 Growth rate (d^{-1}), coccosphere and cell diameters (μm) and volume of the calcitic part (VCP; μm^3) of *E. huxleyi* at the end of our experiments for each replicate.

Growth rate				
	Control	Low	Medium	High
r1	0.66	0.58	0.59	0.56
r2	0.66	0.58	0.60	0.59
r3	0.67	0.58	0.62	0.59
Average	0.66	0.58	0.60	0.58

r=replicate

Coccosphere Diameter				
	Control	Low	Medium	High
r1	7.25	6.60	6.58	6.09
r2	7.26	6.58	6.55	6.17
r3	7.24	6.56	6.67	6.16
Average	7.25	6.58	6.60	6.14

Cell Diameter				
	Control	Low	Medium	High
r1	5.42	5.16	5.17	4.72
r2	5.51	5.10	5.16	4.78
r3	5.41	5.29	5.23	4.74
Average	5.45	5.18	5.19	4.74

VCP				
	Control	Low	Medium	High
r1	116.84	77.42	75.59	60.61
r2	91.13	76.79	74.21	63.39
r3	95.08	72.24	82.43	64.89
Average	101.02	75.48	77.41	62.96

Tab.S2 Growth rate (d^{-1}), coccosphere and cell diameters (μm) and volume of the calcitic part (VCP; μm^3) of *G. oceanica* at the end of our experiments for each replicate.

Growth rate				
	Control	Low	Medium	High
r1	0.55	0.42	0.47	0.44
r2	0.56	0.43	0.42	0.44
r3	0.56	0.42	0.39	0.42
Average	0.56	0.42	0.43	0.43

r=replicate

Coccosphere Diameter				
	Control	Low	Medium	High
r1	19.70	17.01	16.96	16.98
r2	19.90	17.21	16.91	17.13
r3	19.85	17.15	17.27	16.45
Average	19.82	17.12	17.05	16.85

Cell Diameter				
	Control	Low	Medium	High
r1	14.05	10.09	10.16	10.35
r2	16.57	10.13	10.11	10.34
r3	16.33	10.09	11.10	10.45
Average	15.65	10.10	10.46	10.38

VCP				
	Control	Low	Medium	High
r1	1751.16	2112.43	2071.18	1919.11
r2	1806.95	2133.68	1966.05	2153.53
r3	1722.13	2062.28	2072.10	1789.59
Average	1760.08	2102.80	2036.44	1954.08

Tab.S3 Growth rate (d^{-1}), coccosphere and cell diameters (μm) and volume of the calcitic part (VCP; μm^3) of *C. pelagicus* at the end of our experiments for each replicate.

Growth rate				
	Control	Low	Medium	High
r1	0.54	0.57	0.56	0.57
r2	0.50	0.55	0.56	0.56
r3	0.52	0.58	0.56	0.56
Average	0.52	0.57	0.56	0.57

r=replicate

Coccosphere Diameter				
	Control	Low	Medium	High
r1	11.80	12.17	11.89	12.07
r2	11.59	12.01	11.86	12.09
r3	11.72	12.15	11.88	11.81
Average	11.70	12.11	11.88	11.99

Cell Diameter				
	Control	Low	Medium	High
r1	9.36	9.01	8.97	9.01
r2	8.71	8.82	9.00	8.98
r3	9.02	8.96	9.09	8.95
Average	9.03	8.93	9.02	8.98

VCP				
	Control	Low	Medium	High
r1	440.16	577.15	507.49	555.45
r2	473.89	538.06	501.00	551.27
r3	475.14	595.43	494.41	492.81
Average	463.06	570.21	500.97	533.18

Tab.S4 Growth rate (d^{-1}), coccosphere and cell diameters (μm) and volume of the calcitic part (VCP; μm^3) of *P. carterae* at the end of our experiments for each replicate.

E. huxleyi

	Replicate 1		Replicate 2		Replicate 3	
	DSL	DSW	DSL	DSW	DSL	DSW
LOW						
MEAN	2.67	2.14	2.65	2.09	2.66	2.10
MIN	2.12	1.73	2.15	1.65	1.98	1.43
MAX	3.17	2.64	3.27	2.70	3.36	2.81
MEDIAN	2.67	2.09	2.65	2.09	2.67	2.08
MEDIUM						
MEAN	2.68	2.11	2.62	2.06	2.63	2.02
MIN	1.93	1.40	2.00	1.52	2.09	1.21
MAX	3.61	3.01	3.19	2.61	4.52	3.44
MEDIAN	2.66	2.06	2.63	2.09	2.60	1.98
MAX						
MEAN	2.58	1.97	2.58	1.99	2.61	1.99
MIN	1.78	1.44	2.04	1.60	1.55	1.06
MAX	3.35	2.59	3.25	2.61	3.22	2.67
MEDIAN	2.57	1.95	2.57	1.98	2.66	2.01
CONTROL						
MEAN	2.93	2.38	3.04	2.49	2.97	2.44
MIN	2.34	1.83	2.38	1.95	2.09	1.75
MAX	3.65	3.14	3.69	3.06	3.86	3.45
MEDIAN	2.95	2.39	3.04	2.46	2.94	2.40

G. oceanica

	Replicate 1		Replicate 2		Replicate 3	
	DSL	DSW	DSL	DSW	DSL	DSW
LOW						
MEAN	4.02	3.46	4.12	3.61	4.15	3.63
MIN	3.06	2.47	3.30	2.70	3.27	2.79
MAX	4.84	4.55	5.30	4.90	5.38	4.95
MEDIAN	4.00	3.46	4.04	3.51	4.14	3.61
MEDIUM						
MEAN	4.16	3.56	4.18	3.60	4.13	3.59
MIN	3.12	2.58	3.22	2.53	3.19	2.77
MAX	5.15	4.47	5.89	5.15	5.70	4.78
MEDIAN	4.17	3.51	4.14	3.55	4.06	3.48
MAX						
MEAN	3.96	3.34	3.89	3.30	4.06	3.47
MIN	3.13	2.57	3.18	2.47	3.34	2.80
MAX	5.09	4.75	5.32	4.64	5.73	5.21
MEDIAN	3.96	3.29	3.77	3.19	4.05	3.42
CONTROL						
MEAN	4.26	3.72	4.26	3.73	4.42	3.87
MIN	3.28	2.93	3.24	2.90	3.41	3.11
MAX	5.18	4.41	5.11	4.45	5.78	4.77
MEDIAN	4.25	3.76	4.27	3.73	4.37	3.85

Table S5. *E. huxleyi* and *G. oceanica* coccolith distal shield length (DSL) and distal shield width (DSW): mean, minimum (MIN), maximum (MAX) and median values (n=50 coccoliths measurements for each replicate) for every treatment, at the end of the experiment.

C. pelagicus

	Replicate 1		Replicate 2		Replicate 3	
	DSL	DSW	DSL	DSW	DSL	DSW
LOW						
MEAN	10.48	8.55	10.31	8.25	10.52	8.50
MIN	7.99	6.15	7.18	5.61	8.67	6.82
MAX	12.50	10.35	12.65	10.20	11.84	9.78
MEDIAN	10.53	8.61	10.47	8.38	10.60	8.62
MEDIUM						
MEAN	10.17	8.28	10.04	8.16	9.88	8.07
MIN	8.65	6.68	7.38	5.59	6.99	5.62
MAX	11.65	9.57	12.68	10.05	12.21	9.68
MEDIAN	10.29	8.18	10.05	8.23	9.91	8.12
MAX						
MEAN	10.70	8.63	10.33	8.40	10.37	8.47
MIN	9.14	6.98	8.35	6.56	8.47	6.95
MAX	12.16	10.25	12.66	10.65	12.63	10.60
MEDIAN	10.57	8.60	10.30	8.40	10.43	8.60
CONTROL						
MEAN	12.99	11.33	12.52	10.91	12.78	11.00
MIN	11.43	10.00	11.01	10.00	11.15	10.08
MAX	14.85	13.86	14.66	12.80	14.15	11.62
MEDIAN	12.83	11.11	12.43	10.69	12.76	10.94

P. carterae

	Replicate 1		Replicate 2		Replicate 3	
	DSL	DSW	DSL	DSW	DSL	DSW
LOW						
MEAN	1.90	1.17	1.86	1.16	1.93	1.21
MIN	2.29	1.37	2.18	1.42	2.24	1.46
MAX	2.29	1.37	2.18	1.42	2.24	1.46
MEDIAN	1.87	1.18	1.87	1.17	1.94	1.20
MEDIUM						
MEAN	1.86	1.13	1.87	1.17	1.87	1.18
MIN	1.65	0.89	1.56	0.98	1.61	0.97
MAX	2.11	1.27	2.16	1.49	2.15	1.53
MEDIAN	1.87	1.14	1.86	1.15	1.86	1.17
MAX						
MEAN	1.90	1.18	1.91	1.19	1.90	1.19
MIN	1.59	1.00	1.62	1.01	1.62	1.02
MAX	2.26	1.53	2.12	1.43	2.16	1.38
MEDIAN	1.89	1.18	1.91	1.18	1.90	1.20
CONTROL						
MEAN	1.90	1.17	1.86	1.16	1.93	1.21
MIN	1.59	0.95	1.38	0.96	1.67	0.99
MAX	2.29	1.37	2.18	1.42	2.24	1.46
MEDIAN	1.87	1.18	1.87	1.17	1.94	1.20

Table S6. *C. pelagicus* and *P. carterae* coccolith distal shield length (DSL) and distal shield width (DSW): mean, minimum (MIN), maximum (MAX) and median values (n=50 coccoliths measurements for each replicate) for every treatment, at the end of the experiment