Table S1. Sea surface temperature (SST) at the Azores, Bergen and Canary Islands.

	Mean monthly SST range (^{o}C)	**Min. monthly SST (^{o}C)**	**Max. monthly SST (^{o}C)**	**References**
Azores	15.6 – 22.3	12.6	32.9	Wisshak et al., 2010
Bergen	6.0 – 16.0	– 2	16.6	Samuelsen, 1970 Locarnini et al., 2006
Canary Islands	18.0 – 23.5	17.5	24.8	Santana-Casiano et al., 2007

Table S2. Number of base pairs (bp) in the examined loci (marked with asterisk) in the alleles of individual genotypes. The numbers of base pairs in all examined loci are different, which indicates different genotypes within population. NA indicates that no alleles could be obtained.

Genotype	P02E09*		P02B12*		P02F11*		EHMS37*		EHMS15*	
A23	97	97	207	207	101	105	281	283	206	210
A22	99	99	209	211	103	105	197	197	206	206
A21	97	101	207	209	101	137	269	273	206	210
A19	99	101	207	207	103	131	273	283	206	206
A13	95	97	213	223	127	129	297	301	206	206
A10	99	101	207	207	127	127	241	273	206	206
B95	95	99	209	209	101	101	201	205	206	210
B63	97	97	207	207	101	103	203	209	206	210
B62	97	99	207	207	101	103	205	211	206	210
B51	95	97	207	207	101	103	205	205	206	210
B41	97	101	207	207	101	101	201	211	206	210
B17	97	101	207	207	101	103	205	205	NA	NA
C98	104	124	209	211	111	135	233	287	95	95
C91	86	142	219	219	131	141	207	209	89	135
C90	104	106	268	268	125	135	NA	NA	139	189
C41	104	106	268	268	125	135	NA	NA	139	189
C35	96	96	215	219	131	131	245	245	NA	NA

Table S3. Calculated optimum pCO_2, maximum value (V_{max}) and relative sensitivity (*rs*, ‰) of POC and PIC quotas of each *E. huxleyi* strain.

Strain	POC quota			PIC quota		
	optimum pCO_2 (µatm)	V_{max} (pg C cell^{-1})	*rs*	optimum pCO_2 (µatm)	V_{max} (pg C cell^{-1})	*rs*
A23	788	10.75	0.34	266	11.33	0.25
A22	657	14.12	0.23	706	10.17	0.44
A21	873	13.05	0.35	306	12.92	0.90
A19	644	13.43	0.41	528	15.41	0.59
A13	860	9.69	0.52	505	11.09	0.53
A10	568	11.22	0.46	345	9.20	0.17
B95	925	10.86	0.10	549	7.33	0.25
B63	715	13.39	0.17	630	10.38	0.36
B62	1639	14.06	0.05	486	10.96	0.35
B51	635	13.01	0.30	470	9.28	0.39
B41	930	14.73	0.30	517	7.62	0.29
B17	812	11.69	0.31	635	9.80	0.37
C98	685	8.47	0.46	459	6.30	0.20
C91	410	5.20	0.69	184	11.97	0.30
C90	600	8.76	0.28	284	8.90	0.46
C41	675	7.71	0.37	623	11.16	0.20
C35	720	8.89	0.39	538	12.47	0.26

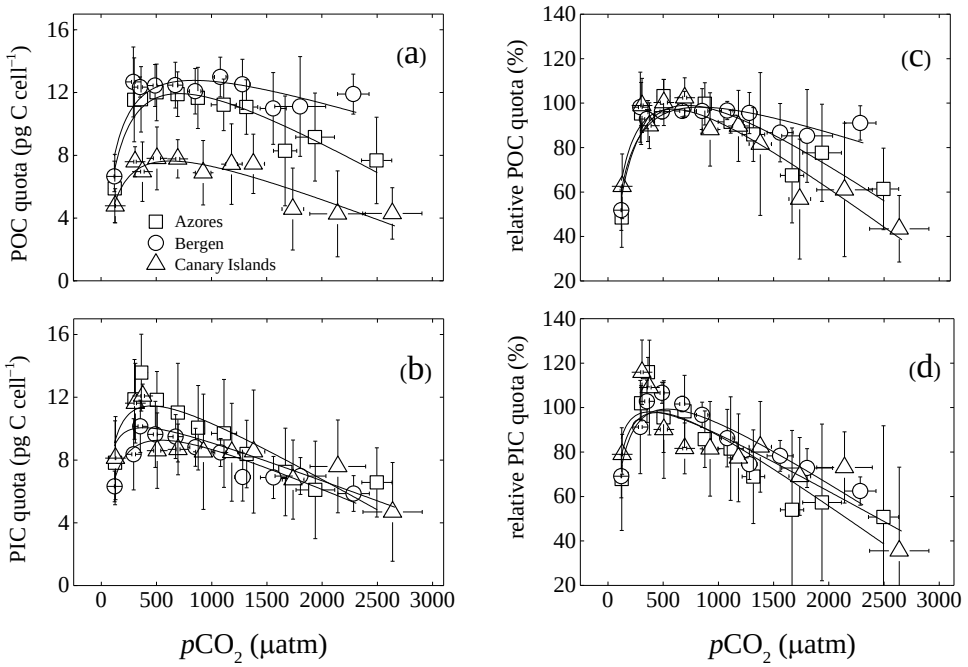

Figure S1. Optimum curve responses of POC and PIC quotas of three *E. huxleyi* populations to a pCO_2 range from 120 µatm to 2630 µatm. Responses of POC quota (**a**) and PIC quota (**b**) to pCO_2. Responses of relative POC quota (**c**) and relative PIC quota (**d**) to pCO_2. For more detail information, see Figure 1.

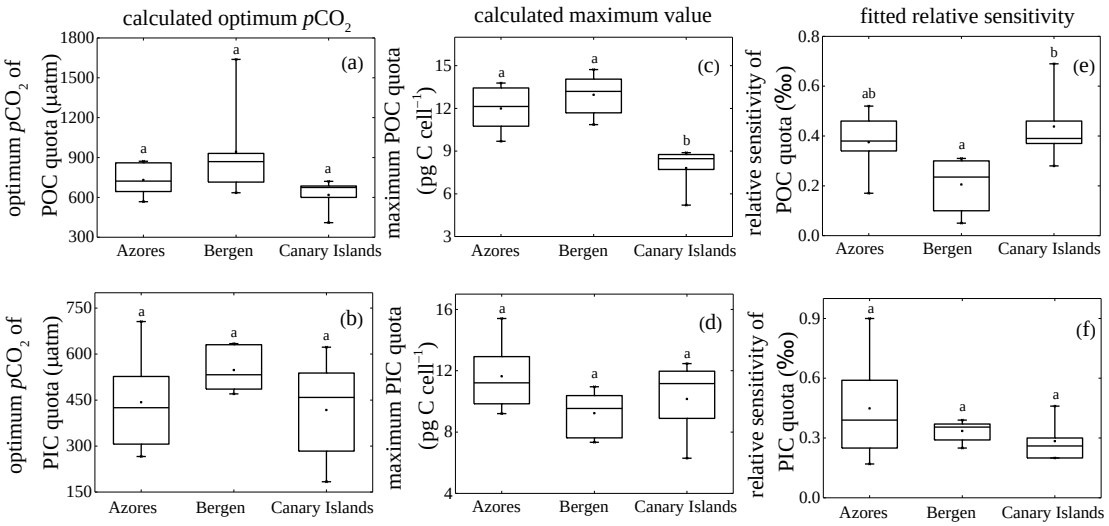

Figure S2. Calculated optimum pCO_2, calculated maximum value and fitted relative sensitivity constant of POC and PIC quotas of each population. **(a)** optimum pCO_2 of POC quota; **(b)** optimum pCO_2 of PIC quota; **(c)** maximum POC quota; **(d)** maximum PIC quota; **(e)** relative sensitivity constant of POC quota; **(f)** relative sensitivity constant of PIC quota. For more detail information, see Figure 2.

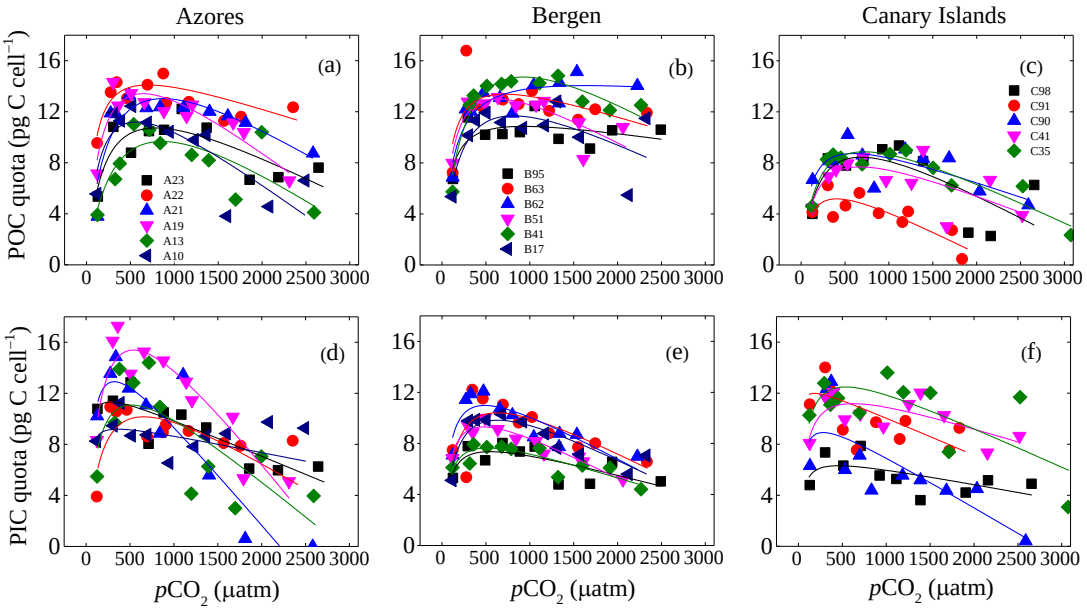

Figure S3. Optimum curve responses of POC and PIC quotas of individual *E. huxleyi* strains in the Azores (left), Bergen (medium) and Canary Islands (right) populations to a CO_2 range from 115 µatm to 3070 µatm. POC quota of each strain as a function of pCO_2 within the Azores (**a**), Bergen (**b**) and Canary Islands (**c**) populations. PIC quota of each strain as a function of pCO_2 within the Azores (**d**), Bergen (**e**) and Canary Islands (**f**) populations. For more detail information, see Figure 3.

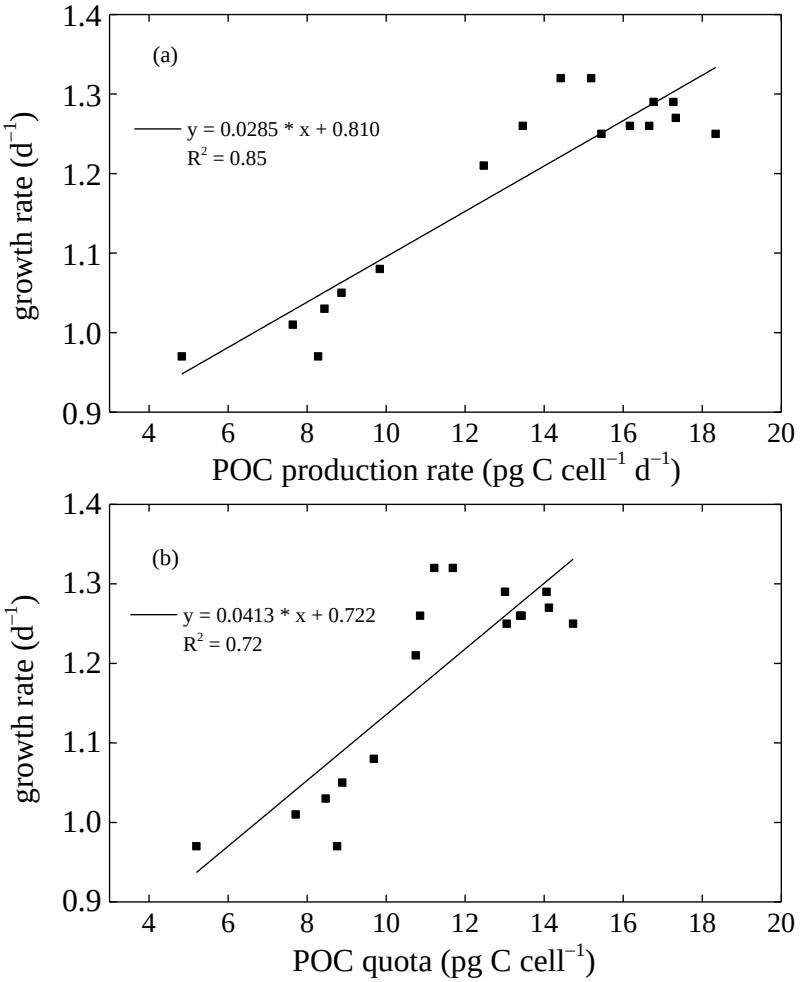

Figure S4. Increased growth rates of 17 *E. huxleyi* strains with increasing POC production rates (**a**) or POC quotas (**b**).

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