Supplementary Information

Table S1. Components used in the inline (NaOH) dosing system (see Fig. S4).

Component	Supplier and model	Details
Submersible pump	Grundfos, UNILIFT AP12.50.11.1	220-240V, 8.5A. 2” female BSP thread
Flow meter	IFM, SM2604	Inline. 2” female NPT threads. COMS: analogue output
Dosing pump	Grundfos, SMART Digital XL – DDA	0 – 200 L/hr dosing rate. COMS: analogue input
Inline mixer	McMaster-Carr, PN: 35385K27	Inline. 2” male NPT threads
SeaFET	Satlantic	COMS: serial USB
Push-To-Connect ’Y’ fitting	McMaster-Carr, PN: 9087K58	3/8” hosing
Push-To-Connect fittings	McMaster-Carr, PN: 9087K11	Male NPT thread, 1/4” hosing
Tubing (3/8” OD)	McMaster-Carr, PN: 2129T17	Hard, chemical resistant
Tubing (1/4” OD)	McMaster-Carr, PN: 2129T16	Hard, chemical resistant
ADAM-4017	Advantech	Data acquisition (flow meter)
ADAM-4021	Advantech	Data acquisition (dosing pump)

Table S2. Background measurements during the month of observations, not including the two experimental days: pCO_2 - partial pressure of CO_2 in μatm; pH; TCO_2 - Total inorganic carbon (calculated from sensor pH and pCO_2) in μmol kg^{-1}, Alk - alkalinity (calculated from sensor pH and pCO_2) in μmol kg^{-1}; SST - Sea surface temperature in °C; dissolved oxygen - O_2 in μmol L^{-1}; O_2sat - dissolved oxygen saturation in % and SAL - salinity. The minimum, maximum, and mean (using all observations), are given, as well as the night time (21:00 pm to 05:00 am) and day time (05:00 am to 21:00 pm) values, with associated standard deviations (stdev). Pre-trial values are shaded in grey, post-trial values are in white.

	Overall	**Overall**	**Night**	**Night**	**Day**	**Day**	**Exp hours (7am to 12pm)**	**Exp hours (7am to 12pm)**
	Min, max	Mean (stdev)	Min, max	Mean (stdev)	Min, max	Mean (stdev)	Min, max	Mean (stdev)
pCO_2	352.4, 548.7	444.9 (± 19.6)	413.6, 536.3	447.1 (± 13.6)	382.8, 548.7	444.9 (± 21.4)	401.3, 548.7	455.5 (± 21.6)
pCO_2	413.2, 542.5	458.4 (± 16.9)	419.5, 542.5	456.1 (± 10.9)	413.2, 528.2	462.3 (± 19.3)	442.2, 528.2	474.6 (± 17.1)
pH	7.89, 8.02	7.96 (± 0.01)	7.89, 7.99	7.97 (± 0.01)	7.90, 8.02	7.96 (± 0.02)	7.90, 7.98	7.95 (± 0.01)
pH	7.89, 8.03	7.97 (± 0.02)	7.89, 8.00	7.96 (± 0.01)	7.91, 8.03	7.96 (± 0.02)	7.91, 7.99	7.95 (± 0.02)
TCO_2	1687.4, 2051.5	1897.8 (± 55.7)	1734.4, 2049.2	1923.6 (± 43.8)	1687.4, 2051.5	1881.0 (± 56.3)	1748.1 2051.5	1895.4 (± 57.4)
TCO_2	1815.7, 2085.5	1931.7 (± 22.6)	1815.7, 2033.0	1914.2 (± 18.7)	1852.9, 2085.5	1931.5, (± 22.3)	1857.3 2033.4	1932.7 (± 22.9)
Alk	1823.5, 2223.4	2062.0 (± 60.6)	1873.2, 2223.4	2090.8 (± 46.6)	1823.5, 2217.3	2043.5 (± 61.4)	1886.7, 2217.3	2053.5 (±62.8)
Alk	1958.1, 2299.2	2108.9 (± 26.1)	1958.1, 2205.0	2088.3 (± 21.5)	2011.2, 2299.2	2106.2 (± 26.3)	2011.2, 2205.1	2100.8 (± 26.8)
SST	13.5, 16.5	14.8 (± 0.6)	13.5, 16.1	14.7 (± 0.5)	13.5, 16.5	14.9 (± 0.6)	13.5, 15.7	14.6 (±0.5)
SST	15.8, 18.3	16.5 (± 0.4)	15.8, 17.3	16.5 (± 0.3)	15.8, 18.3	16.5 (± 0.5)	15.9, 17.4	16.2 (± 0.2)
O_2	213.9, 285.4	248.0 (± 8.3)	217.0, 266.3	246.0 (± 5.9)	213.9, 285.4	249.0 (± 9.3)	213.9, 265.0	242.6 (±7.3)
O_2	212.1, 268.4	244.5 (± 7.7)	217.3, 254.9	244.0 (± 5.4)	212.1, 268.4	243.1 (± 8.8)	212.1, 247.6	236.4, (±6.0)
O_2sat	84, 115	99 (± 4)	87, 108	98 (± 3)	84, 115	99 (± 4)	84, 106	96 (± 3)
O_2sat	87, 114	101 (± 4)	89, 106	100 (± 3)	87, 114	100 (± 4)	87, 102	97 (± 2)
SAL	33.5, 34.1	33.9 (± 0.2)	33.5, 34.1	33.9 (± 0.2)	33.5, 34.1	33.9 (± 0.1)	33.5, 34.1	33.9 (±0.2)
SAL	31.4, 33.9	33.6 (± 0.3)	32.8, 33.9	33.6 (± 0.2)	31.4, 33.9	33.6 (± 0.3)	32.5, 33.9	33.6 (±0.2)

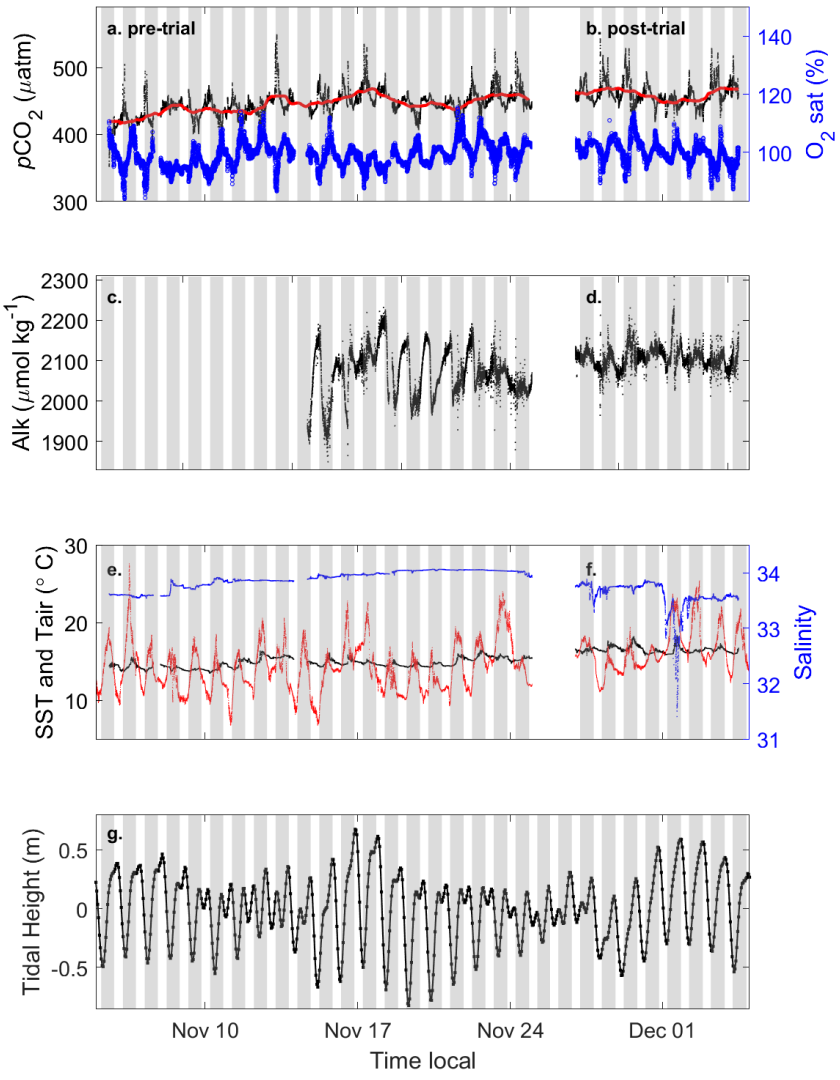

Figure S1. Baseline observations at the field trial site in Woodbridge, Tasmania. a., c. and e. pre-trial observations, b. d. and f. post-trial observations. a.-b. pCO_2 (black) with 24h running mean (red solid line) and dissolved oxygen saturation (O_2sat, in blue); c.-d. Alkalinity (Alk) calculated from sensor pCO_2 and pH. pH data was not measured prior to 14 Nov. e.-f. local sea surface temperature (black) and air temperature (red) from a nearby weather station (Dennes Point), and sea surface salinity (blue); g. tidal changes from a nearby gauge(Southport). Grey shading in all panels represents daylight hours.

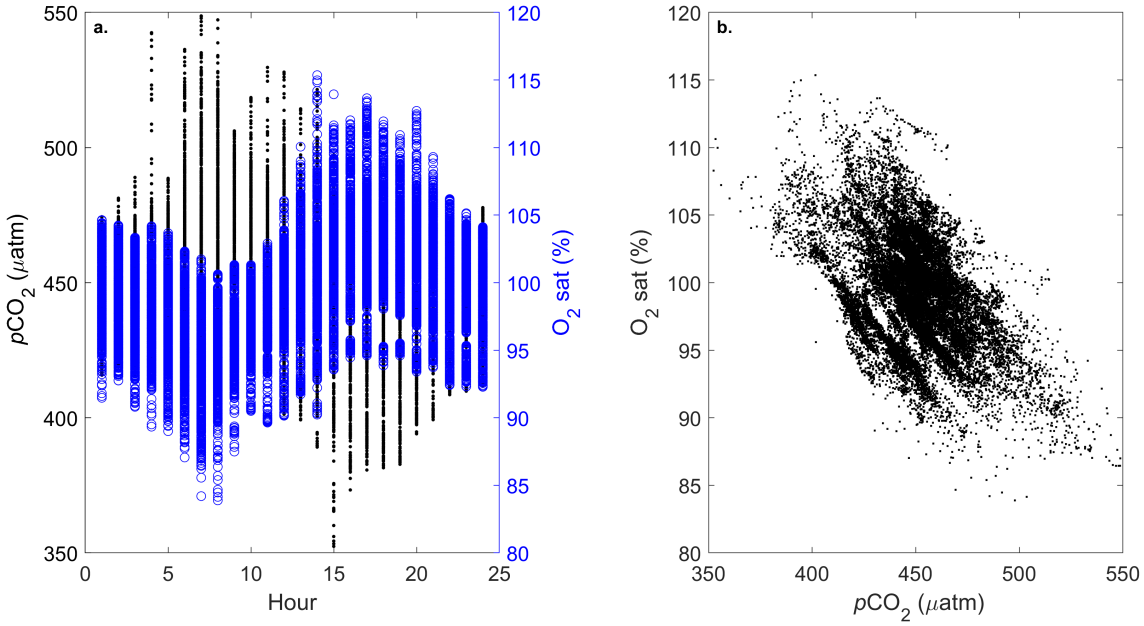

Figure S2. Variation in partial pressure of CO_2 (pCO_2) and dissolved oxygen saturation (O_2sat). a. diurnal variability of pCO_2 (black) and O_2 (blue) based on pre-trial observations collected over three weeks. b. the relationship between pCO_2 and O_2sat from observations collected as in panel a.

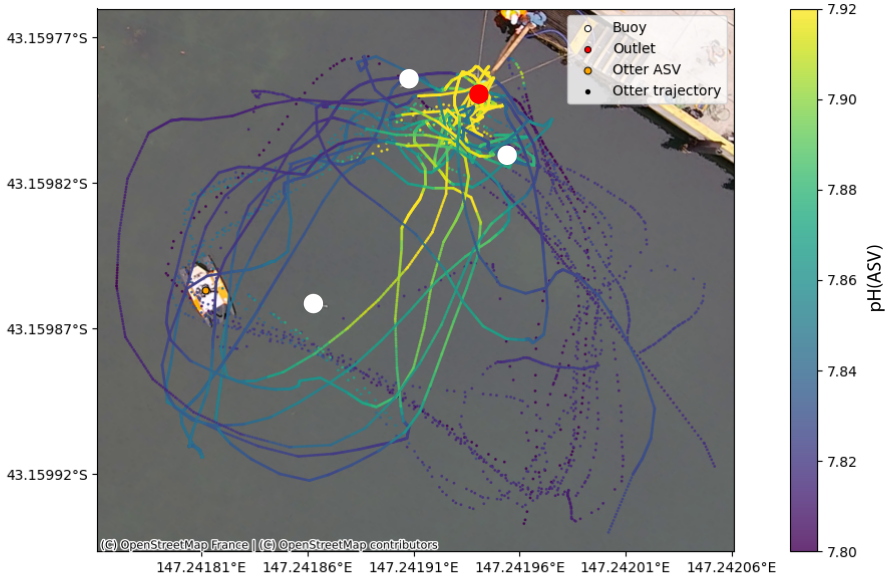

Figure S3. The plume of seawater modified with NaOH during Day 2 of the experiment. A piloted surface vehicle (Maritime Robotics Otter Pro) equipped with an AML Idronaut pH sensor was used to map the dispersion of the plume. The pH(ASV) observations were then interpolated to generate Figure 5c. in the main text (see Methods). The image in the background is a photograph of the field site taken with a drone; the jetty is visible in the top right corner.

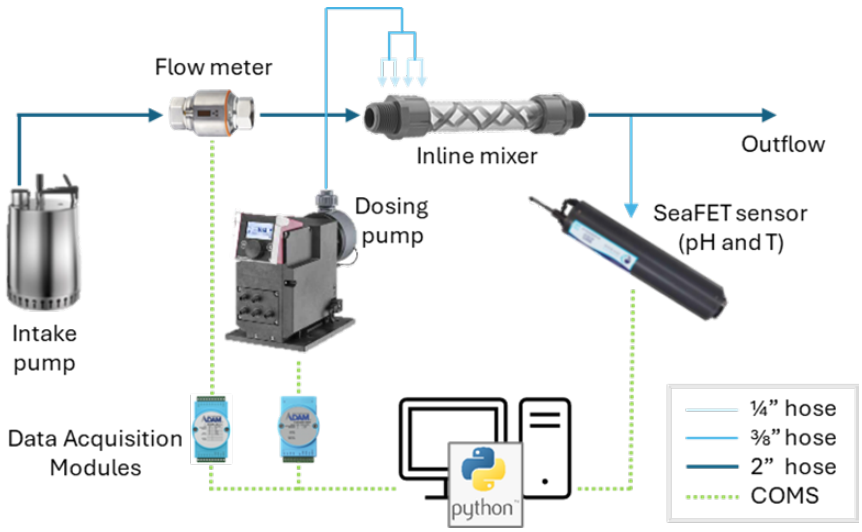

Figure S4. A schematic flow diagram of the inline NaOH dosing system. A list of components used to build the system is given in Table S1.