

Supplementary Material

Mesocosm/multistressor/microcosm experiment designs.

C, Carbon, denotes an addition of dissolved organic carbon (glucose) relative to PO_4 according to the Redfield ratio.

HG/LG, high grazing/low grazing, denotes where zooplankton were added

LpH, low pH, denotes where pH were lowered by acid addition

I Ocean Certain mesocosm design.

DOC	0	0.5	1	2	3
Low Grazing	LG 0C	LG 0.5C	LG 1C	LG 2C	LG 3C
High Grazing	HG 0C	HG 0.5C	HG 1C	HG 2C	HG 3C



Large HDPE containers were incubated at ambient seawater temperatures tethered to jetties or, (for MesoMed) within a pool facility continuously flushed with seawater. *Left MesoArc, centre MesoMed, right MesoArc.*

II Ocean Certain multistressor design

DOC		0	0.5	1	2
Normal pH	Low Grazing	LG 0C	LG 0.5C	LG 1C	LG 2C
	High Grazing	HG 0C	HG 0.5C	HG 1C	HG 2C
Low pH	Low Grazing	LG 0C LpH	LG 0.5C LpH	LG 1C LpH	LG 2C LpH
	High Grazing	HG 0C LpH	HG 0.5C LpH	HG 1C LpH	HG 2C LpH



20 L containers for the multistressor experiment (one container per sampling day) were incubated on custom made racks designed to ensure equal distribution of light and to facilitate easy access to the containers for mixing/sampling (*Patagonia multistressor room shown*).

III Ocean Certain microcosm (MesoPat only)

The experiment matrix of I was used but with the 20 L collapsible container setup of II rather than the large 1000 L containers used for I.

IV Gran Canaria pCO₂ mesocosm

pCO ₂ / µatm	550	1300	850	1000	400	1450	700	1150
Mesocosm	1	2	3	4	5	6	7	8



Polyurethane bags, supported by steel framework, were tethered to a jetty in Taliarte. During sampling the mesocosms were pulled adjacent to the jetty (*as shown*), otherwise the mesocosms were free to float 2-3 m away from the jetty.

Figure S1: Experimental design for all mesocosm, microcosm and multi-stressor incubation experiments. Mesocosm experimental matrix (I) for MesoPat/MesoArc/MesoMed (II) The multistressor experiments, conducted at the same fieldsites as the MesoPat/MesoArc/MesoMed mesocosms mimicked I but with the addition of a low pH treatment (with a pH 0.4-0.6 lower than the unmodified treatment). (III) The Patagonia microcosm experiment used the matrix of I but with the 20 L scale experiment setup of II. (IV) The Gran Canaria mesocosm used a pCO₂ gradient.