Supplements

Supplemental Table S1. pH and salinity of the sea water and meltwater stream of inside and outside of Marian Cove (mean ± SD).

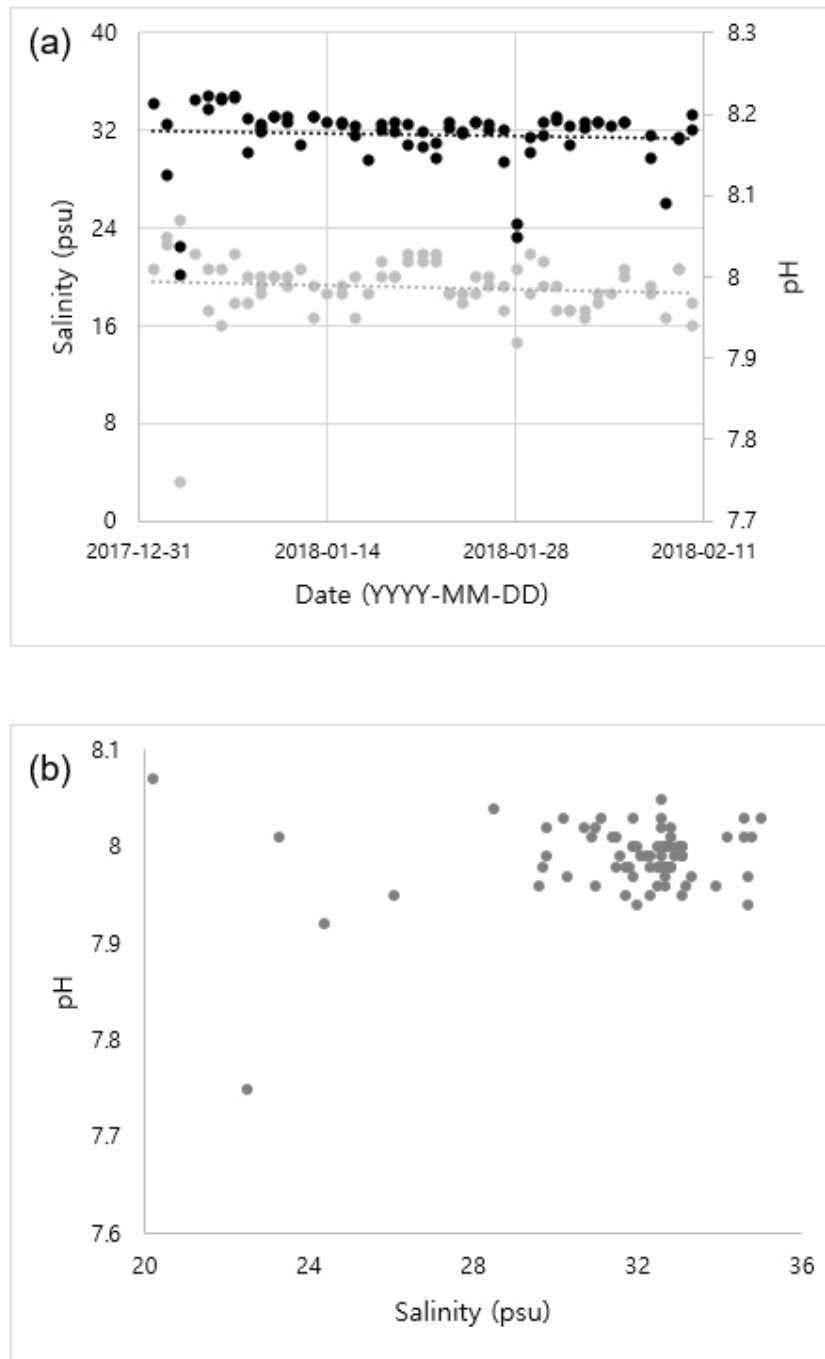|	pH	Salinity (psu)	Location	N
Sea water	7.95 ± 0.20	31.0 ± 2.5	Marian Cove intertidal	6
	8.00 ± 0.04	32.7 ± 0.4	Marian Cove central bay	13
	8.12 ± 0.18	32.9 ± 2.1	Outside of Marian Cove	8
Meltwater stream	6.40 ± 1.13	-	Marian Cove	33
	7.00 ± 0.57	-	Outside of Marian Cove	3

The water quality (pH, salinity) of meltwater stream/seawater in Barton Peninsula was measured from Dec 27, 2017 to Feb 10, 2018. The meltwater stream was significantly more acidic than the sea water (Mann–Whitney U-test; $N_1 = 27$, $N_2 = 36$, $U = 53$, $Z = -6.018$, $P < 0.001$). The sea water of Marian Cove (both intertidal and surface seawater) was significantly more acidic and had a lower salinity than that outside of Marian Cove which is far from the glacial wall and close to the open sea (Mann–Whitney U-test; pH: $N_1 = 19$, $N_2 = 8$, $U = 38.5$, $Z = -2.009$, $P = 0.045$, salinity: $N_1 = 18$, $N_2 = 8$, $U = 23$, $Z = -2.727$, $P = 0.005$). The intertidal sea water of Marian cove had a lower salinity than the surface sea water (Mann–Whitney U-test: $N_1 = 6$, $N_2 = 12$, $U = 12$, $Z = -2.255$, $P = 0.024$).

Supplemental Table S2. pH, salinity and DO of the experimental sea water before and after replacement (mean ± SD).

	C		LS		LP		LPLS	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
pH	8.00 ±0.10	8.02 ±0.03	7.97 ±0.10	8.03 ±0.04	7.54 ±0.06	7.55 ±0.05	7.53 ±0.08	7.55 ±0.05
Salinity (psu)	34.0 ±0.0	34.0 ±0.0	27.0 ±0.0	27.0 ±0.0	34.0 ±0.0	34.0 ±0.0	27.0 ±0.0	27.0 ±0.0
DO (mg/L)	11.1 ±1.4	11.3 ±0.6	9.8 ±1.0	10.7 ±0.5	8.2 ±1.3	11.0 ±0.6	8.1 ±1.1	10.6 ±0.4

The pH and salinity were tend to be stable even the experimental seawater was replaced.

Supplemental Figure S1. Variation in the salinity and pH of sea water collected from the intertidal zone in front of King Sejong Station. Sea water was collected daily from Jan 1 to Feb 10, 2018. The salinity was 31.7 ± 2.6 psu and the pH was 7.99 ± 0.04 (mean ± SD). (**a**) The pH and salinity had no relationships with the passage of time (linear regression test; pH: $R = 0.102$, $P = 0.388$, salinity: $R = 0.067$, $P = 0.569$). The salinity and pH values were labeled with black and gray dots, respectively. (**b**) Correlation data of pH and salinity. The pH and salinity values had no correlation (Spearman correlation test, $P = 0.880$, $\rho = -0.018$).