Supplementary material

Table S1. Weekly measurements of salinity, temperature, pH and A_T were used to calculate the carbonate chemistry and saturation state in exp 2 by CO2SYS (Pierrot et al., 2006).

Time (days)	Ca [Mm]	Salinity	t(°C)	P (dbars)	Total P (mmol/kg)	Total Si (mmol/kg)	TA in (mmol/kg)	TCO2 in (mmol/kg)	pH	Ω_{Ar}
0	10.3	35	25.7	5	0.05	0.10	2106	1849	8.121	2.82
7	10.3	35	25.8	5	0.05	0.10	2047	1792	8.125	2.76
14	10.3	35	25.9	5	0.05	0.10	2000	1726	8.167	2.91
21	10.3	35	25.9	5	0.05	0.10	1934	1699	8.102	2.50
28	10.3	35	25.7	5	0.05	0.10	1882	1665	8.075	2.30
60	10.3	35	25.8	5	0.05	0.10	1642	1450	8.056	1.93
87	10.3	35	25.8	5	0.05	0.10	1502	1330	8.031	1.68
0	15	35.3	26	5	0.05	0.10	2106	1860	8.092	3.94
7	15	35.3	26.1	5	0.05	0.10	2009	1714	8.198	4.54
14	15	35.3	26.1	5	0.05	0.10	1924	1648	8.177	4.19
21	15	35.3	26	5	0.05	0.10	1849	1603	8.133	3.70
28	15	35.3	25.9	5	0.05	0.10	1737	1528	8.075	3.11
60	15	35.3	25.8	5	0.05	0.10	1563	1382	8.038	2.60
87	15	35.3	26	5	0.05	0.10	1367	1207	8.015	2.17
0	20.1	36.1	26	5	0.05	0.10	2106	1844	8.111	5.52
7	20.1	36.1	26	5	0.05	0.10	1993	1778	8.036	4.54
14	20.1	36.1	25.8	5	0.05	0.10	1941	1706	8.087	4.82
21	20.1	36.1	25.9	5	0.05	0.10	1869	1673	8.014	4.06
28	20.1	36.1	25.8	5	0.05	0.10	1783	1599	7.999	3.75
60	20.1	36.1	26	5	0.05	0.10	1602	1435	7.981	3.26
87	20.1	36.1	26	5	0.05	0.10	1488	1334	7.966	2.93
0	25	36.9	25.5	5	0.05	0.10	2106	1814	8.161	7.46
7	25	36.9	25.6	5	0.05	0.10	1892	1651	8.100	6.00
14	25	36.9	25.5	5	0.05	0.10	1744	1533	8.060	5.11
21	25	36.9	25.5	5	0.05	0.10	1647	1464	8.010	4.38
28	25	36.9	25.6	5	0.05	0.10	1505	1356	7.943	3.52

Figure S1 - Exp. 2 A_T depletion describe uniform corals calcification rates throughout the experiment. *P. damicornis* fragments died after 28 days at 25 mM treatment.

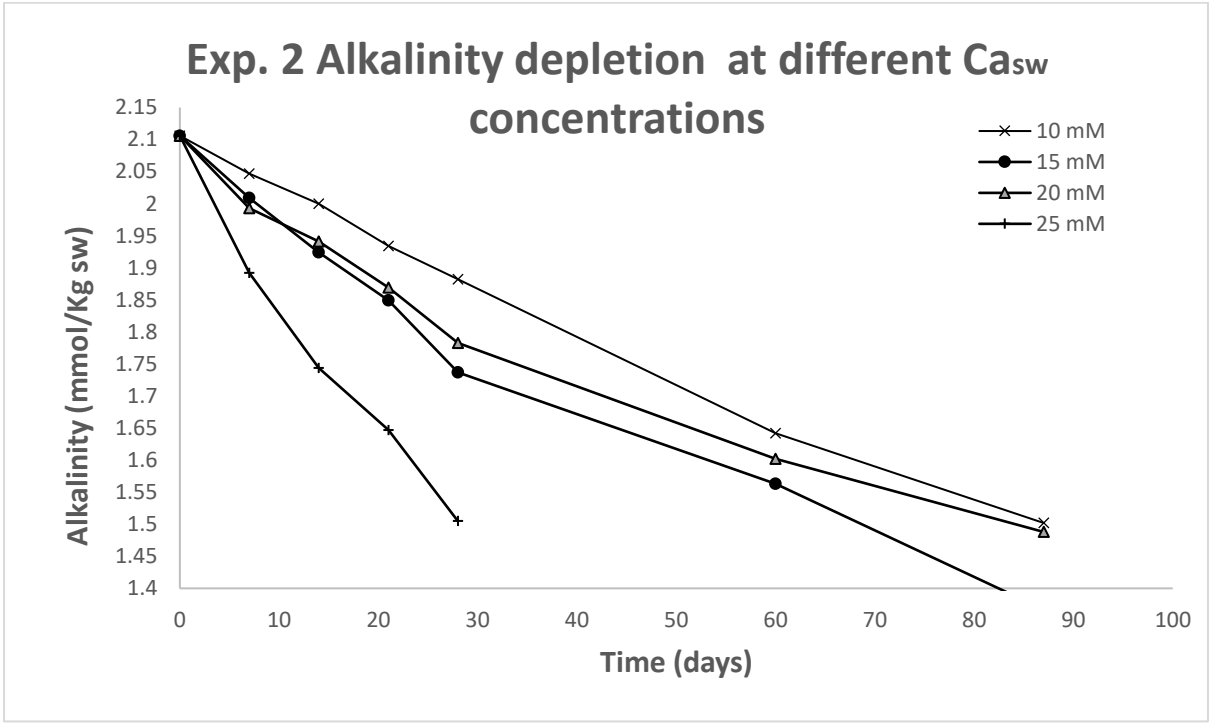

Table S2- SW and skeleton ICP-OES elemental analysis conditions, parameter, standards and errors.

SW analysis (Na rich matrix)							
Element	Ca	Li	Na	Mg	K	Sr	Ba
Wavelength	445.589	670.78	330.237	382.935	404.721	460.733	455.404
Interferences		Cm	Pu, Bk	Pu, U, Ce	Mn, Fe, Tc, Cm	Cm	Cs, Cu
Detection limits (mM)	0.0002	0.0007	0.0004	0.0003	0.0002	0.0001	0.00007
Seawater standard: OSIL IAPSO std (mM)	10.28	0.025	483.2	53.73	10.15	0.089	0.0006
Average of triplicate seawater analysis (mM)	10.31	0.0252	482.7	53.96	10.24	0.09	0.00057
SD (mM)	0.03	0.0003	2.22	0.46	0.02	0.0004	0.00001
RSD %	0.3	0.9	0.5	0.9	0.2	0.4	1.8
Skeleton Analysis (Ca rich matrix)							
Element	Ca	Li	Na	Mg	K	Sr	Ba*10^{-3}
Wavelength	315.887	670.78	330.237	382.935	404.721	460.733	455.404
Interferences		Cm	Pu, Bk	Pu, U, Ce	Mn, Fe, Tc, Cm	Cm	Cs, Cu
Detection limits (mM)	0.0001	0.0001	0.0002	0.0002	0.0001	0.00005	0.00004
Ca matrix Std sol 1 - elements concentration (mM)	49.9	0.014	4.35	0.41	0.026	1.14	0.007
Average of triplicate during coral skeleton analysis (mM)	50.1	0.016	4.38	0.4	0.026	1.15	0.008
SD (mM)	0.25	0.0002	0.04	0.006	0.0004	0.02	0.00009
RSD %	0.50	0.9	0.84	1.43	1.41	1.52	1.17
Ca matrix Std sol 3 - elements concentration (mM)	49.9	0.001	0.44	0.04	0.003	0.11	0.0007
Average of triplicate during coral skeleton analysis (mM)	50.1	0.0011	0.44	0.045	0.003	0.12	0.001
SD (mM)	0.16	0.00002	0.005	0.001	0.00007	0.001	0.00002
RSD %	0.32	1.8	1.04	1.90	2.37	1.16	2.36
Ca matrix Std sol 5 - elements concentration (mM)	49.9	0.0001	0.044	0.004	0.00026	0.011	0.00007
Average of triplicate during coral skeleton analysis (mM)	50.0	0.00013	0.045	0.004	0.00028	0.013	0.00009
SD (mM)	0.13	0.00003	0.001	0.0001	0.000013	0.00016	0.00001
RSD %	0.26	23.1	1.66	2.30	4.43	1.25	11.1

Skeleton analysis was done by ICP-OES (Spectro Arcos 2) following specific method developed for High Ca matrix solutions (e.g. CaCO3 analysis). The coral skeleton analysis was based on multi element standard solutions containing 2000 mg/L Ca as matrix with 5 different minor and trace elements concentrations described in the table below. Note that Spectro Arcos II ICP-OES allows both Radial and Axial view (not simultaneously) and therefore enables specific conditions to increase detection sensitivity for specific trace elements (In this case Li and Ba). Specific wavelength was chosen with minimum interferences of minor and major elements found in coral skeletons and most interferences are of REE's.

The analytical conditions were also specified for Ca matrix solutions. The measuring duration for the 4 phases were increased to 23 instead of 9 sec (per single replicate out of 3), plasma power increased from 1300 to 1425, and the also the auxiliary and nebulizer flows (from 1.8 to 2.2 l/min and 0.8 to 0.9 l/min respectively). The table below demonstrate standard solution calibration and validation results (mean, sd and rsd) before running the experiment samples tests.

Table S3- *A. cervicornis* (Ac) calcification rates in Exp. 1 calculated based on *P. damicornis* (Pd) calcification rates and total calcium depletion in Exp. 2.

Exp	# of Pd fragments	# of Ac fragments	Ca [Mm]	Pd fragments initial dry mass (gr)	Initial Ca (mM)	Final Ca (mM)	Δ Ca mM	% Ca depletion	Total Ca depletion (mg)	Pd calcification (mg Ca/gr dry/day)	Total Ca depletion Pd (mg) based on Exp2	calculated total Ca depletion by Ac (mg)	Ac calcification (mg Ca/gr/day)	Ac: Pd calcification ratio
1	5	5	10	0.60	10.3	10	0.3	2.9	902	4.82	505	397	6.9	0.9
			15	0.66	15.11	14.3	0.81	5.4	2435	6.43	673	1762	30.7	3.2
			20	0.78	20.1	19.6	0.5	2.5	1503	4.82	505	998	17.4	2.8
			25	0.57	25	23.7	1.3	5.2	3908	na*				
2	10		10	1.3	10.3	10	0.3	2.9	902	7.97				
			15	1.43	15	14.6	0.4	2.7	1202	9.66				
			20	1.67	20.05	19.75	0.3	1.5	902	6.21				
			25	1.22	25	24.7	0.3	1.2	902	26.40				

	P. damicoris	*A. cervicornis*	*A. cervicornis : P. damicornis* calcification ratio
Averages	7.95	18.3	2.3
SDV	1.41	9.73	1.01

1. *A. cervicornis* calcification rate was estimated by the total Ca depletion subtracted from the *P. damicornis* calcification rates measured in exp. 2
2. Based on experiment 2, Ca depletion by *P. damicornis* is between 6.21 to 9.66 mg Ca /gr dry / day with an average of 7.95 mg Ca /gr dry / day.
3. Based on these calculation *A. cervicornis* calcification is on average 2.3 faster than that of *P. damicornis*