

Table 1. Summary of the observed parameters in the different provinces. Data are presented as the average and standard deviation (1σ), with the number of measurements or samples indicated in parentheses.

Properties (units)	East Sea/Sea of Japan	North Pacific	Bering Sea
Air temperature ($^{\circ}\text{C}$)	20.5 ± 1.3 (N = 85)	12.0 ± 2.8 (N = 140)	7.7 ± 0.5 (N = 91)
Air pressure (hPa)	1008.5 ± 3.9 (N = 85)	1006.4 ± 4.4 (N = 140)	1004.5 ± 4.2 (N = 91)
Relative humidity (%)	84 ± 8 (N = 85)	92 ± 3 (N = 140)	92 ± 4 (N = 91)
U_{10N}^a (m s^{-2})	6 ± 4 (N = 4791)	9 ± 2 (N = 10151)	8 ± 2 (N = 4663)
Irradiance ($\text{MJ m}^{-2} \text{d}^{-1}$)	27.0 ± 0.4 (N = 283)	11.8 ± 3.4 (N = 1024)	8.9 ± 4.6 (N = 428)
SST ^b ($^{\circ}\text{C}$)	21.3 ± 1.9 (N = 4755)	11.8 ± 3.0 (N = 10152)	8.3 ± 0.3 (N = 4662)
SSS ^b (psu)	32.8 ± 1.2 (N = 4755)	32.9 ± 0.3 (N = 10152)	31.9 ± 1.0 (N = 4662)
<i>Chl-a</i> (mg m^{-3})	0.7 ± 0.4 (N = 4752)	0.9 ± 0.3 (N = 10152)	0.7 ± 0.4 (N = 4663)
MLD ^b (m)	11.4 ± 0.15 (N = 2)	13.7 ± 4.3 (N = 6)	12.7 ± 3.7 (N = 2)
$a_c(412)^c$ (m^{-1})	0.21 (N = 1)	0.16 ± 0.16 (N = 6)	0.17 (N = 1)
k_{CO}^c (hr^{-1})	0.27 ± 0.05 (N = 2)	0.13 ± 0.15 (N = 4)	0.36 ± 0.39 (N = 2)
$[\text{CO}]_{\text{sea}}$ (nM)	0.5 ± 0.4 (N = 80)	0.6 ± 0.4 (N = 140)	1.6 ± 1.3 (N = 91)
CO_{air} (nmol mol^{-1})	141 ± 38 (N = 85)	112 ± 29 (N = 99)	102 ± 10 (N = 74)
SA ^b	3.1 ± 2.7 (N = 80)	5.0 ± 4.4 (N = 99)	14.3 ± 13.8 (N = 74)
Air-sea CO flux ($\mu\text{mol m}^{-2} \text{d}^{-1}$)	W92 ^d	0.8 ± 0.9 (N = 80)	2.2 ± 3.0 (N = 99)
	N00 ^e	0.7 ± 0.8 (N = 80)	1.7 ± 2.3 (N = 99)
	W14 ^f	0.6 ± 0.8 (N = 80)	1.7 ± 2.4 (N = 99)

^a Neutral wind speed at 10 m high.

^b SST, SSS, MLD, and SA stand for sea surface temperature, sea surface salinity, mixed layer depth, and saturation anomaly, respectively.

^c $a_c(412)$ and k_{CO} designate absorption coefficient of CDOM at the wavelength of 412 nm and microbial oxidation constant, respectively.

^{d,e,f} Gas transfer velocity parameterizations by Wanninkhof (1992), Nightingale et al. (2000), and Wanninkhof (2014), respectively.