

Global surface ocean acidification indicators from 1750 to 2100

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Contents of this file

Figures S1 to S20

Tables S1 to S12

Introduction

This document contains additional figures and tables.

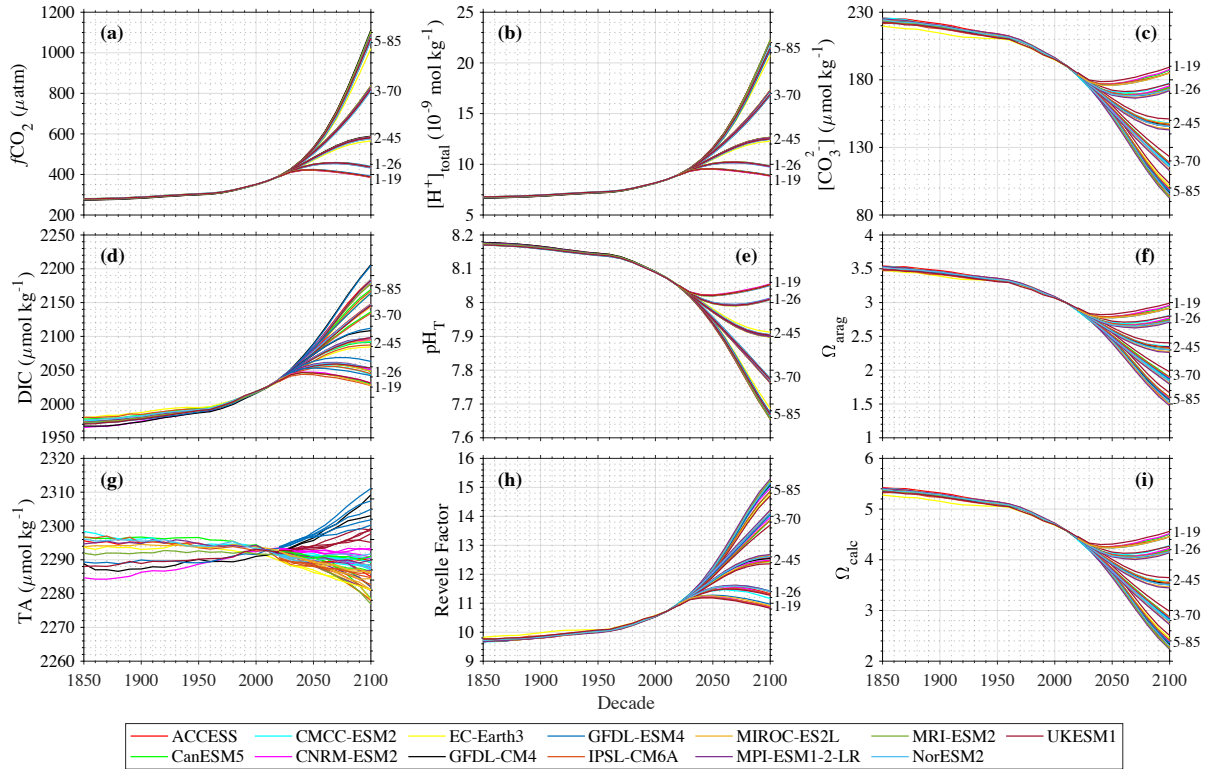


Figure S1. Temporal changes of global surface ocean acidification (OA) indicators (area-averaged): (a) fugacity of carbon dioxide ($f\text{CO}_2$), (b) total hydrogen ion content ($[\text{H}^+]_{\text{total}}$), (c) carbonate ion content ($[\text{CO}_3^{2-}]$), (d) total dissolved inorganic carbon content (DIC), (e) pH on total scale (pH_T), (f) aragonite saturation state (Ω_{arag}), (g) total alkalinity content (TA), (h) Revelle Factor (RF), and (i) calcite saturation state (Ω_{calc}), as reconstructed and projected by different Earth System Models (ESMs) after combining with observational data by using surface ocean partial pressure of carbon dioxide, instead of DIC, as an anchor variable. The numbers next to the right-side y-axes, i.e., 119, 126, 245, 370, and 585, are the Shared Socioeconomic Pathways: SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5, respectively.

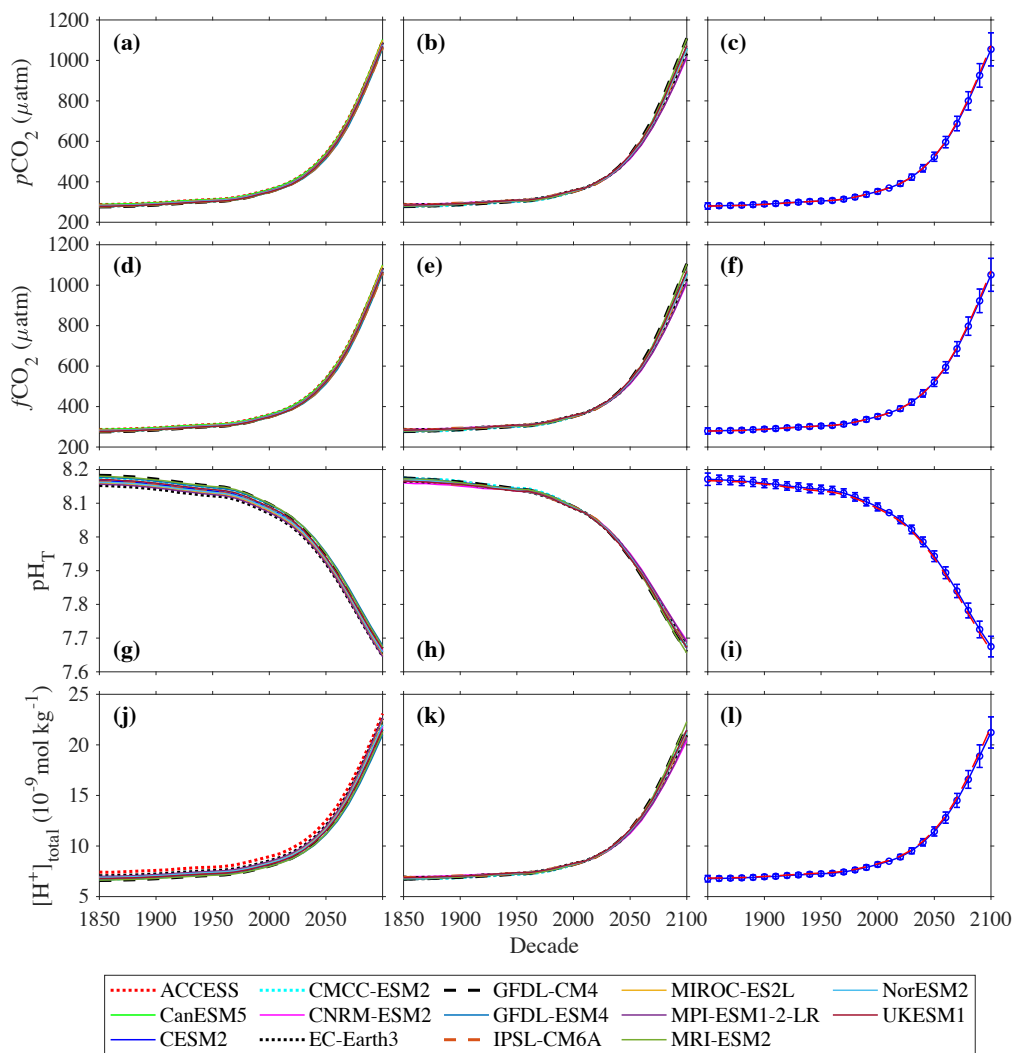


Figure S2. Temporal changes of surface partial pressure of carbon dioxide ($p\text{CO}_2$), fugacity of carbon dioxide ($f\text{CO}_2$), pH on total scale (pH_T), and total hydrogen ion content ($[\text{H}^+]_{\text{total}}$) (area-averaged globally) from 1850 to 2100 under the historical and the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). The four leftmost panels (a, d, g, and j) show raw model output. The four panels in the middle column (b, e, h, and k) show the results after applying bias adjustment to the model output with observational data (drift-corrections have been applied for DIC and TA). The four rightmost panels (c, f, i, and l) show the inter-model median values after adjusting the model output with observational data (blue circles and lines) and the inter-model median values before the correction (dashed red lines).

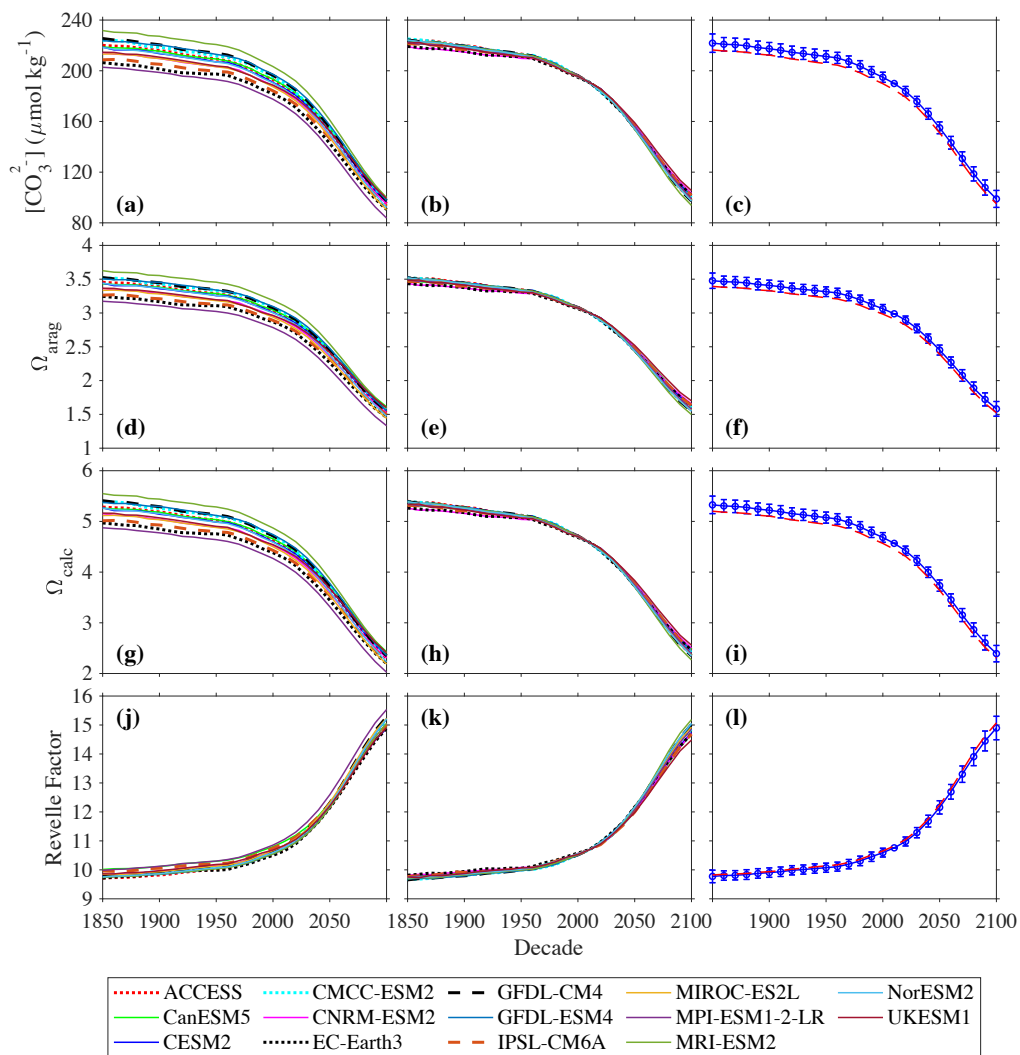


Figure S3. Temporal changes of surface carbonate ion content ($[\text{CO}_3^{2-}]$), aragonite saturation state (Ω_{arag}), calcite saturation state (Ω_{calc}), and Revelle Factor (RF) (area-averaged globally) from 1850 to 2100 under the historical and the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). The four leftmost panels (a, d, g, and j) show raw model output. The four panels in the middle column (b, e, h, and k) show the results after applying bias adjustment to the model output with observational data (drift-corrections have been applied for DIC and TA). The four rightmost panels (c, f, i, and l) show the inter-model median values after adjusting the model output with observational data (blue circles and lines) and the inter-model median values before the correction (dashed red lines).

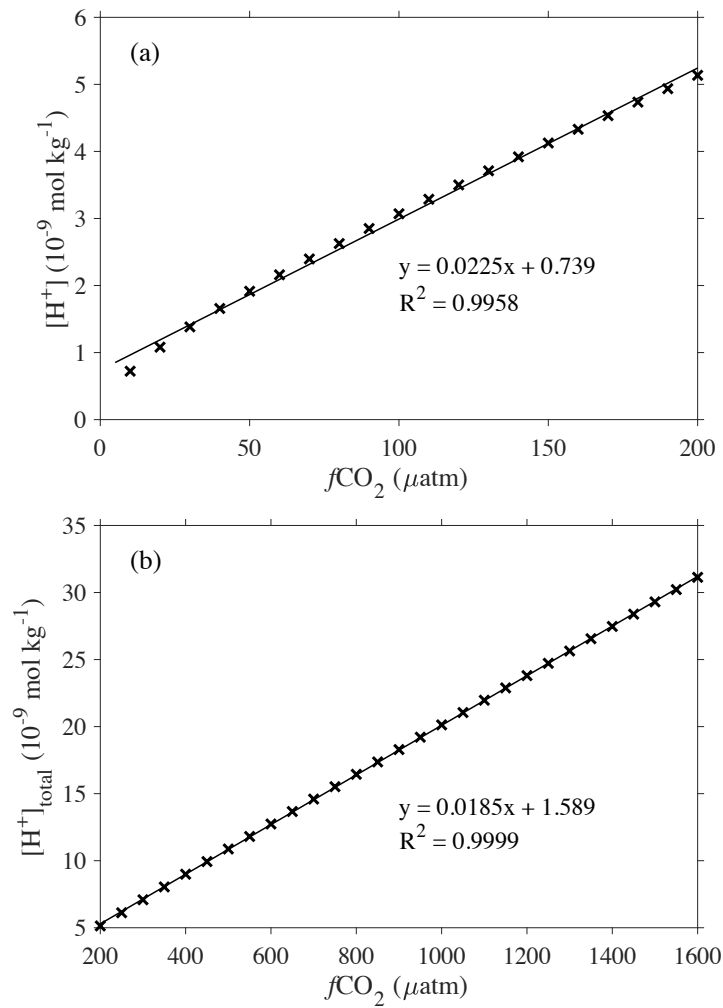


Figure S4. Relationships between fugacity of carbon dioxide ($f\text{CO}_2$) and total hydrogen ion content ($[\text{H}^+]_{\text{total}}$): (a) for $f\text{CO}_2 < 200 \text{ uatm}$ and (b) for $200 < f\text{CO}_2 < 1200$. The calculation was based on the average global sea surface temperature (SST), sea surface salinity (SSS), and total alkalinity content (TA) of $18.35 \text{ }^\circ\text{C}$, 34.87 , and $2306 \text{ } \mu\text{mol kg}^{-1}$ respectively, with the CO2SYS program. SST, SSS, and TA were kept the same, and $[\text{H}^+]_{\text{total}}$ was calculated using different arbitrary $f\text{CO}_2$ values.

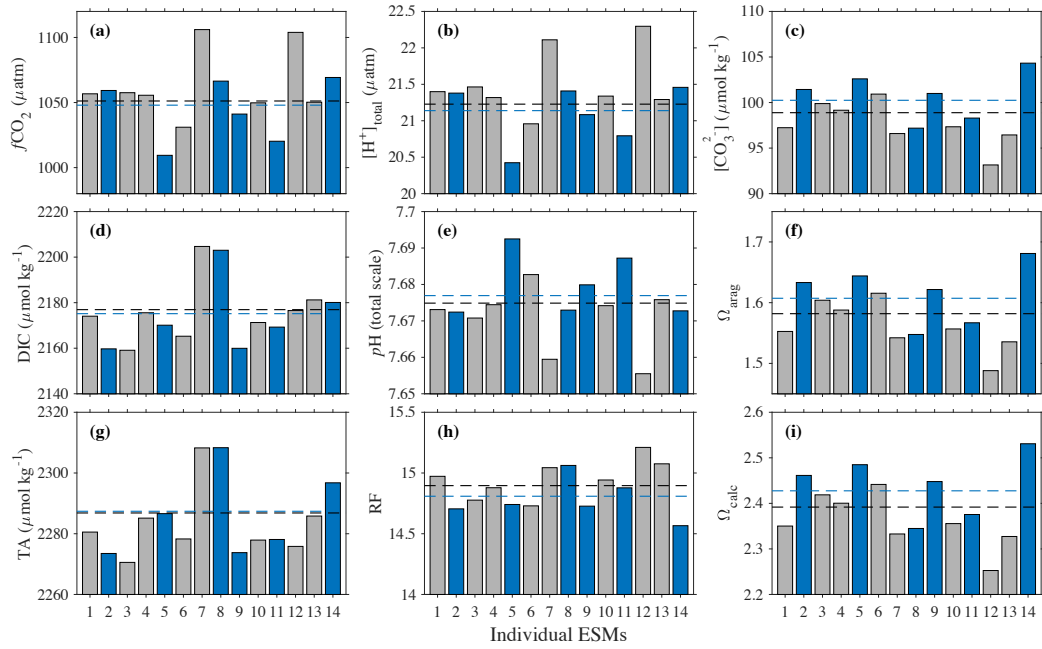


Figure S5. Projected ocean acidification indicators after bias adjustment (area-averaged, inter-model median) in 2100 under the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). The x-axes values in these plots correspond to the 14 ESMs as listed in Table S3. ESMs highlighted in blue also have SSP1-1.9 output available (see Figure S6). The black and blue dashed lines are the median values of all 14 ESMs vs. 6 ESMs with SSP1-1.9 output, respectively.

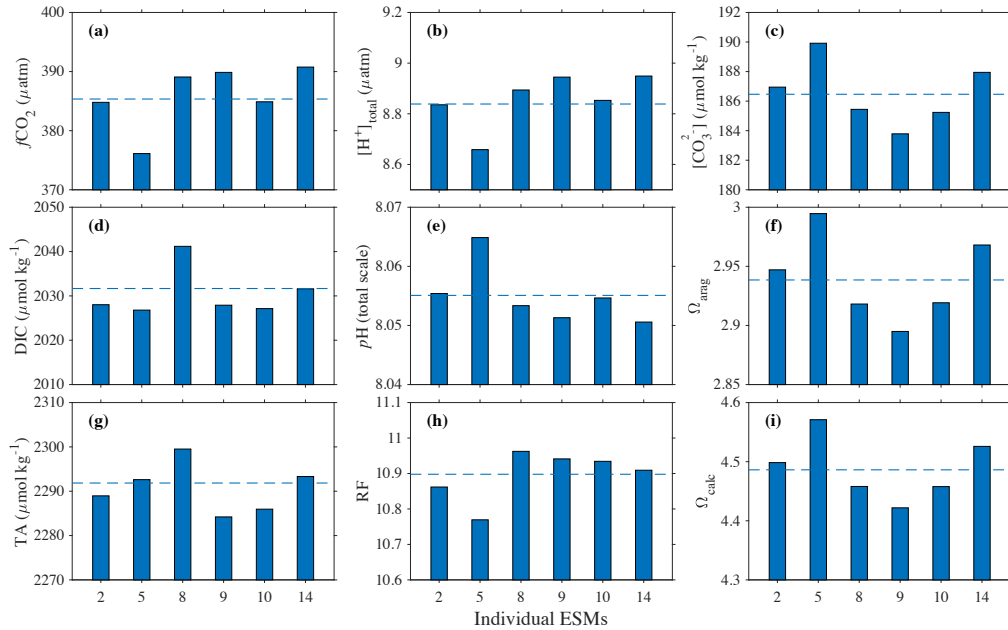


Figure S6. Projected ocean acidification indicators after bias adjustment (area-averaged, inter-model median) in 2100 under the the low-emission, high-mitigation Shared Socioeconomic Pathway (SSP1-1.9). Only ESMs with SSP1-1.9 output available are presented. The x-axes values in these plots correspond to these ESMs: (2) CanESM5, (5) CNRM-ESM-2, (8) GFDL-ESM4, (9) IPSL-CM6A-LR, (10) MIROC-ES2L, (14) UKESM1-0-LL. Refer to Table S4 for the full names of the Y-axis abbreviations. The blue dashed lines are the median values of these 6 ESMs.

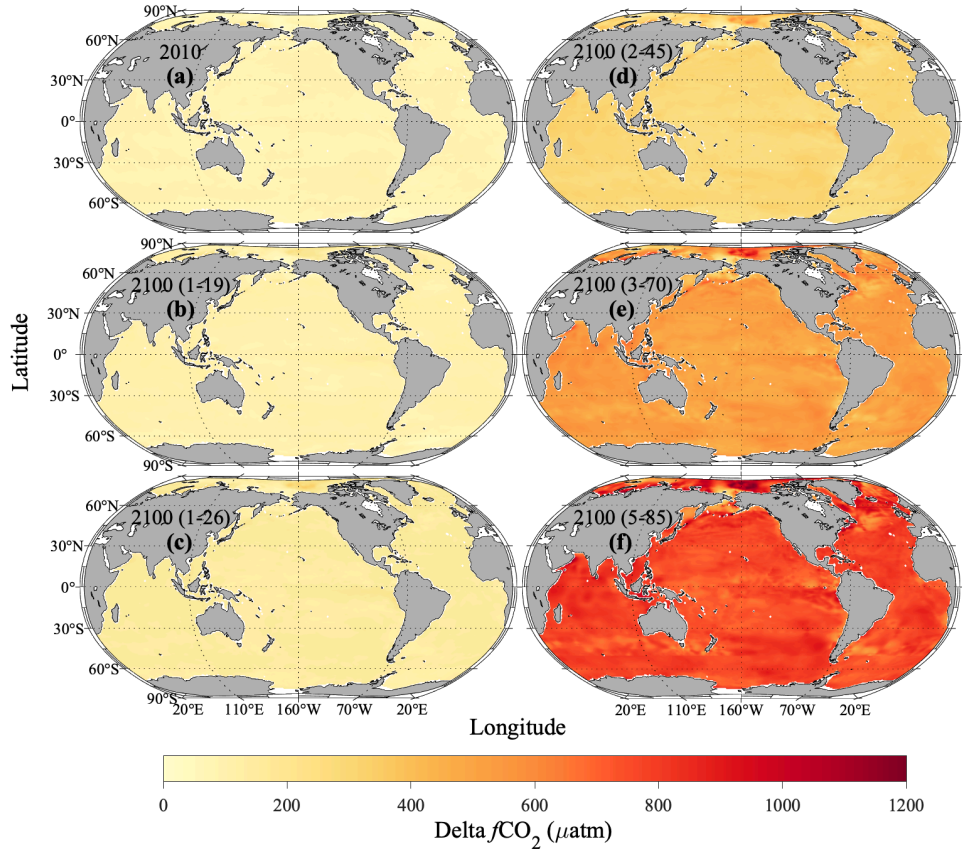


Figure S7. Delta surface ocean fugacity of carbon dioxide ($f\text{CO}_2$) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

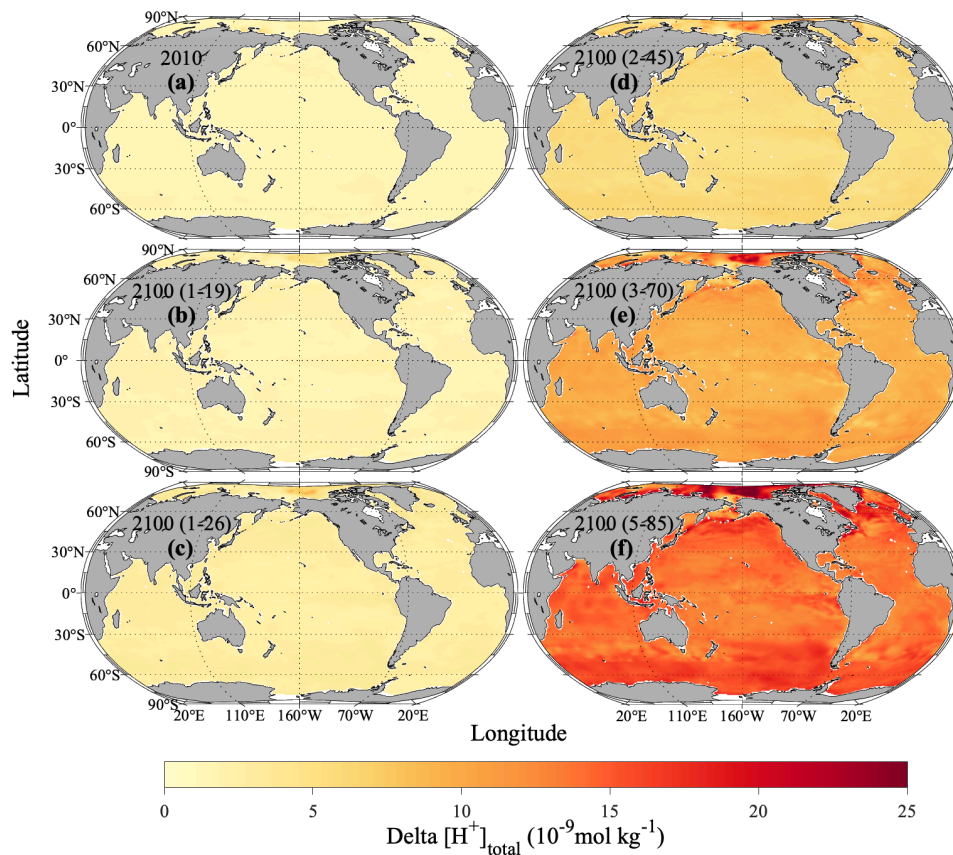


Figure S8. Delta surface ocean total hydrogen ion content ($[H^+]_{total}$) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

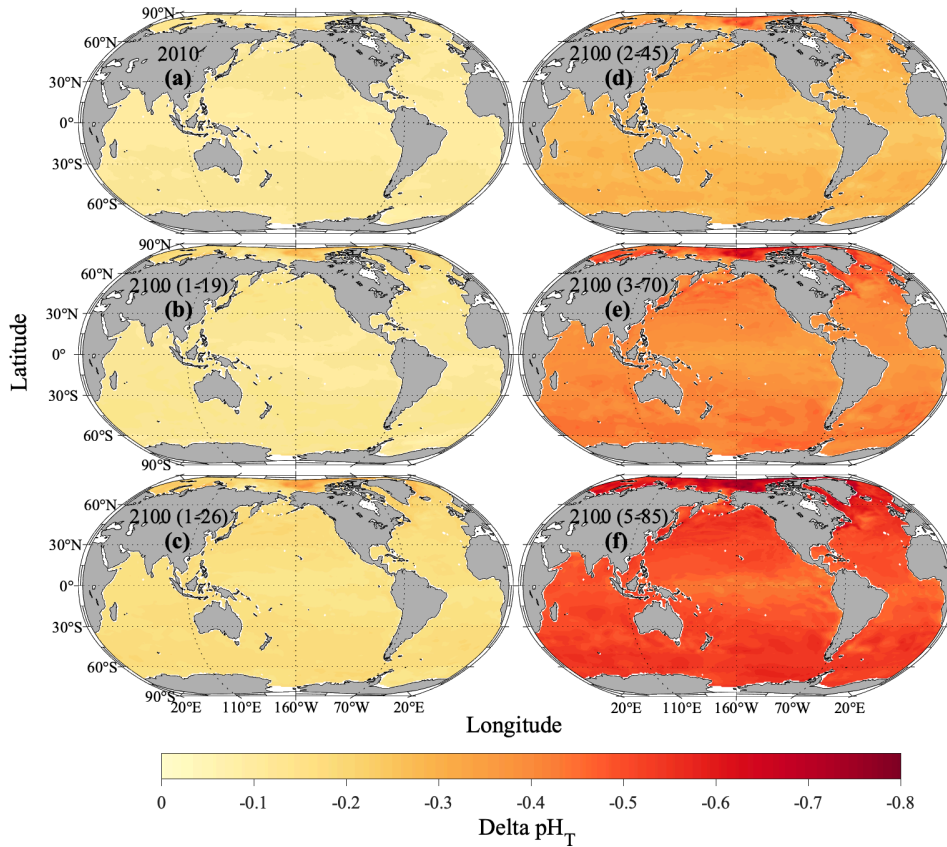


Figure S9. Delta surface ocean pH on total scale (pH_T) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

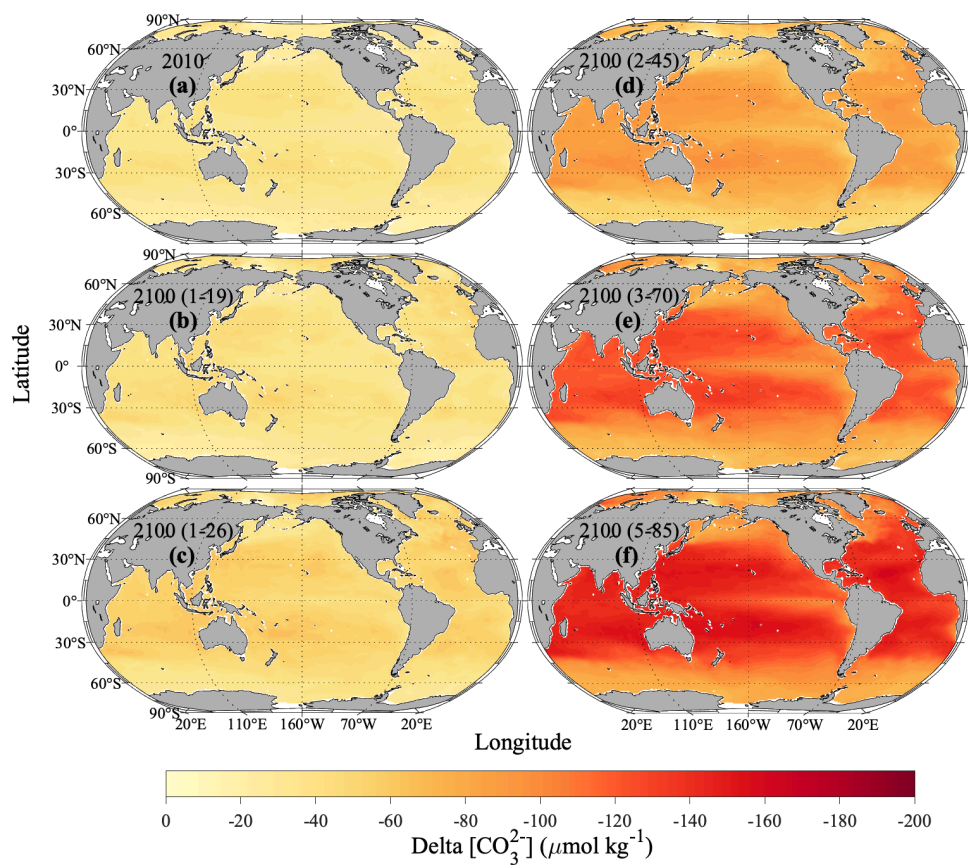


Figure S10. Delta surface ocean carbonate ion content ($[\text{CO}_3^{2-}]$) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

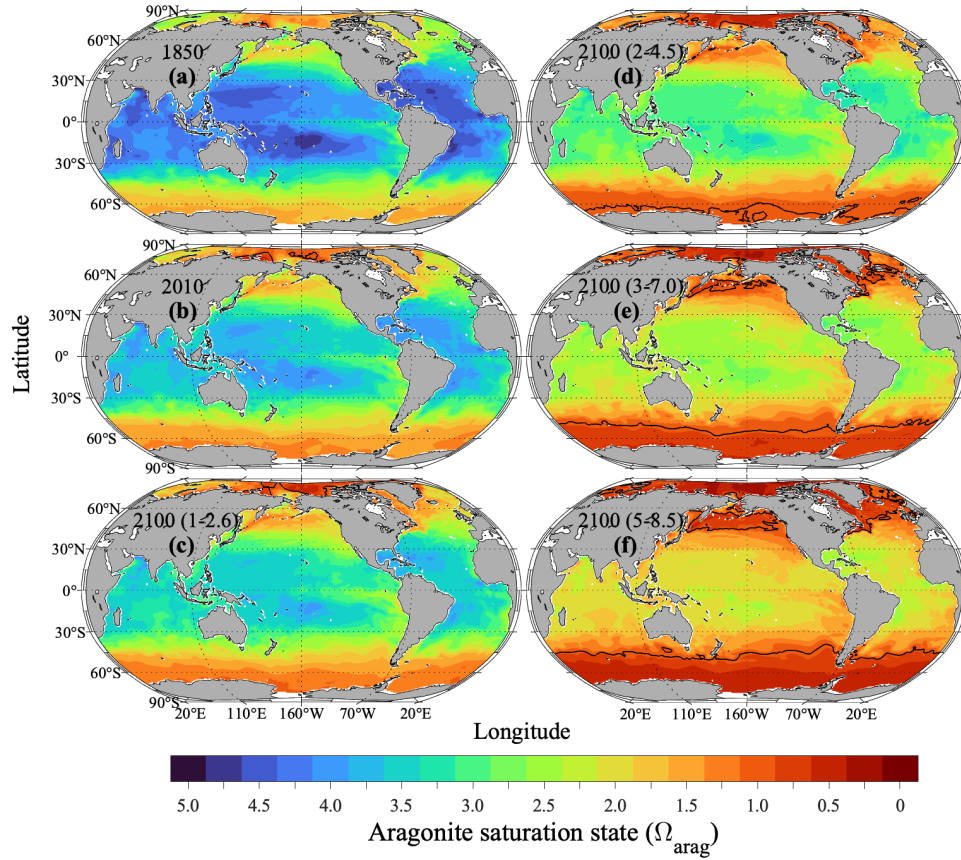


Figure S11. Surface ocean aragonite saturation state (Ω_{arag} , inter-model median) in the decades around (a) 1850, (b) 2010, (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5). The solid black lines depict $\Omega_{\text{arag}} = 1$.

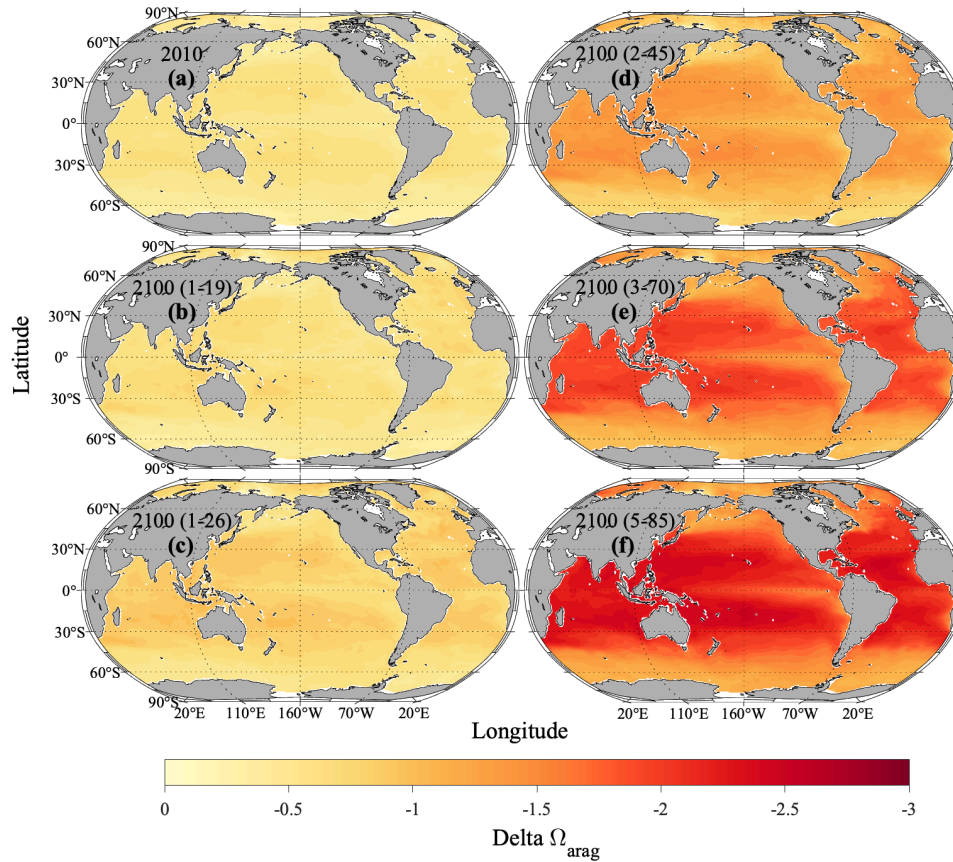


Figure S12. Delta surface ocean aragonite saturation state (Ω_{arag}) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

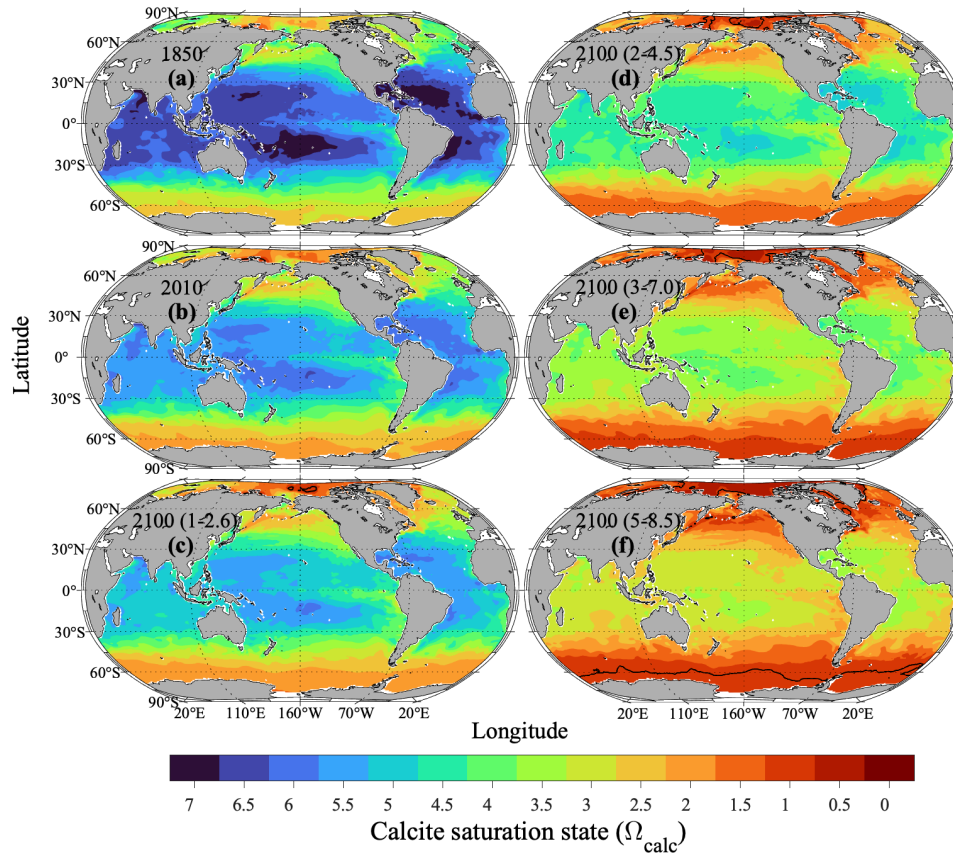


Figure S13. Surface ocean calcite saturation state (Ω_{calc} , inter-model median) in the decades around (a) 1850, (b) 2010, (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5). The solid black lines depict $\Omega_{\text{calc}} = 1$.

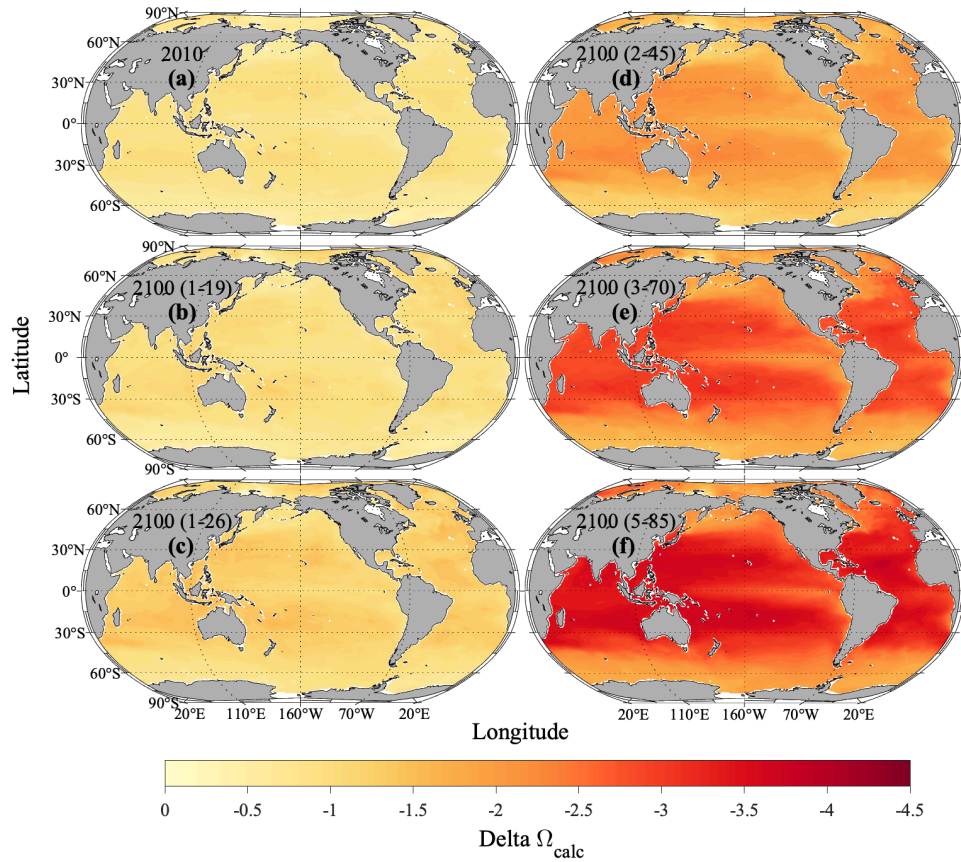


Figure S14. Delta surface ocean calcite saturation state (Ω_{calc}) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

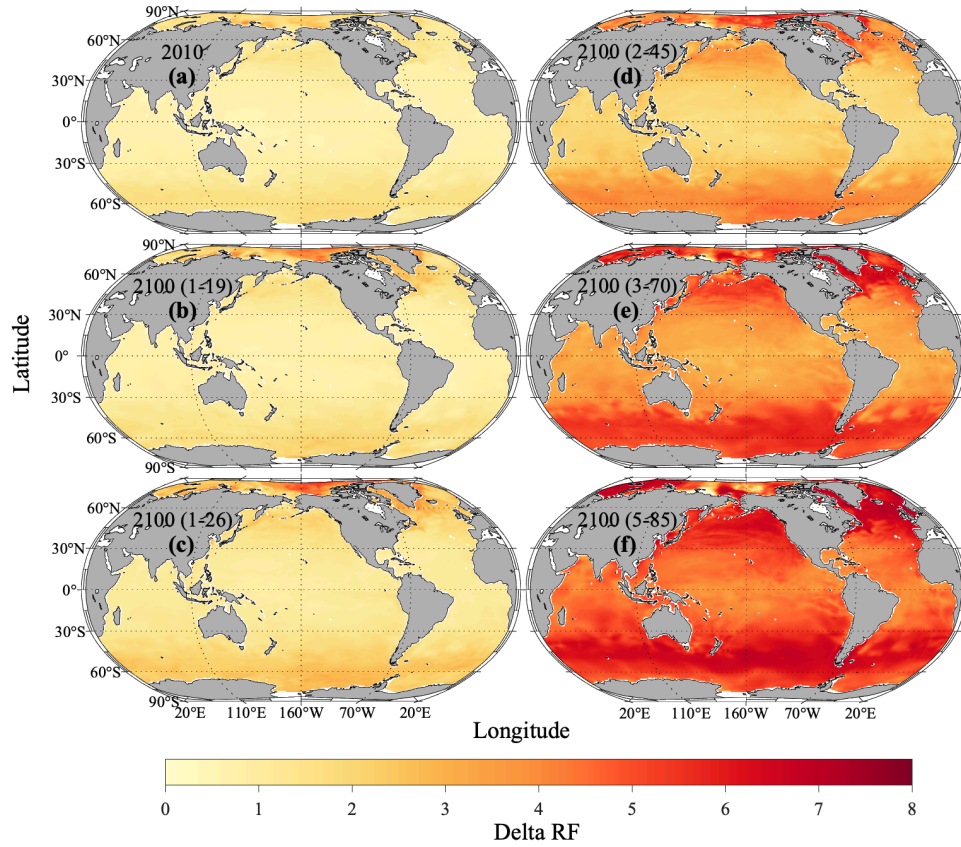


Figure S15. Delta surface ocean Revelle Factor (RF) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

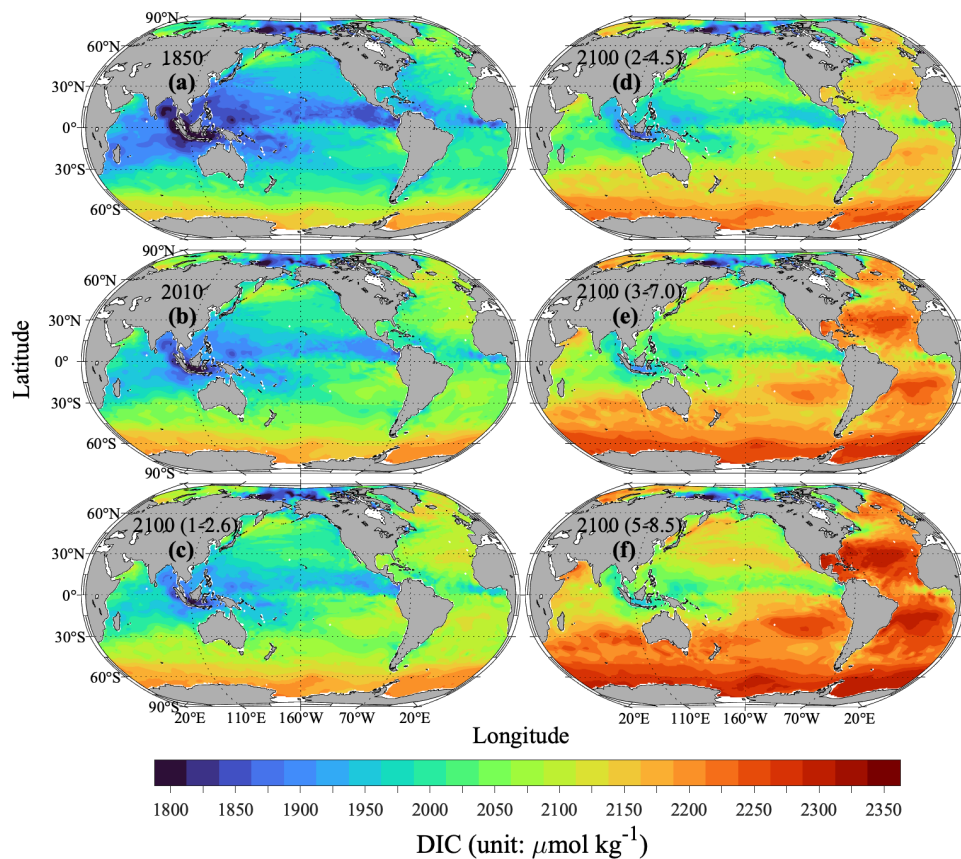


Figure S16. Surface ocean total dissolved inorganic carbon content (DIC, inter-model median) in the decades around (a) 1850, (b) 2010, (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

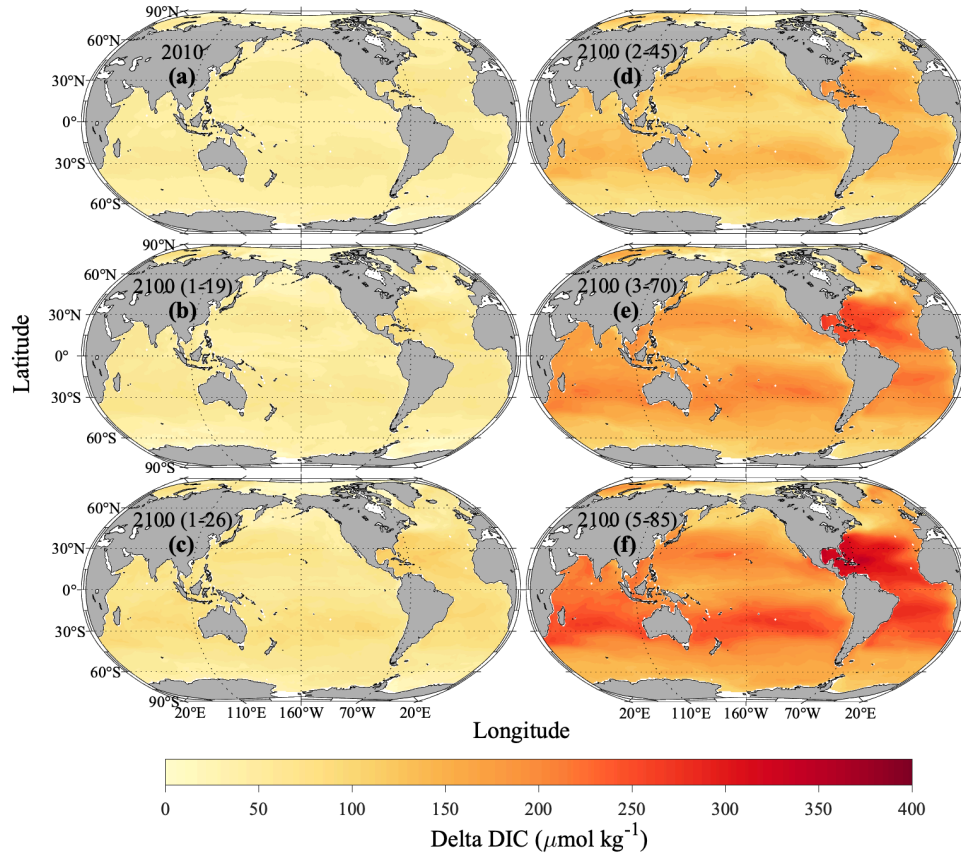


Figure S17. Delta surface ocean total dissolved inorganic carbon content (DIC) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

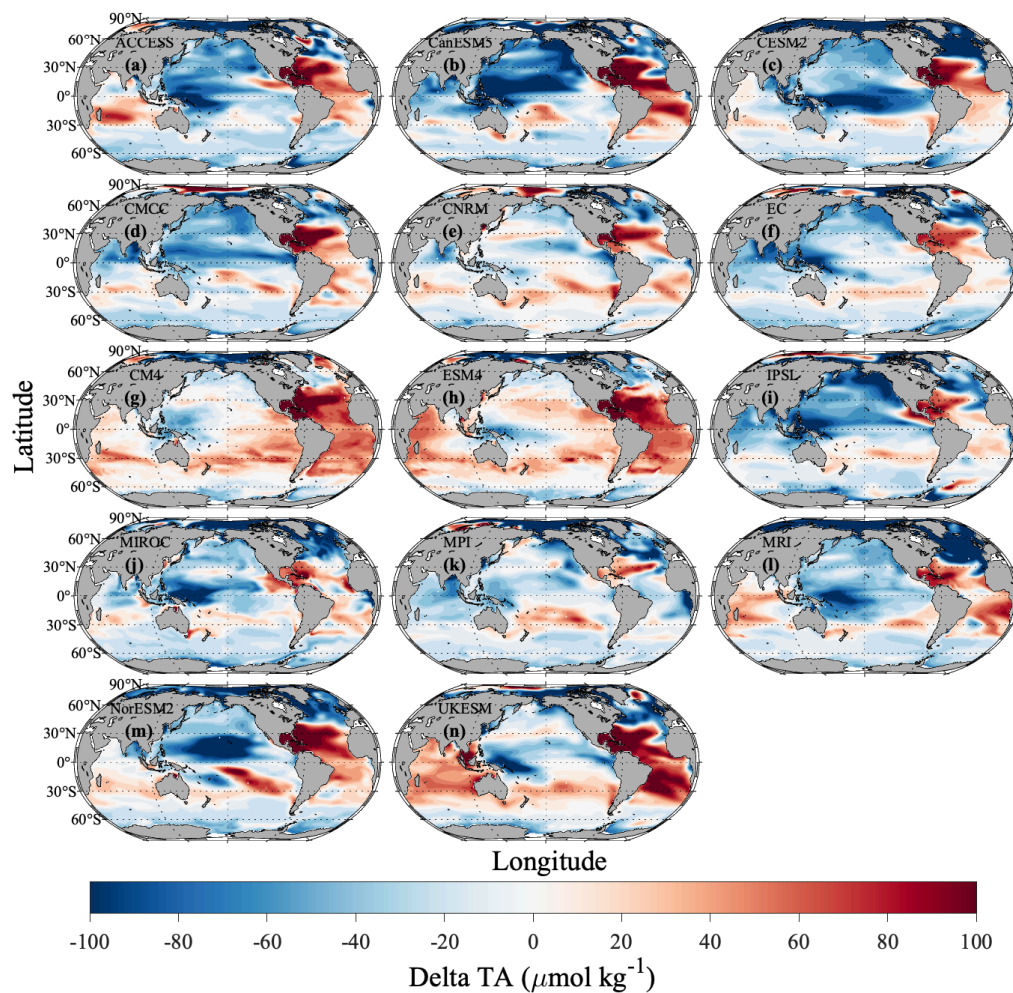


Figure S18. Delta surface ocean total alkalinity content (TA) in 2100 relative to the 1850 level for individual Earth System Models: (a) ACCESS, (b) CanESM5, (c) CESM2, (d) CMCC, (e) CNRM, (f) EC, (g) CM4, (h) ESM4, (i) IPSL, (j) MIROC, (k) MPI, (l) MRI, (m) NorESM2, and (n) UKESM. Refer to Table S3 for the full names of the models.

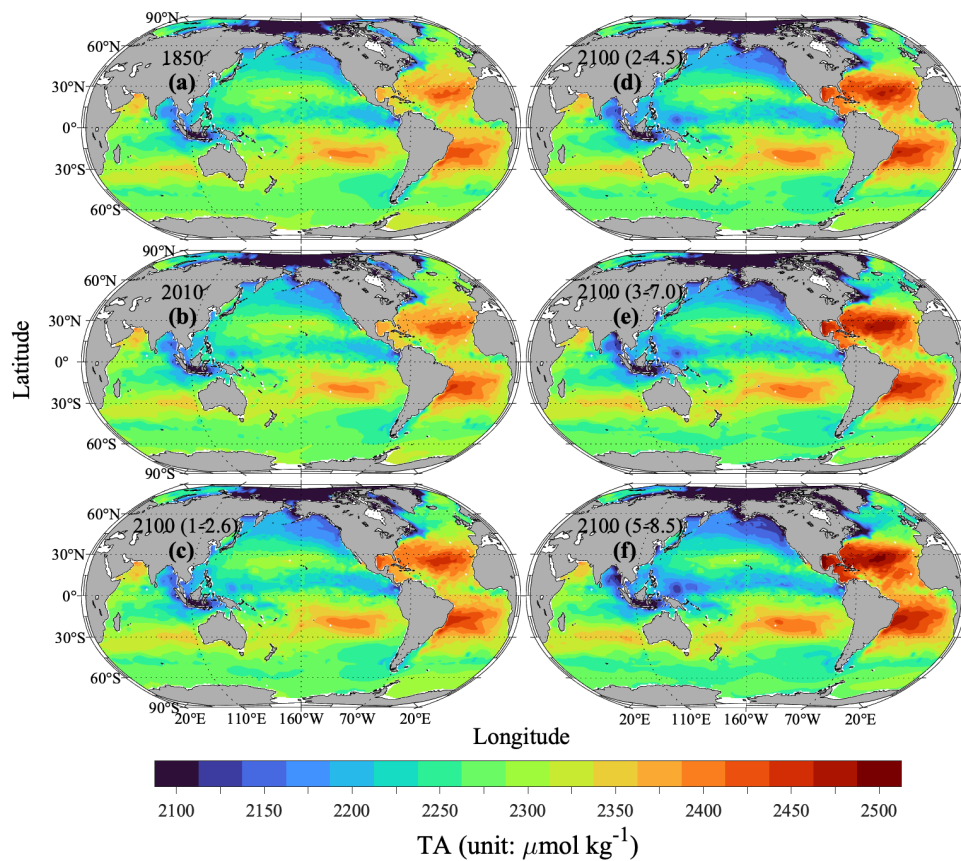


Figure S19. Surface ocean total alkalinity content (TA, inter-model median) in the decades around (a) 1850, (b) 2010, (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

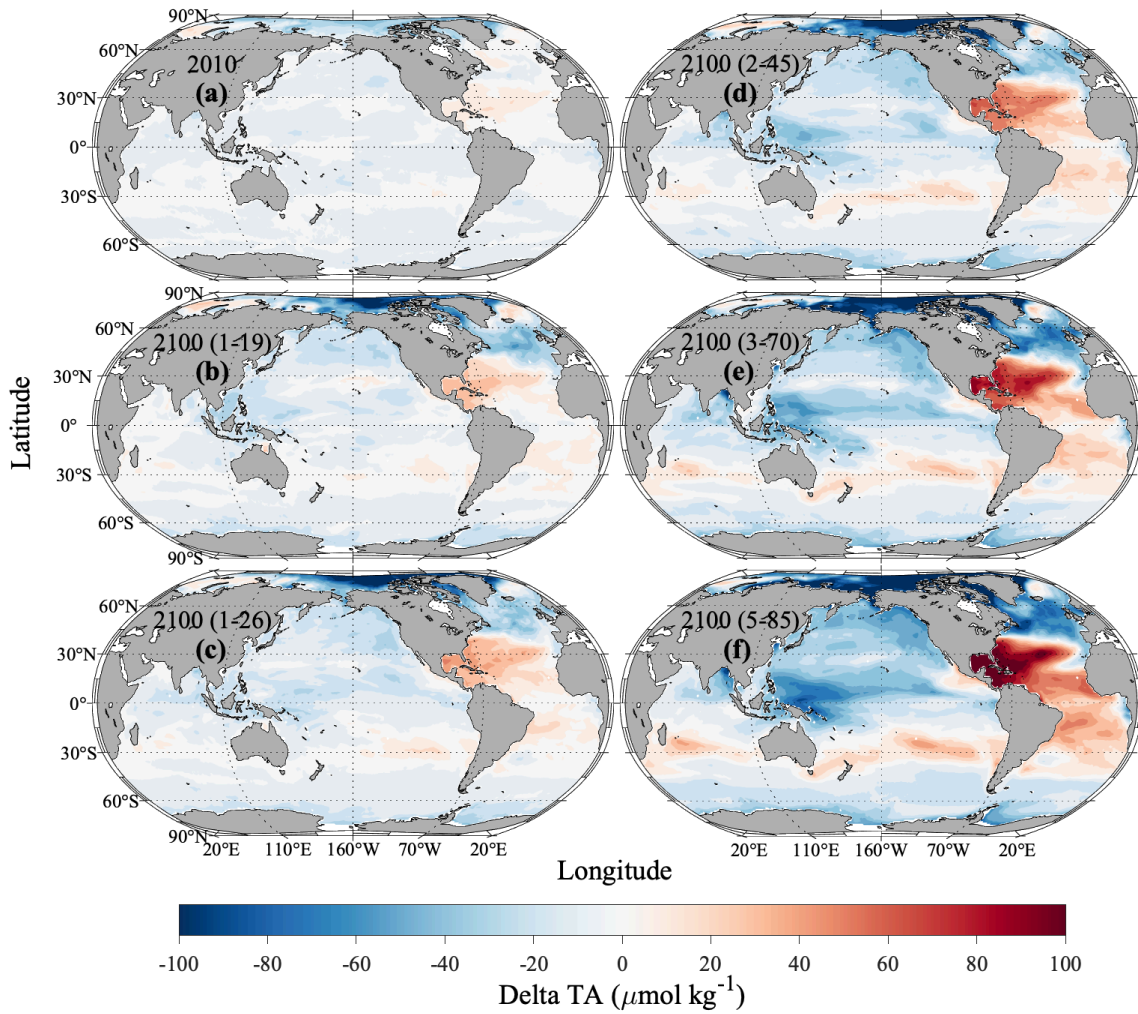


Figure S20. Delta surface ocean total alkalinity content (TA) relative to the 1850 level (inter-model median) in the decades around (a) 2010, (b) 2100 (SSP1-1.9), (c) 2100 (SSP1-2.6), (d) 2100 (SSP2-4.5), (e) 2100 (SSP3-7.0), and (f) 2100 (SSP5-8.5).

Table S1. List of data points that were removed from the grid during the quality control process. DIC is short for total dissolved inorganic carbon content and TA is short for total alkalinity content.

Longitude	Latitude	Temperature (°C)	Salinity (PSS78)	DIC ($\mu\text{mol kg}^{-1}$)	TA ($\mu\text{mol kg}^{-1}$)
278.5	0.5	26.517	33.18	1893.8	2201.9
279.5	0.5	26.67	32.992	1885.1	2191.7
277.5	1.5	26.68	33.137	1895.2	2196.8
278.5	1.5	26.75	32.953	1886.1	2187.3
279.5	1.5	26.81	32.739	1875.9	2175.7
280.5	1.5	26.854	32.557	1867.2	2165.9
163.5	2.5	30.246	34.039	1899.4	2236.9
164.5	2.5	30.312	34.018	1897.7	2235.4
271.5	2.5	26.805	33.211	1896.6	2194.5
272.5	2.5	26.97	33.136	1893.1	2189.8
273.5	2.5	27.037	33.1	1892.3	2188
274.5	2.5	27.011	33.141	1895.8	2191.4
278.5	2.5	27.061	33.184	1896.2	2202.1
279.5	2.5	27.049	32.872	1881.4	2184.2
280.5	2.5	27.06	32.631	1869.2	2170.4
162.5	3.5	29.885	33.971	1899.6	2232.6
163.5	3.5	29.951	33.948	1897.9	2231
266.5	3.5	27.238	33.291	1890	2197.9
267.5	3.5	27.2	33.263	1886.6	2196.3
268.5	3.5	27.07	33.344	1892.9	2202
269.5	3.5	26.95	33.38	1897.9	2205
270.5	3.5	26.919	33.314	1897.2	2201.1
271.5	3.5	27.005	33.182	1892.1	2193
272.5	3.5	27.086	33.042	1886.5	2184.5
273.5	3.5	27.119	32.935	1882.5	2178.5
274.5	3.5	27.122	32.963	1884.2	2181.2
275.5	3.5	27.162	33.228	1896	2198.9
280.5	3.5	27.276	33.106	1885.6	2198.5
281.5	3.5	27.293	32.685	1865.1	2173.4
282.5	3.5	27.321	32.286	1846.6	2150.7
161.5	4.5	29.598	33.879	1895.9	2226.9
162.5	4.5	29.675	33.808	1891.4	2222.2
163.5	4.5	29.81	33.792	1889.9	2221
164.5	4.5	29.968	33.859	1893.2	2225.1
264.5	4.5	27.88	33.186	1891.6	2191
265.5	4.5	27.881	33.103	1883.7	2186
266.5	4.5	27.817	33.054	1875.9	2182.6
267.5	4.5	27.909	33.093	1876.3	2185.3
268.5	4.5	27.992	33.186	1882.4	2191.7
269.5	4.5	27.916	33.173	1884.5	2191.6
270.5	4.5	27.713	32.975	1877.8	2180.3
271.5	4.5	27.571	32.673	1866.1	2163.1
272.5	4.5	27.509	32.379	1854.8	2147.3
273.5	4.5	27.451	32.272	1852.4	2143.8
274.5	4.5	27.391	32.584	1867.8	2164.4

275.5	4.5	27.365	33.276	1899	2206.7
279.5	4.5	27.397	33.415	1893.9	2213.9
280.5	4.5	27.416	33.102	1877.5	2194.8
281.5	4.5	27.501	32.688	1857.3	2170.8
282.5	4.5	27.591	32.218	1836.7	2145.3
308.5	4.5	27.762	32.969	1867.5	2186.8
160.5	5.5	29.416	33.871	1896	2226.3
161.5	5.5	29.35	33.774	1890.8	2220.1
162.5	5.5	29.324	33.703	1886.8	2215.4
163.5	5.5	29.413	33.676	1884.4	2213.6
164.5	5.5	29.656	33.729	1885.8	2216.8
165.5	5.5	29.693	33.949	1897.5	2230.9
251.5	5.5	28.61	33.42	1892	2199.9
252.5	5.5	28.785	33.175	1877.9	2183.9
253.5	5.5	28.271	33.225	1881.5	2187.4
254.5	5.5	27.699	33.35	1888.1	2196
255.5	5.5	27.538	33.395	1890.1	2199.3
256.5	5.5	27.606	33.392	1889.3	2199.4
257.5	5.5	27.695	33.365	1887.4	2198.1
258.5	5.5	27.715	33.302	1883.9	2194.5
259.5	5.5	27.685	33.205	1879.3	2188.8
260.5	5.5	27.667	33.132	1877.1	2184.6
261.5	5.5	27.626	33.186	1884.9	2188.8
262.5	5.5	27.641	33.264	1893.9	2194.6
263.5	5.5	27.83	33.277	1896.8	2196.3
264.5	5.5	28.128	33.201	1892.5	2192.2
265.5	5.5	28.086	33.059	1881	2183.3
266.5	5.5	28.049	32.955	1871.7	2176.6
267.5	5.5	28.251	32.983	1872.3	2178.8
268.5	5.5	28.45	33.083	1878.1	2185.9
269.5	5.5	28.475	33.059	1878.7	2185.3
270.5	5.5	28.433	32.825	1868.2	2171.3
271.5	5.5	28.409	32.473	1852.7	2151.3
272.5	5.5	28.348	32.137	1839.9	2134.3
273.5	5.5	28.174	31.892	1832.6	2124.3
274.5	5.5	27.919	31.966	1839.1	2132.2
275.5	5.5	27.651	32.407	1860.3	2158.4
276.5	5.5	27.475	32.307	1855.7	2149.8
277.5	5.5	27.421	32.315	1854.7	2148.2
278.5	5.5	27.421	32.686	1866.3	2169.5
279.5	5.5	27.45	32.941	1872.2	2184.8
280.5	5.5	27.568	32.906	1865.5	2181.9
281.5	5.5	27.775	32.427	1841.1	2154.4
307.5	5.5	27.872	30.321	1734.1	2046.7
308.5	5.5	28.247	31.426	1788.6	2106.9
309.5	5.5	28.244	33.559	1896	2224.2
160.5	6.5	29.574	33.87	1895.5	2225.9
161.5	6.5	29.471	33.795	1892.2	2221.1
162.5	6.5	29.364	33.744	1890	2217.8
163.5	6.5	29.309	33.742	1890	2217.6
164.5	6.5	29.413	33.826	1893.7	2222.9

247.5	6.5	28.107	33.688	1899	2216.7
248.5	6.5	28.13	33.548	1891.5	2207.9
249.5	6.5	27.862	33.634	1898.5	2214.1
250.5	6.5	27.874	33.543	1894.8	2208.9
251.5	6.5	28.364	33.251	1876.3	2190
252.5	6.5	28.696	32.966	1858	2171.3
253.5	6.5	28.273	32.961	1859.5	2171.2
254.5	6.5	27.721	33.039	1866.7	2176.6
255.5	6.5	27.411	33.103	1873.2	2181.2
256.5	6.5	27.276	33.153	1878.5	2185
257.5	6.5	27.204	33.181	1881.9	2187.4
258.5	6.5	27.167	33.16	1882.3	2186.7
259.5	6.5	27.213	33.109	1880.4	2183.8
260.5	6.5	27.377	33.038	1876.9	2179.6
261.5	6.5	27.553	33.017	1877.5	2178.5
262.5	6.5	27.661	33.122	1887.2	2185.8
263.5	6.5	27.892	33.236	1896.1	2193.7
265.5	6.5	28.149	33.322	1897.5	2200.3
271.5	6.5	28.141	33.18	1889.4	2193.8
272.5	6.5	28.326	32.975	1877.6	2180.7
273.5	6.5	28.427	32.894	1872.2	2176.6
274.5	6.5	28.435	32.896	1871.3	2178.4
275.5	6.5	28.434	32.808	1867.6	2175.1
276.5	6.5	28.431	32.18	1841.5	2140.1
277.5	6.5	28.362	31.755	1825.2	2118.3
278.5	6.5	28.108	31.788	1829.4	2123.3
279.5	6.5	27.806	31.998	1839.3	2136.9
280.5	6.5	27.794	31.979	1833.8	2136.4
281.5	6.5	28.072	31.419	1806.5	2107.3
282.5	6.5	28.271	30.863	1784	2081.4
306.5	6.5	27.058	33.155	1875.5	2201.4
307.5	6.5	27.909	32.231	1830.6	2151.1
308.5	6.5	28.51	32.929	1864.2	2188.6
160.5	7.5	30.073	33.978	1899.9	2232.3
161.5	7.5	30.024	33.928	1897.9	2229
162.5	7.5	29.917	33.889	1896.8	2226.5
163.5	7.5	29.738	33.882	1897.8	2226.2
237.5	7.5	28.294	33.799	1899.6	2222.6
248.5	7.5	28.361	33.588	1899.6	2211.7
252.5	7.5	27.997	33.386	1888	2200.7
253.5	7.5	27.716	33.286	1884.5	2194.2
254.5	7.5	27.385	33.253	1886.2	2192.3
255.5	7.5	27.221	33.317	1893.3	2197
273.5	7.5	28.001	33.021	1891.2	2185.9
274.5	7.5	28.308	32.838	1876.1	2175.5
275.5	7.5	28.539	32.473	1855.7	2154.9
276.5	7.5	28.715	31.95	1831.3	2126.6
277.5	7.5	28.651	31.666	1822.1	2114.8
278.5	7.5	28.24	31.377	1817.3	2104.7
280.5	7.5	27.753	30.885	1800.9	2083
281.5	7.5	28.226	30.31	1775.5	2060.1

171.5	8.5	28.196	33.581	1895.7	2206.9
172.5	8.5	28.354	33.331	1882.8	2190.5
173.5	8.5	28.533	33.172	1873.2	2180
174.5	8.5	28.73	33.08	1866.4	2173.8
175.5	8.5	28.969	33.075	1864.3	2173.1
176.5	8.5	29.141	33.152	1867	2177.9
177.5	8.5	29.142	33.346	1876.5	2190.6
178.5	8.5	29.111	33.678	1893.2	2212.3
222.5	8.5	27.848	33.783	1897.9	2222
223.5	8.5	27.758	33.578	1889.9	2209.8
224.5	8.5	27.595	33.44	1886.5	2201.6
225.5	8.5	27.41	33.37	1887.3	2197.6
226.5	8.5	27.246	33.354	1890.9	2196.6
227.5	8.5	27.14	33.372	1895.7	2197.6
231.5	8.5	27.73	33.401	1895	2197.7
232.5	8.5	28.007	33.342	1886	2193.9
233.5	8.5	28.207	33.32	1879.4	2192.7
234.5	8.5	28.166	33.511	1888	2204.7
235.5	8.5	27.94	33.555	1892.7	2207.5
236.5	8.5	27.945	33.334	1880.6	2193.4
237.5	8.5	28.08	33.331	1879.7	2193.2
238.5	8.5	28.245	33.443	1884.9	2200.4
239.5	8.5	28.246	33.663	1898.5	2214.9
242.5	8.5	27.933	33.402	1881.9	2198.5
243.5	8.5	27.901	33.047	1859.2	2175.4
244.5	8.5	27.875	32.82	1845.2	2160.7
245.5	8.5	27.854	32.812	1846.5	2160.5
246.5	8.5	27.801	32.929	1856.1	2168.4
247.5	8.5	27.943	33.061	1865.2	2177.3
248.5	8.5	28.078	33.134	1871.9	2182.3
249.5	8.5	27.993	33.28	1884.2	2192.2
250.5	8.5	27.779	33.1	1873.1	2181
251.5	8.5	27.796	32.965	1864.3	2172.5
252.5	8.5	27.966	32.908	1862.2	2169.1
253.5	8.5	27.901	32.943	1867.3	2171.9
254.5	8.5	27.708	33.019	1875.3	2177.4
255.5	8.5	27.578	33.122	1883.9	2184.7
256.5	8.5	27.603	33.315	1896.2	2197.9
274.5	8.5	28.522	32.901	1882.7	2181.7
275.5	8.5	28.699	32.436	1858.3	2155.1
280.5	8.5	27.572	31.458	1830.5	2118.5
300.5	8.5	27.132	32.793	1893.1	2192.8
307.5	8.5	27.74	33.421	1883.2	2217.4
172.5	9.5	28.498	33.53	1894.8	2203.1
173.5	9.5	28.7	33.288	1881.1	2187.1
174.5	9.5	28.953	33.117	1870.3	2175.7
175.5	9.5	29.247	33.026	1863.2	2169.4
176.5	9.5	29.545	33.032	1861.1	2169.5
177.5	9.5	29.808	33.152	1864.9	2177.2
178.5	9.5	30.045	33.374	1874	2191.5
179.5	9.5	30.232	33.637	1885.7	2208.7

180.5	9.5	30.181	33.892	1898.4	2225.3
190.5	9.5	28.164	33.859	1899.7	2223
206.5	9.5	28.381	33.777	1898.4	2220.6
222.5	9.5	27.812	33.715	1893.6	2218
223.5	9.5	27.981	33.385	1875.9	2197.9
224.5	9.5	28.021	33.181	1866.7	2185.6
225.5	9.5	27.969	33.103	1865.7	2180.9
226.5	9.5	27.856	33.093	1869.5	2180.5
227.5	9.5	27.724	33.107	1874.2	2181.5
228.5	9.5	27.651	33.139	1878.1	2183.4
229.5	9.5	27.712	33.167	1879.6	2184.7
230.5	9.5	27.895	33.137	1875.5	2182.6
231.5	9.5	28.117	33.05	1868.2	2177.1
232.5	9.5	28.364	32.937	1859.5	2169.8
233.5	9.5	28.545	32.718	1842.6	2156.1
234.5	9.5	28.579	32.772	1843.2	2159.1
235.5	9.5	28.022	33.223	1875.1	2187.3
236.5	9.5	28.028	33.217	1878.4	2186.5
237.5	9.5	28.268	33.305	1886.9	2191.9
238.5	9.5	28.413	33.43	1894.2	2200
242.5	9.5	28.198	33.397	1885.1	2198.9
243.5	9.5	28.234	33.247	1876.1	2189.3
244.5	9.5	28.253	33.183	1873.3	2185.3
245.5	9.5	28.253	33.196	1875.7	2186.5
246.5	9.5	28.255	33.224	1878.4	2188.5
247.5	9.5	28.309	33.173	1875.1	2185.4
248.5	9.5	28.298	33.145	1874.2	2183.7
249.5	9.5	28.271	33.148	1876	2184
250.5	9.5	28.193	32.916	1862.3	2169.1
251.5	9.5	28.339	32.775	1854.7	2160.4
252.5	9.5	28.577	32.707	1852	2156.5
253.5	9.5	28.548	32.731	1856.9	2158.6
254.5	9.5	28.085	32.858	1870.8	2167.4
255.5	9.5	27.571	32.991	1885.2	2176.7
256.5	9.5	27.202	33.138	1899	2186.8
273.5	9.5	27.862	32.979	1899.5	2187.4
274.5	9.5	28.613	32.645	1864.4	2167.6
275.5	9.5	28.839	32.962	1875.6	2189.8
299.5	9.5	27.401	31.634	1844.7	2134.4
306.5	9.5	27.546	33.326	1879.9	2211.5
307.5	9.5	27.641	30.552	1748.8	2056
308.5	9.5	27.632	30.99	1775.9	2078.8
309.5	9.5	27.776	32.415	1843.9	2156.7
175.5	10.5	29.053	33.661	1899.2	2211
176.5	10.5	29.416	33.576	1892.1	2205.2
177.5	10.5	29.8	33.565	1888.5	2204.3
178.5	10.5	30.167	33.626	1888.5	2208
179.5	10.5	30.447	33.739	1891.7	2215.2
180.5	10.5	30.497	33.891	1898.5	2225.1
190.5	10.5	28.167	33.838	1899.6	2222.2
224.5	10.5	27.768	33.641	1897.8	2212.9

225.5	10.5	27.985	33.462	1891.4	2201.6
226.5	10.5	28.088	33.367	1889.1	2195.8
227.5	10.5	28.134	33.271	1883.7	2190.3
228.5	10.5	28.184	33.196	1876.4	2185.9
229.5	10.5	28.273	33.167	1872.1	2184.2
230.5	10.5	28.383	33.159	1870.2	2183.6
231.5	10.5	28.473	33.108	1866.8	2180.4
232.5	10.5	28.557	32.891	1852.6	2167
233.5	10.5	28.598	32.682	1837.7	2154.1
234.5	10.5	28.506	32.908	1850.9	2167.7
235.5	10.5	27.947	33.26	1877.4	2190
236.5	10.5	28.209	33.271	1880.1	2190.3
237.5	10.5	28.43	33.361	1890.7	2195.9
238.5	10.5	28.067	33.369	1897.7	2197.2
241.5	10.5	27.418	33.395	1891.4	2200
242.5	10.5	27.484	33.316	1885.2	2195
243.5	10.5	27.612	33.335	1886	2196.4
244.5	10.5	27.77	33.392	1889.8	2200.3
245.5	10.5	27.965	33.44	1892.9	2203.6
246.5	10.5	28.215	33.427	1891.7	2202.9
247.5	10.5	28.481	33.31	1882.3	2195.5
248.5	10.5	28.525	33.331	1883.4	2196.9
249.5	10.5	28.649	33.275	1881.9	2193.3
250.5	10.5	28.463	33.107	1874	2182.5
251.5	10.5	28.368	33.097	1875.3	2182.2
252.5	10.5	28.45	33.177	1880.8	2188
253.5	10.5	28.513	33.264	1887.2	2194.1
254.5	10.5	28.212	33.327	1895.2	2198.7
273.5	10.5	28.332	33.191	1897.6	2201.3
294.5	10.5	27.94	30.969	1823.5	2099.3
295.5	10.5	27.784	29.867	1782.2	2041.2
297.5	10.5	27.509	28.667	1739.4	1979.5
298.5	10.5	27.499	29.257	1760.4	2012
299.5	10.5	27.433	32.017	1862.4	2155.1
306.5	10.5	27.536	32.656	1864.7	2172.9
307.5	10.5	27.697	30.992	1788	2078.9
308.5	10.5	27.639	30.933	1784.4	2074.7
309.5	10.5	27.455	32.462	1850.6	2159.5
226.5	11.5	28.389	33.396	1890.8	2196
227.5	11.5	28.595	33.272	1882.1	2188.7
228.5	11.5	28.703	33.2	1875.5	2184.6
229.5	11.5	28.766	33.136	1869.9	2181.1
230.5	11.5	28.81	33.069	1864.9	2177.3
231.5	11.5	28.806	32.975	1858.6	2171.8
232.5	11.5	28.713	32.843	1850	2164
233.5	11.5	28.48	32.888	1853.6	2167.2
234.5	11.5	28.006	33.349	1885.5	2195.9
236.5	11.5	27.726	33.456	1894.2	2203.2
237.5	11.5	27.735	33.468	1897.7	2204.3
241.5	11.5	27.177	33.375	1895.9	2199.6
242.5	11.5	27.17	33.367	1894.8	2199.3

243.5	11.5	27.273	33.445	1898	2204.6
246.5	11.5	27.987	33.557	1899.5	2212.3
247.5	11.5	28.241	33.445	1890	2205
248.5	11.5	28.269	33.477	1892.7	2207.2
249.5	11.5	28.446	33.39	1887.8	2201.5
250.5	11.5	28.589	33.309	1882.8	2196.4
251.5	11.5	28.546	33.407	1890.9	2203.3
252.5	11.5	28.586	33.516	1898.6	2210.9
256.5	11.5	28.261	33.442	1897.5	2207.4
257.5	11.5	28.083	33.38	1894.7	2203.7
258.5	11.5	28.13	33.389	1895.7	2204.7
295.5	11.5	27.875	32.711	1887.2	2185.9
296.5	11.5	27.654	32.459	1877.6	2171.2
305.5	11.5	27.61	32.461	1854.8	2162.7
306.5	11.5	27.67	32.502	1859.1	2164.3
307.5	11.5	27.616	33.315	1895.2	2208.9
225.5	12.5	28.075	33.525	1892.7	2204.3
226.5	12.5	28.535	33.285	1879.1	2189.2
227.5	12.5	28.706	33.263	1877	2187.7
228.5	12.5	28.628	33.302	1879.3	2190.6
229.5	12.5	28.423	33.218	1876.1	2186.7
230.5	12.5	28.209	33.11	1871.6	2181.3
231.5	12.5	27.875	33.135	1874.9	2183.8
232.5	12.5	27.486	33.268	1884.7	2192.8
242.5	12.5	27.194	33.378	1897.3	2200.9
247.5	12.5	28.08	33.498	1894.8	2209.1
248.5	12.5	28.139	33.445	1893.2	2205.7
249.5	12.5	28.411	33.375	1888.5	2201.1
250.5	12.5	28.838	33.354	1884.9	2199.8
251.5	12.5	28.985	33.422	1888.7	2204.6
252.5	12.5	28.9	33.493	1893.7	2209.8
253.5	12.5	28.829	33.532	1896.3	2212.7
254.5	12.5	28.764	33.571	1899.1	2215.7
257.5	12.5	28.717	33.553	1899.1	2215.9
258.5	12.5	28.738	33.406	1891.4	2206.7
259.5	12.5	28.836	33.35	1890	2203.4
304.5	12.5	27.536	32.545	1851.1	2168
305.5	12.5	27.49	32.512	1851.7	2165.7
306.5	12.5	27.347	33.562	1899.6	2223.8
226.5	13.5	28.19	33.597	1894.5	2208.3
227.5	13.5	28.25	33.675	1900	2213.1
242.5	13.5	27.43	33.312	1890.2	2197.1
243.5	13.5	27.568	33.347	1892.1	2199.3
249.5	13.5	28.714	33.464	1890	2207.6
250.5	13.5	29.097	33.395	1883.6	2202.9
251.5	13.5	29.259	33.415	1886	2204.6
252.5	13.5	29.024	33.464	1891.3	2208.4
253.5	13.5	28.797	33.528	1896.6	2213.2
258.5	13.5	29.217	33.53	1898.5	2215.5
259.5	13.5	29.444	33.378	1892.2	2205.7
260.5	13.5	29.49	33.383	1895.7	2206.4

267.5	13.5	29.59	33.372	1891.7	2210.3
268.5	13.5	29.848	33.506	1894.2	2219.8
295.5	13.5	28.644	33.062	1894.2	2202.7
249.5	14.5	28.473	33.595	1896.5	2217.5
250.5	14.5	28.74	33.564	1893.3	2215.5
260.5	14.5	29.253	33.38	1893	2207.2
261.5	14.5	29.201	33.509	1897.9	2216.6
259.5	15.5	29.971	33.298	1885.3	2202.1
260.5	15.5	29.731	33.158	1875.3	2193.5
261.5	15.5	29.242	33.305	1885.4	2203.5
262.5	15.5	28.975	33.452	1896.9	2214.1
253.5	16.5	28.768	33.409	1889.8	2207.4
254.5	16.5	28.512	33.461	1892.8	2211.7
259.5	16.5	29.464	33.33	1885.6	2206.3
260.5	16.5	29.692	32.833	1852.8	2173.8

Table S2. List of data points that were replaced from the grid during the quality control process. The values in this table are their original values. Their corresponding new values can be looked up from the final data product as listed in the paper. DIC is short for total dissolved inorganic carbon content and TA is short for total alkalinity content.

Longitude	Latitude	Temperature (°C)	Salinity (PSS78)	DIC ($\mu\text{mol kg}^{-1}$)	TA ($\mu\text{mol kg}^{-1}$)
278.5	0.5	26.517	33.18	1893.8	2201.9
279.5	0.5	26.67	32.992	1885.1	2191.7
277.5	1.5	26.68	33.137	1895.2	2196.8
278.5	1.5	26.75	32.953	1886.1	2187.3
279.5	1.5	26.81	32.739	1875.9	2175.7
280.5	1.5	26.854	32.557	1867.2	2165.9
163.5	2.5	30.246	34.039	1899.4	2236.9
164.5	2.5	30.312	34.018	1897.7	2235.4
271.5	2.5	26.805	33.211	1896.6	2194.5
272.5	2.5	26.97	33.136	1893.1	2189.8
273.5	2.5	27.037	33.1	1892.3	2188
274.5	2.5	27.011	33.141	1895.8	2191.4
278.5	2.5	27.061	33.184	1896.2	2202.1
279.5	2.5	27.049	32.872	1881.4	2184.2
280.5	2.5	27.06	32.631	1869.2	2170.4
162.5	3.5	29.885	33.971	1899.6	2232.6
163.5	3.5	29.951	33.948	1897.9	2231
266.5	3.5	27.238	33.291	1890	2197.9
267.5	3.5	27.2	33.263	1886.6	2196.3
268.5	3.5	27.07	33.344	1892.9	2202
269.5	3.5	26.95	33.38	1897.9	2205
270.5	3.5	26.919	33.314	1897.2	2201.1
271.5	3.5	27.005	33.182	1892.1	2193
272.5	3.5	27.086	33.042	1886.5	2184.5
273.5	3.5	27.119	32.935	1882.5	2178.5
274.5	3.5	27.122	32.963	1884.2	2181.2
275.5	3.5	27.162	33.228	1896	2198.9
280.5	3.5	27.276	33.106	1885.6	2198.5
281.5	3.5	27.293	32.685	1865.1	2173.4
282.5	3.5	27.321	32.286	1846.6	2150.7
161.5	4.5	29.598	33.879	1895.9	2226.9
162.5	4.5	29.675	33.808	1891.4	2222.2
163.5	4.5	29.81	33.792	1889.9	2221

164.5	4.5	29.968	33.859	1893.2	2225.1
264.5	4.5	27.88	33.186	1891.6	2191
265.5	4.5	27.881	33.103	1883.7	2186
266.5	4.5	27.817	33.054	1875.9	2182.6
267.5	4.5	27.909	33.093	1876.3	2185.3
268.5	4.5	27.992	33.186	1882.4	2191.7
269.5	4.5	27.916	33.173	1884.5	2191.6
270.5	4.5	27.713	32.975	1877.8	2180.3
271.5	4.5	27.571	32.673	1866.1	2163.1
272.5	4.5	27.509	32.379	1854.8	2147.3
273.5	4.5	27.451	32.272	1852.4	2143.8
274.5	4.5	27.391	32.584	1867.8	2164.4
275.5	4.5	27.365	33.276	1899	2206.7
279.5	4.5	27.397	33.415	1893.9	2213.9
280.5	4.5	27.416	33.102	1877.5	2194.8
281.5	4.5	27.501	32.688	1857.3	2170.8
282.5	4.5	27.591	32.218	1836.7	2145.3
308.5	4.5	27.762	32.969	1867.5	2186.8
160.5	5.5	29.416	33.871	1896	2226.3
161.5	5.5	29.35	33.774	1890.8	2220.1
162.5	5.5	29.324	33.703	1886.8	2215.4
163.5	5.5	29.413	33.676	1884.4	2213.6
164.5	5.5	29.656	33.729	1885.8	2216.8
165.5	5.5	29.693	33.949	1897.5	2230.9
251.5	5.5	28.61	33.42	1892	2199.9
252.5	5.5	28.785	33.175	1877.9	2183.9
253.5	5.5	28.271	33.225	1881.5	2187.4
254.5	5.5	27.699	33.35	1888.1	2196
255.5	5.5	27.538	33.395	1890.1	2199.3
256.5	5.5	27.606	33.392	1889.3	2199.4
257.5	5.5	27.695	33.365	1887.4	2198.1
258.5	5.5	27.715	33.302	1883.9	2194.5
259.5	5.5	27.685	33.205	1879.3	2188.8
260.5	5.5	27.667	33.132	1877.1	2184.6
261.5	5.5	27.626	33.186	1884.9	2188.8
262.5	5.5	27.641	33.264	1893.9	2194.6
263.5	5.5	27.83	33.277	1896.8	2196.3
264.5	5.5	28.128	33.201	1892.5	2192.2
265.5	5.5	28.086	33.059	1881	2183.3

266.5	5.5	28.049	32.955	1871.7	2176.6
267.5	5.5	28.251	32.983	1872.3	2178.8
268.5	5.5	28.45	33.083	1878.1	2185.9
269.5	5.5	28.475	33.059	1878.7	2185.3
270.5	5.5	28.433	32.825	1868.2	2171.3
271.5	5.5	28.409	32.473	1852.7	2151.3
272.5	5.5	28.348	32.137	1839.9	2134.3
273.5	5.5	28.174	31.892	1832.6	2124.3
274.5	5.5	27.919	31.966	1839.1	2132.2
275.5	5.5	27.651	32.407	1860.3	2158.4
276.5	5.5	27.475	32.307	1855.7	2149.8
277.5	5.5	27.421	32.315	1854.7	2148.2
278.5	5.5	27.421	32.686	1866.3	2169.5
279.5	5.5	27.45	32.941	1872.2	2184.8
280.5	5.5	27.568	32.906	1865.5	2181.9
281.5	5.5	27.775	32.427	1841.1	2154.4
307.5	5.5	27.872	30.321	1734.1	2046.7
308.5	5.5	28.247	31.426	1788.6	2106.9
309.5	5.5	28.244	33.559	1896	2224.2
160.5	6.5	29.574	33.87	1895.5	2225.9
161.5	6.5	29.471	33.795	1892.2	2221.1
162.5	6.5	29.364	33.744	1890	2217.8
163.5	6.5	29.309	33.742	1890	2217.6
164.5	6.5	29.413	33.826	1893.7	2222.9
247.5	6.5	28.107	33.688	1899	2216.7
248.5	6.5	28.13	33.548	1891.5	2207.9
249.5	6.5	27.862	33.634	1898.5	2214.1
250.5	6.5	27.874	33.543	1894.8	2208.9
251.5	6.5	28.364	33.251	1876.3	2190
252.5	6.5	28.696	32.966	1858	2171.3
253.5	6.5	28.273	32.961	1859.5	2171.2
254.5	6.5	27.721	33.039	1866.7	2176.6
255.5	6.5	27.411	33.103	1873.2	2181.2
256.5	6.5	27.276	33.153	1878.5	2185
257.5	6.5	27.204	33.181	1881.9	2187.4
258.5	6.5	27.167	33.16	1882.3	2186.7
259.5	6.5	27.213	33.109	1880.4	2183.8
260.5	6.5	27.377	33.038	1876.9	2179.6
261.5	6.5	27.553	33.017	1877.5	2178.5

262.5	6.5	27.661	33.122	1887.2	2185.8
263.5	6.5	27.892	33.236	1896.1	2193.7
265.5	6.5	28.149	33.322	1897.5	2200.3
271.5	6.5	28.141	33.18	1889.4	2193.8
272.5	6.5	28.326	32.975	1877.6	2180.7
273.5	6.5	28.427	32.894	1872.2	2176.6
274.5	6.5	28.435	32.896	1871.3	2178.4
275.5	6.5	28.434	32.808	1867.6	2175.1
276.5	6.5	28.431	32.18	1841.5	2140.1
277.5	6.5	28.362	31.755	1825.2	2118.3
278.5	6.5	28.108	31.788	1829.4	2123.3
279.5	6.5	27.806	31.998	1839.3	2136.9
280.5	6.5	27.794	31.979	1833.8	2136.4
281.5	6.5	28.072	31.419	1806.5	2107.3
282.5	6.5	28.271	30.863	1784	2081.4
306.5	6.5	27.058	33.155	1875.5	2201.4
307.5	6.5	27.909	32.231	1830.6	2151.1
308.5	6.5	28.51	32.929	1864.2	2188.6
160.5	7.5	30.073	33.978	1899.9	2232.3
161.5	7.5	30.024	33.928	1897.9	2229
162.5	7.5	29.917	33.889	1896.8	2226.5
163.5	7.5	29.738	33.882	1897.8	2226.2
237.5	7.5	28.294	33.799	1899.6	2222.6
248.5	7.5	28.361	33.588	1899.6	2211.7
252.5	7.5	27.997	33.386	1888	2200.7
253.5	7.5	27.716	33.286	1884.5	2194.2
254.5	7.5	27.385	33.253	1886.2	2192.3
255.5	7.5	27.221	33.317	1893.3	2197
273.5	7.5	28.001	33.021	1891.2	2185.9
274.5	7.5	28.308	32.838	1876.1	2175.5
275.5	7.5	28.539	32.473	1855.7	2154.9
276.5	7.5	28.715	31.95	1831.3	2126.6
277.5	7.5	28.651	31.666	1822.1	2114.8
278.5	7.5	28.24	31.377	1817.3	2104.7
280.5	7.5	27.753	30.885	1800.9	2083
281.5	7.5	28.226	30.31	1775.5	2060.1
171.5	8.5	28.196	33.581	1895.7	2206.9
172.5	8.5	28.354	33.331	1882.8	2190.5
173.5	8.5	28.533	33.172	1873.2	2180

174.5	8.5	28.73	33.08	1866.4	2173.8
175.5	8.5	28.969	33.075	1864.3	2173.1
176.5	8.5	29.141	33.152	1867	2177.9
177.5	8.5	29.142	33.346	1876.5	2190.6
178.5	8.5	29.111	33.678	1893.2	2212.3
222.5	8.5	27.848	33.783	1897.9	2222
223.5	8.5	27.758	33.578	1889.9	2209.8
224.5	8.5	27.595	33.44	1886.5	2201.6
225.5	8.5	27.41	33.37	1887.3	2197.6
226.5	8.5	27.246	33.354	1890.9	2196.6
227.5	8.5	27.14	33.372	1895.7	2197.6
231.5	8.5	27.73	33.401	1895	2197.7
232.5	8.5	28.007	33.342	1886	2193.9
233.5	8.5	28.207	33.32	1879.4	2192.7
234.5	8.5	28.166	33.511	1888	2204.7
235.5	8.5	27.94	33.555	1892.7	2207.5
236.5	8.5	27.945	33.334	1880.6	2193.4
237.5	8.5	28.08	33.331	1879.7	2193.2
238.5	8.5	28.245	33.443	1884.9	2200.4
239.5	8.5	28.246	33.663	1898.5	2214.9
242.5	8.5	27.933	33.402	1881.9	2198.5
243.5	8.5	27.901	33.047	1859.2	2175.4
244.5	8.5	27.875	32.82	1845.2	2160.7
245.5	8.5	27.854	32.812	1846.5	2160.5
246.5	8.5	27.801	32.929	1856.1	2168.4
247.5	8.5	27.943	33.061	1865.2	2177.3
248.5	8.5	28.078	33.134	1871.9	2182.3
249.5	8.5	27.993	33.28	1884.2	2192.2
250.5	8.5	27.779	33.1	1873.1	2181
251.5	8.5	27.796	32.965	1864.3	2172.5
252.5	8.5	27.966	32.908	1862.2	2169.1
253.5	8.5	27.901	32.943	1867.3	2171.9
254.5	8.5	27.708	33.019	1875.3	2177.4
255.5	8.5	27.578	33.122	1883.9	2184.7
256.5	8.5	27.603	33.315	1896.2	2197.9
274.5	8.5	28.522	32.901	1882.7	2181.7
275.5	8.5	28.699	32.436	1858.3	2155.1
280.5	8.5	27.572	31.458	1830.5	2118.5
300.5	8.5	27.132	32.793	1893.1	2192.8

307.5	8.5	27.74	33.421	1883.2	2217.4
172.5	9.5	28.498	33.53	1894.8	2203.1
173.5	9.5	28.7	33.288	1881.1	2187.1
174.5	9.5	28.953	33.117	1870.3	2175.7
175.5	9.5	29.247	33.026	1863.2	2169.4
176.5	9.5	29.545	33.032	1861.1	2169.5
177.5	9.5	29.808	33.152	1864.9	2177.2
178.5	9.5	30.045	33.374	1874	2191.5
179.5	9.5	30.232	33.637	1885.7	2208.7
180.5	9.5	30.181	33.892	1898.4	2225.3
190.5	9.5	28.164	33.859	1899.7	2223
206.5	9.5	28.381	33.777	1898.4	2220.6
222.5	9.5	27.812	33.715	1893.6	2218
223.5	9.5	27.981	33.385	1875.9	2197.9
224.5	9.5	28.021	33.181	1866.7	2185.6
225.5	9.5	27.969	33.103	1865.7	2180.9
226.5	9.5	27.856	33.093	1869.5	2180.5
227.5	9.5	27.724	33.107	1874.2	2181.5
228.5	9.5	27.651	33.139	1878.1	2183.4
229.5	9.5	27.712	33.167	1879.6	2184.7
230.5	9.5	27.895	33.137	1875.5	2182.6
231.5	9.5	28.117	33.05	1868.2	2177.1
232.5	9.5	28.364	32.937	1859.5	2169.8
233.5	9.5	28.545	32.718	1842.6	2156.1
234.5	9.5	28.579	32.772	1843.2	2159.1
235.5	9.5	28.022	33.223	1875.1	2187.3
236.5	9.5	28.028	33.217	1878.4	2186.5
237.5	9.5	28.268	33.305	1886.9	2191.9
238.5	9.5	28.413	33.43	1894.2	2200
242.5	9.5	28.198	33.397	1885.1	2198.9
243.5	9.5	28.234	33.247	1876.1	2189.3
244.5	9.5	28.253	33.183	1873.3	2185.3
245.5	9.5	28.253	33.196	1875.7	2186.5
246.5	9.5	28.255	33.224	1878.4	2188.5
247.5	9.5	28.309	33.173	1875.1	2185.4
248.5	9.5	28.298	33.145	1874.2	2183.7
249.5	9.5	28.271	33.148	1876	2184
250.5	9.5	28.193	32.916	1862.3	2169.1
251.5	9.5	28.339	32.775	1854.7	2160.4

252.5	9.5	28.577	32.707	1852	2156.5
253.5	9.5	28.548	32.731	1856.9	2158.6
254.5	9.5	28.085	32.858	1870.8	2167.4
255.5	9.5	27.571	32.991	1885.2	2176.7
256.5	9.5	27.202	33.138	1899	2186.8
273.5	9.5	27.862	32.979	1899.5	2187.4
274.5	9.5	28.613	32.645	1864.4	2167.6
275.5	9.5	28.839	32.962	1875.6	2189.8
299.5	9.5	27.401	31.634	1844.7	2134.4
306.5	9.5	27.546	33.326	1879.9	2211.5
307.5	9.5	27.641	30.552	1748.8	2056
308.5	9.5	27.632	30.99	1775.9	2078.8
309.5	9.5	27.776	32.415	1843.9	2156.7
175.5	10.5	29.053	33.661	1899.2	2211
176.5	10.5	29.416	33.576	1892.1	2205.2
177.5	10.5	29.8	33.565	1888.5	2204.3
178.5	10.5	30.167	33.626	1888.5	2208
179.5	10.5	30.447	33.739	1891.7	2215.2
180.5	10.5	30.497	33.891	1898.5	2225.1
190.5	10.5	28.167	33.838	1899.6	2222.2
224.5	10.5	27.768	33.641	1897.8	2212.9
225.5	10.5	27.985	33.462	1891.4	2201.6
226.5	10.5	28.088	33.367	1889.1	2195.8
227.5	10.5	28.134	33.271	1883.7	2190.3
228.5	10.5	28.184	33.196	1876.4	2185.9
229.5	10.5	28.273	33.167	1872.1	2184.2
230.5	10.5	28.383	33.159	1870.2	2183.6
231.5	10.5	28.473	33.108	1866.8	2180.4
232.5	10.5	28.557	32.891	1852.6	2167
233.5	10.5	28.598	32.682	1837.7	2154.1
234.5	10.5	28.506	32.908	1850.9	2167.7
235.5	10.5	27.947	33.26	1877.4	2190
236.5	10.5	28.209	33.271	1880.1	2190.3
237.5	10.5	28.43	33.361	1890.7	2195.9
238.5	10.5	28.067	33.369	1897.7	2197.2
241.5	10.5	27.418	33.395	1891.4	2200
242.5	10.5	27.484	33.316	1885.2	2195
243.5	10.5	27.612	33.335	1886	2196.4
244.5	10.5	27.77	33.392	1889.8	2200.3

245.5	10.5	27.965	33.44	1892.9	2203.6
246.5	10.5	28.215	33.427	1891.7	2202.9
247.5	10.5	28.481	33.31	1882.3	2195.5
248.5	10.5	28.525	33.331	1883.4	2196.9
249.5	10.5	28.649	33.275	1881.9	2193.3
250.5	10.5	28.463	33.107	1874	2182.5
251.5	10.5	28.368	33.097	1875.3	2182.2
252.5	10.5	28.45	33.177	1880.8	2188
253.5	10.5	28.513	33.264	1887.2	2194.1
254.5	10.5	28.212	33.327	1895.2	2198.7
273.5	10.5	28.332	33.191	1897.6	2201.3
294.5	10.5	27.94	30.969	1823.5	2099.3
295.5	10.5	27.784	29.867	1782.2	2041.2
297.5	10.5	27.509	28.667	1739.4	1979.5
298.5	10.5	27.499	29.257	1760.4	2012
299.5	10.5	27.433	32.017	1862.4	2155.1
306.5	10.5	27.536	32.656	1864.7	2172.9
307.5	10.5	27.697	30.992	1788	2078.9
308.5	10.5	27.639	30.933	1784.4	2074.7
309.5	10.5	27.455	32.462	1850.6	2159.5
226.5	11.5	28.389	33.396	1890.8	2196
227.5	11.5	28.595	33.272	1882.1	2188.7
228.5	11.5	28.703	33.2	1875.5	2184.6
229.5	11.5	28.766	33.136	1869.9	2181.1
230.5	11.5	28.81	33.069	1864.9	2177.3
231.5	11.5	28.806	32.975	1858.6	2171.8
232.5	11.5	28.713	32.843	1850	2164
233.5	11.5	28.48	32.888	1853.6	2167.2
234.5	11.5	28.006	33.349	1885.5	2195.9
236.5	11.5	27.726	33.456	1894.2	2203.2
237.5	11.5	27.735	33.468	1897.7	2204.3
241.5	11.5	27.177	33.375	1895.9	2199.6
242.5	11.5	27.17	33.367	1894.8	2199.3
243.5	11.5	27.273	33.445	1898	2204.6
246.5	11.5	27.987	33.557	1899.5	2212.3
247.5	11.5	28.241	33.445	1890	2205
248.5	11.5	28.269	33.477	1892.7	2207.2
249.5	11.5	28.446	33.39	1887.8	2201.5
250.5	11.5	28.589	33.309	1882.8	2196.4

251.5	11.5	28.546	33.407	1890.9	2203.3
252.5	11.5	28.586	33.516	1898.6	2210.9
256.5	11.5	28.261	33.442	1897.5	2207.4
257.5	11.5	28.083	33.38	1894.7	2203.7
258.5	11.5	28.13	33.389	1895.7	2204.7
295.5	11.5	27.875	32.711	1887.2	2185.9
296.5	11.5	27.654	32.459	1877.6	2171.2
305.5	11.5	27.61	32.461	1854.8	2162.7
306.5	11.5	27.67	32.502	1859.1	2164.3
307.5	11.5	27.616	33.315	1895.2	2208.9
225.5	12.5	28.075	33.525	1892.7	2204.3
226.5	12.5	28.535	33.285	1879.1	2189.2
227.5	12.5	28.706	33.263	1877	2187.7
228.5	12.5	28.628	33.302	1879.3	2190.6
229.5	12.5	28.423	33.218	1876.1	2186.7
230.5	12.5	28.209	33.11	1871.6	2181.3
231.5	12.5	27.875	33.135	1874.9	2183.8
232.5	12.5	27.486	33.268	1884.7	2192.8
242.5	12.5	27.194	33.378	1897.3	2200.9
247.5	12.5	28.08	33.498	1894.8	2209.1
248.5	12.5	28.139	33.445	1893.2	2205.7
249.5	12.5	28.411	33.375	1888.5	2201.1
250.5	12.5	28.838	33.354	1884.9	2199.8
251.5	12.5	28.985	33.422	1888.7	2204.6
252.5	12.5	28.9	33.493	1893.7	2209.8
253.5	12.5	28.829	33.532	1896.3	2212.7
254.5	12.5	28.764	33.571	1899.1	2215.7
257.5	12.5	28.717	33.553	1899.1	2215.9
258.5	12.5	28.738	33.406	1891.4	2206.7
259.5	12.5	28.836	33.35	1890	2203.4
304.5	12.5	27.536	32.545	1851.1	2168
305.5	12.5	27.49	32.512	1851.7	2165.7
306.5	12.5	27.347	33.562	1899.6	2223.8
226.5	13.5	28.19	33.597	1894.5	2208.3
227.5	13.5	28.25	33.675	1900	2213.1
242.5	13.5	27.43	33.312	1890.2	2197.1
243.5	13.5	27.568	33.347	1892.1	2199.3
249.5	13.5	28.714	33.464	1890	2207.6
250.5	13.5	29.097	33.395	1883.6	2202.9

251.5	13.5	29.259	33.415	1886	2204.6
252.5	13.5	29.024	33.464	1891.3	2208.4
253.5	13.5	28.797	33.528	1896.6	2213.2
258.5	13.5	29.217	33.53	1898.5	2215.5
259.5	13.5	29.444	33.378	1892.2	2205.7
260.5	13.5	29.49	33.383	1895.7	2206.4
267.5	13.5	29.59	33.372	1891.7	2210.3
268.5	13.5	29.848	33.506	1894.2	2219.8
295.5	13.5	28.644	33.062	1894.2	2202.7
249.5	14.5	28.473	33.595	1896.5	2217.5
250.5	14.5	28.74	33.564	1893.3	2215.5
260.5	14.5	29.253	33.38	1893	2207.2
261.5	14.5	29.201	33.509	1897.9	2216.6
259.5	15.5	29.971	33.298	1885.3	2202.1
260.5	15.5	29.731	33.158	1875.3	2193.5
261.5	15.5	29.242	33.305	1885.4	2203.5
262.5	15.5	28.975	33.452	1896.9	2214.1
253.5	16.5	28.768	33.409	1889.8	2207.4
254.5	16.5	28.512	33.461	1892.8	2211.7
259.5	16.5	29.464	33.33	1885.6	2206.3
260.5	16.5	29.692	32.833	1852.8	2173.8

Table S3. Earth System Models and scenarios that are analyzed in this paper. All models include a “historical” simulation with forcing terms following their historical records (1850–2010), and “piControl” with steady preindustrial forcing. “SSP” is short for Shared Socioeconomic Pathway. “pi” is short for preindustrial control or PiControl. TEOS is short for the International Thermodynamic Equation of Seawater - 2010 (TEOS-10).

No.	Model	Variant	Scenarios (SSP)	pi start point	Density factor (kg/m ³)	Full name	Institution	Citation
1	ACCESS-ESM1-5	r1i1p1f1	1-2.6, 2-4.5, 3-7.0, 5-8.5	161	1024.5	Australian Community Climate and Earth System Simulator (ACCESS) - Earth System Model	Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia	Ziehn et al., 2020
2	CanESM5	r1i1p1f1	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	5201	1025	Canadian Earth System Model	Canadian Centre for Climate Modelling and Analysis, Canada	Swart et al., 2019
3	CESM2	r11i1p1f1	1-2.6, 2-4.5, 3-7.0, 5-8.5	601	TEOS	Community Earth System Model	Climate and Global Dynamics Laboratory, United States	Danabasoglu et al., 2020
4	CMCC-ESM2	r1i1p1f1	1-2.6, 2-4.5, 3-7.0, 5-8.5	1850	TEOS	CMCC Earth System Model	Centro Euro-Mediterraneo Sui Cambiamenti Climatici (CMCC), Italy	Lovato et al., 2022
5	CNRM-ESM-2	r1i1p1f2	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	1850	TEOS	CNRM Earth System Model	Centre National de Recherches Météorologiques (CNRM), France	Séférian et al., 2019
6	EC-Earth3-CC	r1i1p1f1	2-4.5, 5-8.5	1850	TEOS	Earth System Model EC-Earth3	Swedish Meteorological and Hydrological Institute, Sweden	Döscher et al., 2021
7	GFDL-CM4	r1i1p1f1	2-4.5, 5-8.5	151	1035	GFDL Climate Model	NOAA Geophysical Fluid Dynamics Laboratory (GFDL), United States	Held et al., 2019; Dunne et al., 2020b
8	GFDL-ESM4	r1i1p1f1	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	101	1035	GFDL Earth System Model	NOAA Geophysical Fluid Dynamics Laboratory (GFDL), United States	Dunne et al., 2020a; Stock et al., 2020
9	IPSL- CM6A-LR	r1i1p1f1	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	1910	1028	IPSL Climate Model	Institut Pierre-Simon Laplace (IPSL), France	Boucher et al., 2020
10	MIROC-ES2L	r1i1p1f2	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	1850	TEOS	Model for Interdisciplinary Research on Climate, Earth System	Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan	Hajima et al., 2020
11	MPI-ESM1-2-LR	r1i1p1f1	1-2.6, 2-4.5, 3-7.0, 5-8.5	1850	1025	MPI Earth System Model	Max-Planck-Institut (MPI), Germany	Mauritsen et al., 2019
12	MRI-ESM2-0	r1i2p1f1	5-8.5	1850	1024.5	MRI Earth System Model	Meteorological Research Institute (MRI), Japan	Yukimoto et al., 2019
13	NorESM2-LM	r1i1p1f1	1-2.6, 2-4.5, 3-7.0, 5-8.5	1600	TEOS	Norwegian Earth System Model	NorESM Climate Modeling Consortium, Norway	Seland et al., 2020; Tjiputra et al., 2020
14	UKESM1-0-LL	r1i1p1f2	1-1.9, 1-2.6, 2-4.5, 3-7.0, 5-8.5	2250	TEOS	United Kingdom Earth System Model	Met Office and Natural Environment Research Council (NERC), United Kingdom	Sellar et al., 2019

Table S4. A comparison of global surface ocean OA indicators (area-averaged) from different Earth System Models (ESMs) in 1850 and 2100 under the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). The results are before they were corrected with observational data. “Stdev” is short for standard deviation. Refer to Table S3 for the full names of the models. Presented variables include sea surface temperature (T, unit: °C), sea surface salinity (S), total dissolved inorganic carbon content (DIC, unit: $\mu\text{mol kg}^{-1}$), total alkalinity content (TA, unit: $\mu\text{mol kg}^{-1}$), fugacity of carbon dioxide ($f\text{CO}_2$, unit: μatm), free hydrogen ion content ($[\text{H}^+]_{\text{free}}$, unit: $10^{-9} \text{ mol kg}^{-1}$), total hydrogen ion content ($[\text{H}^+]_{\text{total}}$, unit: $10^{-9} \text{ mol kg}^{-1}$), pH on total scale (pH_T), carbonate ion content ($[\text{CO}_3^{2-}]$, unit: $\mu\text{mol kg}^{-1}$), aragonite saturation state (Ω_{arag}), calcite saturation state (Ω_{calc}), and Revelle Factor (RF).

Decade	Models	T	S	DIC	TA	$f\text{CO}_2$	$[\text{H}^+]_{\text{free}}$	$[\text{H}^+]_{\text{total}}$	pH_T	$[\text{CO}_3^{2-}]$	Ω_{arag}	Ω_{calc}	RF
1850	ACCESS-ESM1	18.58	34.58	1938	2254	287	6.0	7.4	8.16	220	3.45	5.28	9.7
	CanESM5	17.53	34.41	2003	2313	287	5.6	6.9	8.17	219	3.43	5.26	10
	CESM2	18.43	34.32	1949	2262	278	5.6	6.8	8.17	219	3.44	5.27	9.8
	CMCC-ESM2	18.06	34.47	1994	2313	280	5.5	6.7	8.17	224	3.52	5.39	9.8
	CNRM-ESM2	18.27	34.5	1941	2249	281	5.7	6.9	8.16	214	3.36	5.15	9.8
	EC-Earth3	18.9	34.36	1878	2177	279	5.7	7.1	8.15	206	3.25	4.97	9.7
	GFDL-CM4	17.36	34.45	1999	2317	275	5.4	6.6	8.18	225	3.52	5.41	9.8
	GFDL-ESM4	17.82	34.42	1981	2298	276	5.5	6.7	8.18	224	3.51	5.38	9.8
	IPSL-CM6A	17.45	34.37	1939	2238	279	5.7	6.9	8.16	209	3.26	5.01	10
	MIROC-ES2L	17.98	34.57	1948	2253	283	5.7	6.9	8.16	213	3.34	5.12	9.8
	MPI-ESM1	17.31	34.35	1919	2210	281	5.7	7.0	8.16	203	3.17	4.87	10
	MRI-ESM2	17.85	34.91	2006	2333	276	5.4	6.6	8.18	232	3.63	5.55	9.7
	NorESM2	18.87	34.27	1943	2256	281	5.6	6.9	8.16	218	3.44	5.26	9.8
	UKESM1	17.67	34.3	1955	2261	278	5.6	6.8	8.17	215	3.37	5.16	9.9
[median]	17.92	34.42	1948	2258	280	5.6	6.9	8.16	218	3.44	5.26	9.8	
[stdev]	0.54	0.16	36	44	4	0.2	0.2	0.01	8	0.12	0.19	0.1	
2010	ACCESS-ESM1	19.14	34.55	1986	2251	377	7.5	9.3	8.06	188	2.95	4.51	10.7
	CanESM5	18.5	34.32	2047	2308	379	7.0	8.6	8.06	188	2.97	4.54	11
	CESM2	18.87	34.29	1999	2260	367	7.0	8.6	8.07	186	2.94	4.49	10.8
	CMCC-ESM2	18.79	34.17	2042	2307	371	6.9	8.5	8.07	190	3	4.59	10.8
	CNRM-ESM2	18.72	34.46	1999	2258	371	7.1	8.7	8.06	184	2.89	4.42	10.8
	EC-Earth3	19.77	34.33	1922	2174	368	7.2	8.9	8.05	177	2.8	4.28	10.7
	GFDL-CM4	17.85	34.41	2055	2319	367	6.8	8.3	8.08	191	3	4.59	10.8
	GFDL-ESM4	18.34	34.4	2035	2301	364	6.8	8.4	8.08	192	3.02	4.61	10.7
	IPSL-CM6A	18.34	34.35	1981	2233	366	7.1	8.7	8.06	180	2.82	4.32	10.9
	MIROC-ES2L	18.56	34.55	1997	2252	373	7.1	8.7	8.06	182	2.86	4.38	10.8
	MPI-ESM1	17.84	34.32	1965	2207	371	7.2	8.8	8.06	172	2.7	4.15	11.1
	MRI-ESM2	18.32	34.89	2058	2332	364	6.8	8.3	8.08	198	3.11	4.75	10.7
	NorESM2	19.18	34.23	1992	2252	370	7.0	8.7	8.06	185	2.93	4.47	10.8
	UKESM1	18.26	34.27	2008	2266	365	6.9	8.5	8.07	184	2.9	4.44	10.8
[median]	18.53	34.34	1999	2259	369	7.0	8.6	8.06	186	2.94	4.48	10.8	
[stdev]	0.53	0.18	38	44	5	0.2	0.3	0.01	7	0.1	0.15	0.1	
2100	ACCESS-ESM1	22.03	34.38	2137	2241	1092	18.4	23.1	7.65	95	1.52	2.3	15
	CanESM5	23.05	34	2182	2290	1100	17.4	22.0	7.66	100	1.61	2.43	14.9
	CESM2	22.76	34.05	2133	2239	1069	17.4	22.0	7.66	97	1.56	2.35	14.9
	CMCC-ESM2	22.19	33.99	2195	2301	1076	17.1	21.5	7.67	98	1.57	2.38	15.1
	CNRM-ESM2	22.27	34.25	2148	2253	1067	17.4	21.8	7.66	95	1.52	2.3	15

EC-Earth3	23.17	34.2	2061	2161	1070	17.9	22.6	7.65	90	1.45	2.2	14.9
GFDL-CM4	20.91	34.37	2232	2335	1086	17.2	21.4	7.67	97	1.55	2.35	15.3
GFDL-ESM4	20.74	34.35	2212	2317	1055	16.9	21.0	7.68	98	1.55	2.36	15.2
IPSL-CM6A	22.31	34.18	2114	2216	1059	17.5	22.0	7.66	93	1.5	2.26	15
MIROC-ES2L	21.38	34.29	2142	2237	1096	18.1	22.6	7.65	90	1.44	2.19	15.2
MPI-ESM1	20.17	34.15	2109	2195	1081	18.3	22.7	7.65	84	1.33	2.02	15.5
MRI-ESM2	21.13	34.61	2207	2315	1062	17.0	21.2	7.67	100	1.59	2.4	15.1
NorESM2	21.35	34.14	2149	2247	1072	17.6	22.0	7.66	92	1.47	2.23	15.2
UKESM1	22.89	34.03	2162	2272	1067	17.1	21.5	7.67	99	1.6	2.41	14.9
[median]	22.11	34.19	2148	2250	1071	17.4	22.0	7.66	96	1.54	2.33	15
[stdev]	0.94	0.18	46	50	14	0.5	0.6	0.01	5	0.08	0.11	0.2

Table S5. Global surface OA indicators (inter-model median, area-averaged) in 1750 and from 1850 to 2000. Refer to Table S3 for the full names of the models, and Table S4 for the full names of the variable abbreviations and their units. Their corresponding inter-model standard deviations are presented in Supplementary Table S6.

Variable	1750	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
T	18.19	18.19	18.12	18.17	18.15	18.10	18.17	18.17	18.20	18.23	18.27	18.28	18.26	18.23	18.31	18.39	18.59
S	34.67	34.67	34.66	34.66	34.65	34.66	34.66	34.66	34.66	34.66	34.65	34.65	34.65	34.65	34.65	34.64	34.64
DIC	1969	1977	1978	1979	1980	1982	1984	1986	1988	1990	1992	1994	1995	2000	2006	2013	2020
TA	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294	2294
fCO₂	267	279	281	282	283	286	289	291	295	298	301	304	307	313	323	337	351
[H⁺]_{free}	5.3	5.5	5.5	5.6	5.6	5.6	5.7	5.7	5.8	5.8	5.9	5.9	6	6.1	6.2	6.4	6.7
[H⁺]_{total}	6.5	6.8	6.8	6.8	6.9	6.9	7.0	7.0	7.1	7.1	7.2	7.3	7.3	7.4	7.6	7.9	8.2
pH_T	8.19	8.17	8.17	8.17	8.17	8.16	8.16	8.16	8.15	8.15	8.14	8.14	8.14	8.13	8.12	8.10	8.09
[CO₃²⁻]	228	222	221	221	220	218	217	216	215	214	212	211	210	207	204	199	195
Ω_{arag}	3.57	3.48	3.46	3.46	3.44	3.42	3.41	3.39	3.37	3.35	3.33	3.31	3.30	3.25	3.20	3.13	3.06
Ω_{calc}	5.47	5.33	5.31	5.3	5.28	5.24	5.22	5.19	5.15	5.13	5.10	5.08	5.05	4.98	4.89	4.78	4.68
RF	9.6	9.8	9.8	9.8	9.8	9.9	9.9	9.9	10.0	10.0	10.0	10.1	10.1	10.2	10.3	10.5	10.6

Table S6. Inter-model standard deviations of global mean surface OA indicators (area-averaged) in 1750 and from 1850 to 2000. Refer to Table S4 for the full names of the variable abbreviations and their units. Their corresponding inter-model medians are presented in Table S5.

Variable	1750	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
T	0.43	0.43	0.33	0.34	0.34	0.34	0.34	0.34	0.32	0.31	0.28	0.27	0.28	0.27	0.26	0.25	0.20
S	0.21	0.21	0.17	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.13	0.12	0.12	0.12	0.12	0.11	0.10
DIC	13	13	10	10	10	10	10	10	10	10	9	9	9	9	9	8	8
TA	12	12	9	10	9	9	9	9	9	9	8	7	8	7	7	7	6
fCO₂	15	15	11	10	10	10	10	10	10	10	10	10	10	11	11	11	11
[H⁺]_{free}	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
[H⁺]_{total}	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
pH_T	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
[CO₃²⁻]	8	7	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4
Ω_{arag}	0.12	0.11	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06
Ω_{calc}	0.18	0.17	0.13	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.1	0.1	0.1	0.1	0.09
RF	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1

Table S7. Global mean surface OA indicators (inter-model median, area-averaged) from 2010 to 2100 under different Shared Socioeconomic Pathways (SSPs). Refer to Table S4 for the full names of the variable abbreviations and their units. Their corresponding inter-model standard deviations are presented in Table S8.

Variable	SSP	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	1-1.9	18.77	18.96	19.15	19.27	19.32	19.29	19.26	19.23	19.16	19.13
	1-2.6		18.93	19.14	19.27	19.40	19.47	19.51	19.54	19.51	19.52
	2-4.5		18.93	19.13	19.32	19.54	19.72	19.88	20.03	20.18	20.32
	3-7.0		18.92	19.13	19.34	19.62	19.90	20.17	20.50	20.85	21.22
	5-8.5		18.94	19.16	19.44	19.75	20.13	20.52	20.97	21.42	21.91
S	1-1.9	34.62	34.60	34.59	34.58	34.57	34.57	34.57	34.57	34.56	34.57
	1-2.6		34.61	34.60	34.58	34.57	34.57	34.57	34.56	34.56	34.57
	2-4.5		34.61	34.60	34.59	34.58	34.57	34.56	34.56	34.55	34.54
	3-7.0		34.61	34.60	34.59	34.57	34.56	34.54	34.53	34.52	34.48
	5-8.5		34.61	34.60	34.58	34.57	34.56	34.54	34.52	34.49	34.45
DIC	1-1.9	2027	2036	2044	2048	2047	2046	2043	2040	2036	2032
	1-2.6		2037	2046	2053	2057	2059	2059	2057	2054	2050
	2-4.5		2037	2047	2058	2068	2077	2084	2090	2092	2093
	3-7.0		2037	2049	2063	2077	2091	2104	2117	2130	2141
	5-8.5		2037	2049	2064	2083	2102	2122	2143	2162	2177
TA	1-1.9	2294	2293	2293	2292	2292	2292	2292	2292	2292	2292
	1-2.6		2293	2293	2292	2292	2291	2291	2291	2291	2291
	2-4.5		2293	2293	2292	2292	2292	2291	2291	2290	2290
	3-7.0		2293	2293	2292	2292	2291	2290	2290	2289	2288
	5-8.5		2293	2293	2292	2292	2291	2290	2289	2288	2287
fCO ₂	1-1.9	368	389	411	422	422	418	412	405	397	385
	1-2.6		389	413	434	446	453	454	451	443	432
	2-4.5		389	416	446	476	505	531	553	567	573
	3-7.0		390	421	460	503	552	606	666	731	804
	5-8.5		390	421	465	522	594	686	797	923	1051
[H ⁺] _{free}	1-1.9	6.9	7.2	7.6	7.7	7.7	7.7	7.6	7.5	7.4	7.2
	1-2.6		7.2	7.6	7.9	8.1	8.2	8.2	8.2	8	7.9
	2-4.5		7.2	7.6	8.1	8.6	9	9.4	9.7	9.9	10
	3-7.0		7.2	7.7	8.3	9	9.7	10.5	11.4	12.3	13.4
	5-8.5		7.2	7.7	8.4	9.2	10.3	11.7	13.3	15.1	16.9
[H ⁺] _{total}	1-1.9	8.5	8.9	9.3	9.5	9.5	9.5	9.4	9.2	9.1	8.8
	1-2.6		8.9	9.4	9.8	10.0	10.1	10.2	10.1	9.9	9.7
	2-4.5		8.9	9.4	10.0	10.6	11.1	11.6	12.0	12.3	12.4
	3-7.0		8.9	9.5	10.3	11.1	12.0	13.0	14.2	15.4	16.7
	5-8.5		8.9	9.5	10.4	11.4	12.8	14.5	16.6	18.9	21.2
pH _T	1-1.9	8.07	8.05	8.03	8.02	8.02	8.02	8.03	8.04	8.04	8.06
	1-2.6		8.05	8.03	8.01	8.00	8.00	8.00	8.00	8.00	8.01
	2-4.5		8.05	8.03	8.00	7.98	7.96	7.94	7.92	7.91	7.91
	3-7.0		8.05	8.02	7.99	7.96	7.92	7.89	7.85	7.82	7.78
	5-8.5		8.05	8.02	7.98	7.94	7.89	7.84	7.78	7.73	7.68
[CO ₃ ²⁻]	1-1.9	190	184	179	176	177	178	179	181	183	186
	1-2.6		184	178	173	170	169	169	170	172	175
	2-4.5		184	177	170	164	158	154	150	148	147
	3-7.0		184	176	167	158	150	141	134	126	119

	5-8.5		184	176	166	155	143	131	119	108	99
Ω_{arag}	1-1.9	2.99	2.90	2.82	2.78	2.78	2.80	2.82	2.86	2.89	2.94
	1-2.6		2.90	2.81	2.73	2.69	2.67	2.67	2.68	2.72	2.76
	2-4.5		2.90	2.79	2.68	2.59	2.50	2.43	2.38	2.35	2.34
	3-7.0		2.89	2.77	2.63	2.50	2.37	2.24	2.12	2.01	1.89
	5-8.5		2.90	2.77	2.62	2.45	2.27	2.08	1.89	1.72	1.58
Ω_{calc}	1-1.9	4.57	4.43	4.30	4.25	4.25	4.27	4.31	4.36	4.41	4.49
	1-2.6		4.43	4.28	4.17	4.10	4.07	4.07	4.09	4.14	4.21
	2-4.5		4.42	4.26	4.10	3.95	3.81	3.70	3.62	3.57	3.55
	3-7.0		4.42	4.23	4.02	3.81	3.61	3.41	3.22	3.04	2.87
	5-8.5		4.42	4.23	4.00	3.73	3.45	3.15	2.86	2.61	2.39
RF	1-1.9	10.8	11.0	11.2	11.3	11.3	11.2	11.2	11.1	11.0	10.9
	1-2.6		11.0	11.2	11.4	11.5	11.6	11.6	11.5	11.4	11.3
	2-4.5		11.0	11.2	11.5	11.8	12.0	12.2	12.4	12.4	12.5
	3-7.0		11.0	11.3	11.6	12.0	12.4	12.8	13.2	13.5	13.9
	5-8.5		11.0	11.3	11.7	12.2	12.7	13.3	13.9	14.4	14.9

Table S8. Inter-model standard deviations of global mean surface OA indicators (area-averaged) from 2010 to 2100 under different Shared Socioeconomic Pathways (SSPs). Refer to Table S4 for the full names of the variable abbreviations and their units. Their corresponding inter-model medians are presented in Table S7.

Variable	SSP	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	1-1.9	0.00	0.21	0.25	0.31	0.32	0.35	0.36	0.38	0.37	0.43
	1-2.6		0.26	0.28	0.32	0.37	0.4	0.44	0.45	0.48	0.56
	2-4.5		0.25	0.3	0.32	0.36	0.42	0.45	0.49	0.54	0.61
	3-7.0		0.26	0.32	0.35	0.44	0.49	0.56	0.63	0.72	0.87
	5-8.5		0.23	0.28	0.35	0.42	0.5	0.6	0.69	0.81	0.98
S	1-1.9	0.00	0.12	0.14	0.15	0.16	0.16	0.16	0.16	0.16	0.22
	1-2.6		0.12	0.14	0.16	0.17	0.18	0.18	0.19	0.19	0.24
	2-4.5		0.11	0.14	0.15	0.16	0.18	0.2	0.21	0.23	0.27
	3-7.0		0.12	0.14	0.15	0.18	0.2	0.23	0.26	0.28	0.35
	5-8.5		0.11	0.14	0.16	0.18	0.2	0.24	0.27	0.32	0.39
DIC	1-1.9	0	7	8	10	10	11	11	11	11	15
	1-2.6		8	9	10	11	11	12	12	13	16
	2-4.5		7	9	10	10	12	13	14	15	19
	3-7.0		8	9	10	11	12	14	16	18	23
	5-8.5		7	9	10	11	13	16	18	22	27
TA	1-1.9	0	6	8	9	10	10	10	11	11	14
	1-2.6		7	8	9	10	11	12	12	12	15
	2-4.5		6	8	9	10	11	13	14	15	18
	3-7.0		7	8	9	11	13	14	17	18	23
	5-8.5		6	8	9	11	13	15	18	22	26
fCO ₂	1-1.9	0	10	13	16	16	17	16	16	15	20
	1-2.6		12	14	16	17	18	18	18	19	24
	2-4.5		12	14	17	18	20	23	25	27	34
	3-7.0		12	14	18	20	24	28	33	40	55
	5-8.5		12	14	18	22	27	35	46	59	82
[H ⁺] _{free}	1-1.9	0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	1-2.6		0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4
	2-4.5		0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.6
	3-7.0		0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.9
	5-8.5		0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.3
[H ⁺] _{total}	1-1.9	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
	1-2.6		0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5
	2-4.5		0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.7
	3-7.0		0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.8	1.1
	5-8.5		0.2	0.3	0.4	0.4	0.5	0.7	0.9	1.1	1.6
pH _T	1-1.9	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	1-2.6		0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
	2-4.5		0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
	3-7.0		0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03
	5-8.5		0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03
[CO ₃ ²⁻]	1-1.9	0	3	4	4	4	4	5	5	5	6
	1-2.6		4	4	4	5	5	5	5	6	7
	2-4.5		4	4	4	4	5	5	5	6	6
	3-7.0		4	4	4	5	5	5	6	6	7

	5-8.5		4	4	4	5	5	5	6	6	7
Ω_{arag}	1-1.9	0.00	0.05	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.1
	1-2.6		0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.09	0.11
	2-4.5		0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.09	0.1
	3-7.0		0.06	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.11
	5-8.5		0.06	0.06	0.07	0.07	0.08	0.09	0.09	0.1	0.11
Ω_{calc}	1-1.9	0.00	0.08	0.09	0.1	0.1	0.11	0.12	0.12	0.12	0.15
	1-2.6		0.1	0.1	0.1	0.11	0.11	0.12	0.12	0.13	0.16
	2-4.5		0.09	0.1	0.1	0.11	0.11	0.12	0.12	0.13	0.16
	3-7.0		0.1	0.1	0.1	0.11	0.12	0.12	0.13	0.14	0.16
	5-8.5		0.09	0.1	0.1	0.11	0.12	0.13	0.14	0.15	0.16
RF	1-1.9	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	1-2.6		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
	2-4.5		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
	3-7.0		0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
	5-8.5		0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4

Table S9. Regional variations of surface OA indicators (inter-model median, area-averaged) from 1750 to 2100 under the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). Refer to Table S4 for the full names of the variable abbreviations and their units, and Table S9 for the definitions of each region. Their corresponding inter-model standard deviations are presented in Table S10.

		1750	1850	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	Arctic	1.10	1.10	1.55	1.65	1.79	2.07	2.48	2.95	3.38	3.88	4.67	5.20
	Pacific-N	9.54	9.54	10.18	10.40	10.83	11.23	11.67	12.18	12.74	13.53	14.25	15.01
	Atlantic-N	11.42	11.42	12.05	12.11	12.28	12.36	12.68	13.06	13.52	13.99	14.46	15.00
	Pacific-C	24.02	24.02	24.62	24.83	25.09	25.42	25.73	26.14	26.57	27.02	27.49	28.00
	Atlantic-C	23.23	23.23	23.91	24.10	24.32	24.62	24.96	25.35	25.73	26.19	26.62	27.07
	Indian	24.86	24.86	25.49	25.68	25.90	26.17	26.53	26.9	27.34	27.78	28.18	28.68
	Southern	5.13	5.13	5.55	5.65	5.77	5.95	6.15	6.43	6.69	7.04	7.40	7.78
S	Arctic	31.09	31.09	30.84	30.76	30.63	30.5	30.45	30.38	30.22	30.10	30.05	29.83
	Pacific-N	32.82	32.82	32.75	32.72	32.69	32.64	32.61	32.55	32.45	32.36	32.28	32.20
	Atlantic-N	34.84	34.84	34.84	34.74	34.68	34.56	34.46	34.38	34.20	34.09	33.91	33.72
	Pacific-C	34.90	34.90	34.84	34.83	34.81	34.79	34.78	34.74	34.71	34.68	34.62	34.57
	Atlantic-C	36.10	36.10	36.12	36.14	36.16	36.20	36.24	36.30	36.36	36.42	36.46	36.53
	Indian	35.00	35.00	34.97	34.96	34.93	34.92	34.92	34.91	34.90	34.89	34.88	34.87
	Southern	34.17	34.17	34.14	34.13	34.12	34.10	34.09	34.08	34.07	34.05	34.03	34.01
DIC	Arctic	1960	1968	1995	2001	2004	2013	2025	2034	2041	2052	2062	2062
	Pacific-N	1976	1984	2026	2034	2042	2052	2063	2075	2086	2095	2104	2110
	Atlantic-N	2022	2030	2080	2086	2098	2108	2122	2137	2148	2163	2173	2175
	Pacific-C	1926	1936	1987	1997	2010	2026	2045	2065	2085	2107	2125	2138
	Atlantic-C	1977	1987	2047	2058	2074	2093	2116	2141	2170	2197	2225	2249
	Indian	1914	1924	1979	1990	2004	2022	2042	2064	2089	2111	2134	2154
	Southern	2074	2082	2124	2132	2143	2155	2170	2186	2202	2220	2235	2248
TA	Arctic	2151	2151	2135	2130	2122	2114	2110	2104	2094	2087	2082	2071
	Pacific-N	2213	2213	2210	2207	2206	2202	2200	2196	2189	2184	2178	2172
	Atlantic-N	2303	2303	2305	2300	2297	2290	2286	2283	2273	2268	2260	2249
	Pacific-C	2296	2296	2295	2295	2294	2293	2293	2291	2290	2287	2284	2281
	Atlantic-C	2365	2365	2369	2371	2372	2375	2378	2382	2387	2391	2397	2403
	Indian	2295	2295	2295	2295	2294	2294	2294	2294	2294	2293	2294	2294
	Southern	2291	2291	2289	2289	2288	2287	2287	2286	2285	2284	2282	2280
fCO₂	Arctic	210	222	302	323	354	414	471	551	633	764	893	1019
	Pacific-N	255	267	357	383	417	461	518	589	681	784	908	1031
	Atlantic-N	248	260	345	366	399	442	500	576	672	794	926	1053
	Pacific-C	275	287	376	398	428	472	528	598	687	795	919	1038
	Atlantic-C	272	284	374	397	428	470	527	600	693	806	932	1066
	Indian	271	283	373	396	429	474	532	605	703	816	942	1085
	Southern	262	274	362	383	414	456	513	587	677	790	915	1043
[H⁺]_{free}	Arctic	5	5.2	6.9	7.3	7.9	9.2	10.3	11.9	13.5	16.1	18.6	20.9
	Pacific-N	5.5	5.7	7.3	7.7	8.3	9.1	10	11.2	12.8	14.4	16.5	18.5
	Atlantic-N	5.2	5.4	6.8	7.2	7.7	8.4	9.4	10.6	12.2	14.1	16.2	18.2
	Pacific-C	5.3	5.5	6.8	7.1	7.5	8.1	8.9	9.8	11.1	12.5	14.2	15.7
	Atlantic-C	5.2	5.4	6.6	6.9	7.4	7.9	8.7	9.7	10.9	12.3	13.9	15.6
	Indian	5.2	5.4	6.7	7	7.5	8.1	8.9	9.9	11.2	12.7	14.3	16.1
Southern	5.6	5.9	7.4	7.8	8.4	9.1	10.2	11.4	13	15	17.2	19.3	
[H⁺]_{total}	Arctic	5.4	5.7	7.6	8.0	8.7	10.2	11.4	13.2	15.0	18.0	20.8	23.4

	Pacific-N	6.3	6.6	8.4	8.9	9.6	10.5	11.7	13.1	15.0	17.0	19.5	21.9
	Atlantic-N	6.0	6.3	8.0	8.4	9.0	9.9	11.0	12.5	14.4	16.7	19.2	21.7
	Pacific-C	6.7	7.0	8.6	9.1	9.6	10.4	11.5	12.7	14.4	16.3	18.5	20.6
	Atlantic-C	6.6	6.8	8.4	8.8	9.4	10.2	11.2	12.5	14.1	16.0	18.1	20.4
	Indian	6.7	6.9	8.6	9.0	9.7	10.5	11.6	12.9	14.6	16.6	18.8	21.4
	Southern	6.3	6.6	8.4	8.8	9.5	10.3	11.5	13.0	14.8	17.1	19.5	22.1
pH_T	Arctic	8.27	8.25	8.13	8.10	8.07	8.01	7.95	7.89	7.84	7.76	7.70	7.64
	Pacific-N	8.20	8.18	8.08	8.05	8.02	7.98	7.93	7.88	7.83	7.77	7.71	7.66
	Atlantic-N	8.22	8.20	8.10	8.08	8.04	8.01	7.96	7.90	7.84	7.78	7.72	7.67
	Pacific-C	8.17	8.16	8.06	8.04	8.02	7.98	7.94	7.90	7.84	7.79	7.73	7.69
	Atlantic-C	8.18	8.17	8.07	8.05	8.03	7.99	7.95	7.90	7.85	7.80	7.74	7.69
	Indian	8.18	8.16	8.06	8.04	8.02	7.98	7.94	7.89	7.84	7.78	7.73	7.67
	Southern	8.20	8.18	8.08	8.05	8.02	7.99	7.94	7.89	7.83	7.77	7.71	7.66
[CO₃²⁻]	Arctic	136	130	104	98	92	82	75	68	61	53	48	43
	Pacific-N	165	160	133	127	121	113	105	97	87	80	72	66
	Atlantic-N	197	191	161	154	146	136	124	113	101	90	81	73
	Pacific-C	258	252	218	211	203	192	180	167	153	139	127	117
	Atlantic-C	270	264	229	222	213	203	191	178	163	149	137	126
	Indian	265	258	223	216	207	195	183	170	155	141	129	118
	Southern	152	147	121	116	110	103	94	86	77	68	61	55
Ω_{arag}	Arctic	2.06	1.97	1.57	1.49	1.39	1.25	1.14	1.03	0.92	0.80	0.72	0.66
	Pacific-N	2.53	2.45	2.03	1.94	1.85	1.74	1.61	1.49	1.34	1.23	1.11	1.02
	Atlantic-N	3.00	2.91	2.46	2.36	2.23	2.08	1.90	1.73	1.55	1.38	1.25	1.13
	Pacific-C	4.09	3.99	3.46	3.36	3.23	3.07	2.88	2.68	2.46	2.25	2.05	1.89
	Atlantic-C	4.23	4.13	3.59	3.49	3.35	3.20	3.01	2.80	2.57	2.36	2.16	2.00
	Indian	4.20	4.10	3.56	3.45	3.31	3.13	2.93	2.73	2.50	2.28	2.09	1.91
	Southern	2.30	2.23	1.84	1.77	1.67	1.56	1.43	1.30	1.17	1.04	0.93	0.84
Ω_{calc}	Arctic	3.3	3.16	2.52	2.39	2.22	2.00	1.82	1.64	1.47	1.29	1.15	1.05
	Pacific-N	3.99	3.86	3.20	3.06	2.91	2.73	2.53	2.34	2.11	1.93	1.74	1.59
	Atlantic-N	4.70	4.56	3.84	3.68	3.48	3.24	2.97	2.69	2.41	2.15	1.94	1.76
	Pacific-C	6.21	6.06	5.25	5.10	4.89	4.64	4.35	4.04	3.71	3.38	3.08	2.84
	Atlantic-C	6.43	6.28	5.45	5.29	5.08	4.84	4.55	4.23	3.88	3.55	3.26	3.00
	Indian	6.37	6.22	5.38	5.22	4.99	4.72	4.42	4.11	3.75	3.42	3.13	2.86
	Southern	3.64	3.52	2.90	2.79	2.64	2.46	2.26	2.05	1.84	1.64	1.46	1.32
RF	Arctic	12.5	12.8	14.6	15.0	15.6	16.4	17.0	17.5	18.0	18.2	18.3	18.2
	Pacific-N	11.1	11.3	12.6	13.0	13.4	13.8	14.4	15.0	15.7	16.3	16.8	17.2
	Atlantic-N	10.2	10.4	11.6	11.9	12.3	12.8	13.5	14.2	15.0	15.8	16.4	16.8
	Pacific-C	8.6	8.8	9.5	9.7	9.9	10.3	10.7	11.1	11.7	12.3	13.0	13.5
	Atlantic-C	8.6	8.7	9.4	9.6	9.8	10.1	10.5	11.0	11.6	12.2	12.8	13.4
	Indian	8.5	8.6	9.4	9.5	9.8	10.1	10.5	11.0	11.6	12.2	12.8	13.4
	Southern	12.0	12.2	13.7	14.0	14.4	15.0	15.6	16.3	17.0	17.6	18.0	18.2

Table S10. Regional variations of the inter-model standard deviations of surface OA indicators (area-averaged) from 1750 to 2100 under the high-emission, low-mitigation Shared Socioeconomic Pathway (SSP5-8.5). Refer to Table S4 for the full names of the variable abbreviations and their units, and Table S9 for the definitions of each region. Their corresponding inter-model medians are presented in Table S9.

		1750	1850	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	Arctic	0.54	0.54	0	0.34	0.49	0.58	0.79	1.01	1.28	1.57	1.92	2.32
	Pacific-N	0.89	0.89	0	0.42	0.55	0.57	0.69	0.8	0.81	1	1.18	1.27
	Atlantic-N	0.94	0.94	0	0.48	0.76	0.86	1.11	1.3	1.5	1.61	1.69	1.76
	Pacific-S	0.45	0.45	0	0.22	0.24	0.31	0.38	0.44	0.51	0.61	0.7	0.89
	Atlantic-S	0.32	0.32	0	0.21	0.24	0.33	0.38	0.47	0.57	0.63	0.74	0.87
	Indian	0.29	0.29	0	0.17	0.2	0.26	0.33	0.4	0.51	0.58	0.68	0.86
	Southern	0.4	0.4	0	0.22	0.27	0.34	0.39	0.47	0.56	0.64	0.77	0.92
S	Arctic	0.79	0.79	0	0.36	0.62	0.66	0.76	0.78	0.86	0.94	1.11	1.39
	Pacific-N	0.21	0.21	0	0.08	0.11	0.12	0.13	0.14	0.14	0.19	0.23	0.28
	Atlantic-N	0.38	0.38	0	0.19	0.3	0.36	0.43	0.52	0.59	0.64	0.7	0.82
	Pacific-S	0.19	0.19	0	0.1	0.12	0.14	0.16	0.18	0.22	0.25	0.32	0.38
	Atlantic-S	0.18	0.18	0	0.11	0.14	0.17	0.19	0.22	0.28	0.34	0.38	0.46
	Indian	0.22	0.22	0	0.1	0.12	0.11	0.14	0.16	0.19	0.21	0.26	0.33
	Southern	0.1	0.1	0	0.05	0.06	0.07	0.07	0.08	0.09	0.1	0.12	0.14
DIC	Arctic	42	42	0	21	32	36	38	43	48	52	62	76
	Pacific-N	15	15	0	6	9	10	10	11	12	15	18	24
	Atlantic-N	14	14	0	7	12	12	16	20	26	30	38	46
	Pacific-S	13	13	0	7	8	9	10	12	15	18	22	26
	Atlantic-S	10	10	0	6	7	9	10	13	16	21	24	29
	Indian	11	10	0	7	7	9	10	11	14	17	19	26
	Southern	9	9	0	6	7	8	8	9	10	11	13	15
TA	Arctic	44	44	0	20	33	37	42	44	50	55	65	79
	Pacific-N	13	13	0	5	7	7	8	10	10	13	16	20
	Atlantic-N	21	21	0	10	16	19	24	31	36	40	46	52
	Pacific-S	10	10	0	6	7	8	10	12	14	17	21	25
	Atlantic-S	10	10	0	6	7	10	12	14	18	22	26	31
	Indian	10	10	0	5	7	8	9	10	14	16	19	25
	Southern	7	7	0	3	4	5	6	6	7	8	9	11
fCO₂	Arctic	90	90	0	51	79	103	125	150	167	212	251	302
	Pacific-N	18	18	0	14	19	21	24	28	39	50	61	102
	Atlantic-N	14	14	0	12	16	18	26	36	45	64	85	134
	Pacific-S	14	14	0	12	13	13	17	21	29	38	53	74
	Atlantic-S	10	10	0	7	8	11	13	18	22	32	40	61
	Indian	11	11	0	9	8	12	15	18	26	33	43	58
	Southern	13	13	0	12	15	20	24	30	36	43	53	71
[H⁺]_{free}	Arctic	1.9	1.9	0	1.1	1.6	2.1	2.6	3.1	3.4	4.4	5.1	6.2
	Pacific-N	0.3	0.3	0	0.2	0.4	0.4	0.4	0.5	0.6	0.8	1	1.7
	Atlantic-N	0.3	0.3	0	0.2	0.3	0.3	0.5	0.7	0.9	1.3	1.7	2.5
	Pacific-S	0.2	0.2	0	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.7	1
	Atlantic-S	0.2	0.2	0	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.8
	Indian	0.2	0.2	0	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.6	0.8
	Southern	0.2	0.2	0	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	1.3
[H⁺]_{total}	Arctic	2.1	2.1	0	1.2	1.7	2.5	2.8	3.5	4	5.2	5.4	7.4

	Pacific-N	0.4	0.4	0	0.3	0.4	0.4	0.5	0.6	0.8	0.9	1.2	1.9
	Atlantic-N	0.3	0.3	0	0.2	0.3	0.4	0.5	0.7	1	1.4	1.8	2.8
	Pacific-S	0.3	0.3	0	0.2	0.2	0.2	0.3	0.4	0.5	0.7	1	1.3
	Atlantic-S	0.2	0.2	0	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.7	1
	Indian	0.2	0.2	0	0.2	0.2	0.2	0.3	0.3	0.4	0.6	0.7	1
	Southern	0.3	0.3	0	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.1	1.4
pH_T	Arctic	0.09	0.08	0	0.05	0.06	0.08	0.08	0.09	0.09	0.1	0.1	0.12
	Pacific-N	0.03	0.02	0	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04
	Atlantic-N	0.02	0.02	0	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.06
	Pacific-S	0.02	0.02	0	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03
	Atlantic-S	0.01	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
	Indian	0.01	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	Southern	0.02	0.02	0	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03
[CO₃²⁻]	Arctic	21	20	0	10	11	12	12	12	11	12	11	13
	Pacific-N	10	9	0	4	5	4	5	4	4	4	4	6
	Atlantic-N	11	11	0	5	7	8	9	10	11	11	11	12
	Pacific-S	8	8	0	4	4	4	5	5	6	6	7	7
	Atlantic-S	6	6	0	3	3	4	4	5	5	6	6	7
	Indian	6	6	0	3	3	4	4	4	5	5	5	6
	Southern	6	5	0	3	3	4	4	4	4	4	4	4
Ω_{arag}	Arctic	0.31	0.3	0	0.14	0.16	0.18	0.19	0.18	0.16	0.18	0.17	0.19
	Pacific-N	0.15	0.14	0	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.09
	Atlantic-N	0.17	0.16	0	0.08	0.11	0.12	0.14	0.16	0.17	0.17	0.17	0.19
	Pacific-S	0.13	0.12	0	0.07	0.07	0.07	0.07	0.08	0.09	0.1	0.11	0.12
	Atlantic-S	0.1	0.1	0	0.04	0.05	0.06	0.07	0.08	0.09	0.09	0.1	0.12
	Indian	0.1	0.09	0	0.05	0.04	0.06	0.06	0.06	0.08	0.08	0.09	0.1
	Southern	0.08	0.08	0	0.04	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Ω_{calc}	Arctic	0.5	0.47	0	0.23	0.26	0.29	0.3	0.28	0.26	0.29	0.27	0.31
	Pacific-N	0.23	0.22	0	0.09	0.11	0.11	0.11	0.1	0.11	0.11	0.11	0.14
	Atlantic-N	0.26	0.25	0	0.12	0.17	0.18	0.22	0.24	0.25	0.26	0.26	0.28
	Pacific-S	0.19	0.18	0	0.1	0.1	0.1	0.11	0.12	0.13	0.15	0.16	0.18
	Atlantic-S	0.15	0.14	0	0.07	0.08	0.08	0.1	0.11	0.12	0.13	0.14	0.17
	Indian	0.15	0.14	0	0.08	0.07	0.09	0.08	0.09	0.11	0.11	0.12	0.14
	Southern	0.13	0.12	0	0.06	0.08	0.09	0.09	0.09	0.1	0.09	0.1	0.1
RF	Arctic	1.2	1.2	0	0.8	0.9	1	1	1	1	1.2	1.2	1.4
	Pacific-N	0.4	0.4	0	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
	Atlantic-N	0.3	0.3	0	0.2	0.4	0.4	0.5	0.6	0.7	0.8	0.7	0.8
	Pacific-S	0.1	0.1	0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4
	Atlantic-S	0.1	0.1	0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4
	Indian	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3
	Southern	0.3	0.3	0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2

Table S11. Regional variations of surface OA indicators (inter-model median, area-averaged) from 1750 to 2100 under the low-emission, high-mitigation Shared Socioeconomic Pathway (SSP1-1.9). Presented regions include the Arctic Ocean (Arctic, defined as the region north of 65°N), northern part of the Pacific Ocean (Pacific-N, defined as the Pacific Ocean between 40°N and 65°N), northern part of the Atlantic Ocean (Atlantic-N, defined as the Atlantic Ocean between 40°N and 65°N), central part of the Pacific Ocean (Pacific-C, defined as the Pacific Ocean between 40°S and 40°N), central part of the Atlantic Ocean (Atlantic-C, defined as the Atlantic Ocean between 40°S and 40°N), Indian Ocean (Indian, defined as the Indian Ocean between 40°S and 25°N), and the Southern Ocean (Southern, defined as the ocean south of 40°S). Refer to Table S4 for the full names of the variable abbreviations and their units. Their corresponding inter-model standard deviations are presented in Table S12.

		1750	1850	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	Arctic	1.10	1.10	1.55	1.88	2.11	2.23	2.19	2.12	2.15	2.20	2.12	2.16
	Pacific-N	9.54	9.54	10.18	10.55	10.82	11.00	11.17	11.19	11.16	10.99	10.96	10.83
	Atlantic-N	11.42	11.42	12.05	12.27	12.47	12.48	12.54	12.49	12.44	12.33	12.11	11.86
	Pacific-C	24.02	24.02	24.62	24.84	25.03	25.16	25.23	25.18	25.16	25.14	25.04	25.04
	Atlantic-C	23.23	23.23	23.91	24.14	24.34	24.45	24.52	24.49	24.46	24.39	24.34	24.34
	Indian	24.86	24.86	25.49	25.67	25.88	25.96	26.02	25.99	25.96	25.93	25.86	25.86
	Southern	5.13	5.13	5.55	5.65	5.80	5.91	5.92	5.91	5.87	5.88	5.84	5.80
S	Arctic	31.09	31.09	30.84	30.69	30.62	30.58	30.55	30.46	30.57	30.64	30.57	30.57
	Pacific-N	32.82	32.82	32.75	32.69	32.65	32.65	32.64	32.64	32.63	32.60	32.60	32.58
	Atlantic-N	34.84	34.84	34.84	34.75	34.62	34.53	34.52	34.48	34.44	34.37	34.31	34.28
	Pacific-C	34.90	34.90	34.84	34.84	34.83	34.83	34.81	34.81	34.81	34.82	34.82	34.81
	Atlantic-C	36.10	36.10	36.12	36.14	36.16	36.16	36.17	36.18	36.18	36.20	36.18	36.19
	Indian	35.00	35.00	34.97	34.97	34.94	34.92	34.94	34.92	34.92	34.91	34.90	34.93
	Southern	34.17	34.17	34.14	34.13	34.13	34.11	34.10	34.10	34.10	34.10	34.10	34.11
DIC	Arctic	1960	1968	1995	1998	2002	2006	2002	2005	2004	2003	2002	1996
	Pacific-N	1976	1984	2026	2031	2037	2039	2034	2030	2031	2023	2021	2017
	Atlantic-N	2022	2030	2080	2084	2089	2090	2089	2088	2084	2081	2075	2074
	Pacific-C	1926	1936	1987	1997	2006	2010	2009	2007	2004	2000	1997	1991
	Atlantic-C	1977	1987	2047	2058	2069	2073	2074	2073	2071	2068	2064	2059
	Indian	1914	1924	1979	1990	2000	2004	2005	2002	1999	1995	1990	1987
	Southern	2074	2082	2124	2132	2139	2140	2139	2138	2136	2133	2130	2126
TA	Arctic	2151	2151	2135	2127	2122	2119	2114	2113	2117	2120	2118	2121
	Pacific-N	2213	2213	2210	2206	2204	2202	2202	2201	2200	2199	2198	2198
	Atlantic-N	2303	2303	2305	2301	2294	2291	2290	2287	2285	2282	2279	2279
	Pacific-C	2296	2296	2295	2295	2295	2296	2295	2295	2295	2295	2296	2294
	Atlantic-C	2365	2365	2369	2371	2373	2373	2374	2375	2375	2375	2374	2375
	Indian	2295	2295	2295	2296	2294	2294	2295	2295	2294	2294	2293	2295
	Southern	2291	2291	2289	2289	2289	2288	2287	2287	2287	2287	2287	2288
fCO₂	Arctic	210	222	302	326	360	380	383	395	374	376	371	350
	Pacific-N	255	267	357	381	406	418	415	404	403	389	382	375
	Atlantic-N	248	260	345	364	385	398	397	399	390	388	380	370
	Pacific-C	275	287	376	397	417	429	428	425	419	410	403	391
	Atlantic-C	272	284	374	396	418	428	429	425	420	413	404	394
	Indian	271	283	373	395	418	429	431	424	418	411	401	394
	Southern	262	274	362	382	402	411	409	405	400	394	386	373
[H⁺]_{free}	Arctic	5	5.2	6.9	7.3	8	8.5	8.5	8.8	8.4	8.4	8.3	7.8

	Pacific-N	5.5	5.7	7.3	7.7	8.1	8.3	8.3	8.1	8	7.8	7.7	7.6
	Atlantic-N	5.2	5.4	6.8	7.1	7.5	7.6	7.7	7.7	7.6	7.6	7.4	7.2
	Pacific-C	5.3	5.5	6.8	7.1	7.3	7.5	7.5	7.4	7.4	7.2	7.1	7
	Atlantic-C	5.2	5.4	6.6	6.9	7.2	7.4	7.4	7.3	7.2	7.1	7	6.9
	Indian	5.2	5.4	6.7	7	7.3	7.5	7.5	7.4	7.3	7.2	7.1	7
	Southern	5.7	5.9	7.4	7.8	8.2	8.3	8.3	8.2	8.1	8	7.9	7.6
[H⁺]_{total}	Arctic	5.4	5.7	7.6	8.1	8.9	9.4	9.4	9.7	9.2	9.2	9.1	8.7
	Pacific-N	6.3	6.6	8.4	8.9	9.4	9.7	9.6	9.4	9.4	9.1	8.9	8.8
	Atlantic-N	6.0	6.3	8.0	8.3	8.8	9.0	9.0	9.1	8.9	8.8	8.7	8.5
	Pacific-C	6.7	7.0	8.6	9.0	9.4	9.6	9.6	9.6	9.4	9.3	9.2	8.9
	Atlantic-C	6.6	6.8	8.4	8.8	9.2	9.4	9.4	9.4	9.3	9.1	9.0	8.8
	Indian	6.7	6.9	8.6	9.0	9.5	9.7	9.7	9.6	9.5	9.3	9.2	9.0
	Southern	6.3	6.6	8.4	8.8	9.2	9.4	9.4	9.3	9.2	9.1	8.9	8.6
pH_T	Arctic	8.27	8.25	8.13	8.10	8.06	8.04	8.04	8.03	8.04	8.04	8.05	8.07
	Pacific-N	8.20	8.18	8.08	8.05	8.03	8.02	8.02	8.03	8.03	8.04	8.05	8.06
	Atlantic-N	8.22	8.20	8.10	8.08	8.06	8.05	8.05	8.04	8.05	8.05	8.06	8.07
	Pacific-C	8.17	8.16	8.06	8.04	8.03	8.02	8.02	8.02	8.03	8.03	8.04	8.05
	Atlantic-C	8.18	8.17	8.07	8.05	8.04	8.03	8.03	8.03	8.03	8.04	8.05	8.06
	Indian	8.18	8.16	8.06	8.05	8.02	8.02	8.01	8.02	8.02	8.03	8.04	8.05
	Southern	8.20	8.18	8.08	8.06	8.04	8.03	8.03	8.03	8.04	8.04	8.05	8.06
[CO₃²⁻]	Arctic	136	130	104	99	92	89	88	87	89	90	91	95
	Pacific-N	165	160	133	128	123	121	122	125	125	128	129	130
	Atlantic-N	197	191	161	156	150	147	146	145	146	146	148	148
	Pacific-C	258	252	218	212	206	204	204	205	206	209	211	215
	Atlantic-C	270	264	229	222	217	214	214	215	217	219	222	226
	Indian	265	258	223	217	210	207	207	209	210	213	215	218
	Southern	152	147	121	117	113	111	112	112	114	115	116	119
Ω_{arag}	Arctic	2.06	1.97	1.57	1.50	1.40	1.36	1.33	1.32	1.35	1.37	1.38	1.44
	Pacific-N	2.53	2.45	2.03	1.96	1.88	1.86	1.88	1.92	1.92	1.96	1.98	2.00
	Atlantic-N	3.00	2.91	2.46	2.38	2.29	2.24	2.24	2.22	2.24	2.24	2.26	2.27
	Pacific-C	4.09	3.99	3.46	3.37	3.29	3.24	3.25	3.26	3.29	3.33	3.36	3.42
	Atlantic-C	4.23	4.13	3.59	3.50	3.41	3.37	3.37	3.39	3.42	3.45	3.50	3.55
	Indian	4.20	4.10	3.56	3.46	3.35	3.31	3.31	3.34	3.37	3.40	3.44	3.49
	Southern	2.30	2.23	1.84	1.77	1.71	1.69	1.69	1.71	1.72	1.74	1.77	1.81
Ω_{calc}	Arctic	3.30	3.16	2.52	2.40	2.25	2.17	2.13	2.11	2.16	2.19	2.22	2.31
	Pacific-N	3.99	3.86	3.20	3.09	2.97	2.93	2.96	3.02	3.02	3.09	3.12	3.15
	Atlantic-N	4.70	4.56	3.84	3.72	3.58	3.50	3.50	3.46	3.49	3.50	3.53	3.55
	Pacific-C	6.21	6.06	5.25	5.10	4.98	4.91	4.92	4.94	4.98	5.05	5.09	5.18
	Atlantic-C	6.43	6.28	5.45	5.30	5.16	5.11	5.11	5.13	5.18	5.22	5.30	5.37
	Indian	6.37	6.22	5.38	5.23	5.07	5.00	5.00	5.04	5.08	5.14	5.20	5.27
	Southern	3.64	3.52	2.90	2.80	2.70	2.66	2.67	2.70	2.72	2.75	2.79	2.86
RF	Arctic	12.5	12.8	14.6	15.0	15.5	15.8	15.9	15.9	15.8	15.8	15.7	15.4
	Pacific-N	11.1	11.3	12.6	12.9	13.2	13.3	13.2	13.1	13.1	12.9	12.8	12.7
	Atlantic-N	10.2	10.4	11.6	11.8	12.1	12.3	12.3	12.3	12.3	12.2	12.2	12.1
	Pacific-C	8.6	8.8	9.5	9.7	9.8	9.9	9.9	9.9	9.8	9.8	9.7	9.6
	Atlantic-C	8.6	8.7	9.4	9.6	9.7	9.8	9.8	9.8	9.7	9.7	9.6	9.5
	Indian	8.5	8.6	9.4	9.5	9.7	9.8	9.8	9.7	9.7	9.6	9.5	9.5
	Southern	12.0	12.2	13.7	14.0	14.3	14.4	14.3	14.3	14.2	14.1	14.0	13.8

Table S12. Regional variations of the inter-model standard deviations of surface OA indicators (area-averaged) from 1750 to 2100 under the low-emission, high-mitigation Shared Socioeconomic Pathway (SSP1-1.9). Refer to Table S4 for the full names of the variable abbreviations and their units, and Table S9 for the definitions of each region. Their corresponding inter-model medians are presented in Table S11.

		1750	1850	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
T	Arctic	0.54	0.54	0	0.35	0.55	0.61	0.76	0.79	0.67	0.73	0.75	0.77
	Pacific-N	0.89	0.89	0	0.32	0.41	0.45	0.46	0.61	0.56	0.7	0.62	0.72
	Atlantic-N	0.94	0.94	0	0.47	0.81	0.96	1.07	1.2	1.26	1.24	1.21	1.08
	Pacific-S	0.45	0.45	0	0.21	0.2	0.27	0.27	0.28	0.31	0.31	0.3	0.38
	Atlantic-S	0.32	0.32	0	0.17	0.24	0.26	0.29	0.34	0.35	0.34	0.33	0.45
	Indian	0.29	0.29	0	0.13	0.15	0.18	0.2	0.2	0.22	0.24	0.24	0.28
	Southern	0.4	0.4	0	0.22	0.25	0.3	0.3	0.33	0.34	0.37	0.36	0.4
S	Arctic	0.79	0.79	0	0.42	0.66	0.82	0.82	0.91	0.82	0.78	0.81	1.03
	Pacific-N	0.21	0.21	0	0.11	0.11	0.1	0.13	0.11	0.14	0.11	0.13	0.18
	Atlantic-N	0.38	0.38	0	0.23	0.3	0.35	0.39	0.46	0.43	0.44	0.46	0.55
	Pacific-S	0.19	0.19	0	0.1	0.12	0.11	0.13	0.12	0.13	0.13	0.12	0.19
	Atlantic-S	0.18	0.18	0	0.11	0.14	0.16	0.16	0.16	0.17	0.17	0.18	0.25
	Indian	0.22	0.22	0	0.1	0.11	0.11	0.1	0.11	0.11	0.1	0.11	0.16
	Southern	0.1	0.1	0	0.05	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.1
DIC	Arctic	41	41	0	27	41	44	45	50	42	45	42	55
	Pacific-N	15	15	0	7	7	9	8	8	11	11	11	16
	Atlantic-N	13	13	0	8	10	11	13	14	13	13	16	21
	Pacific-S	13	13	0	6	7	8	8	8	9	9	9	13
	Atlantic-S	10	10	0	6	6	8	8	9	10	10	11	14
	Indian	10	10	0	6	6	7	7	8	9	9	8	12
	Southern	9	9	0	6	7	9	9	9	9	9	9	10
TA	Arctic	44	44	0	23	36	42	43	46	44	43	44	54
	Pacific-N	13	13	0	6	6	6	8	8	9	9	9	12
	Atlantic-N	21	21	0	11	15	17	18	22	19	22	23	27
	Pacific-S	10	10	0	6	7	7	8	8	8	8	9	12
	Atlantic-S	10	10	0	6	7	9	9	10	11	12	12	16
	Indian	10	10	0	6	6	8	8	9	9	10	10	12
	Southern	7	7	0	3	4	5	6	6	6	6	7	7
fCO₂	Arctic	90	90	0	55	91	100	113	115	104	102	102	92
	Pacific-N	18	18	0	14	13	19	19	16	20	19	18	30
	Atlantic-N	14	14	0	12	15	14	22	23	19	18	16	24
	Pacific-S	14	14	0	10	10	10	11	10	11	11	10	14
	Atlantic-S	10	10	0	8	8	9	10	11	10	11	10	15
	Indian	11	11	0	7	8	8	9	9	11	10	8	14
	Southern	13	13	0	13	14	19	21	21	19	19	16	20
[H⁺]_{free}	Arctic	2	1.9	0	1.2	1.8	2	2.3	2.3	2.2	2.1	2.2	1.9
	Pacific-N	0.3	0.3	0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.5
	Atlantic-N	0.3	0.3	0	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4
	Pacific-S	0.2	0.2	0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
	Atlantic-S	0.1	0.2	0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
	Indian	0.2	0.2	0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2
	Southern	0.3	0.2	0	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4
[H⁺]_{total}	Arctic	2.1	2.1	0	1.3	2	2.2	2.6	2.6	2.4	2.3	2.4	2.1

	Pacific-N	0.4	0.4	0	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.6
	Atlantic-N	0.3	0.3	0	0.2	0.3	0.3	0.4	0.5	0.4	0.4	0.3	0.5
	Pacific-S	0.3	0.3	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
	Atlantic-S	0.2	0.2	0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3
	Indian	0.2	0.2	0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3
	Southern	0.3	0.3	0	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4
pH_T	Arctic	0.08	0.08	0	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09
	Pacific-N	0.02	0.02	0	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.03
	Atlantic-N	0.02	0.02	0	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02
	Pacific-S	0.02	0.02	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Atlantic-S	0.01	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Indian	0.01	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Southern	0.02	0.02	0	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
[CO₃²⁻]	Arctic	20	20	0	9	11	12	13	11	12	12	13	16
	Pacific-N	9	9	0	3	3	4	4	4	4	4	4	8
	Atlantic-N	12	12	0	5	7	7	8	10	9	10	9	10
	Pacific-S	8	8	0	3	4	4	4	4	4	4	4	6
	Atlantic-S	6	6	0	3	3	4	4	5	5	6	5	7
	Indian	6	6	0	3	3	3	3	3	4	4	4	5
	Southern	5	5	0	3	3	4	4	4	4	4	4	5
Ω_{arag}	Arctic	0.29	0.29	0	0.14	0.17	0.18	0.2	0.17	0.19	0.18	0.2	0.24
	Pacific-N	0.14	0.14	0	0.05	0.05	0.07	0.06	0.07	0.06	0.07	0.07	0.12
	Atlantic-N	0.18	0.18	0	0.08	0.1	0.11	0.13	0.15	0.14	0.15	0.14	0.14
	Pacific-S	0.12	0.12	0	0.05	0.06	0.06	0.06	0.06	0.07	0.07	0.06	0.09
	Atlantic-S	0.1	0.1	0	0.05	0.05	0.06	0.07	0.08	0.08	0.09	0.08	0.12
	Indian	0.09	0.09	0	0.04	0.04	0.05	0.05	0.06	0.07	0.07	0.06	0.09
	Southern	0.08	0.08	0	0.04	0.05	0.06	0.06	0.06	0.06	0.07	0.06	0.07
Ω_{calc}	Arctic	0.47	0.47	0	0.23	0.28	0.28	0.32	0.27	0.3	0.29	0.32	0.38
	Pacific-N	0.22	0.22	0	0.08	0.08	0.11	0.1	0.1	0.1	0.11	0.11	0.18
	Atlantic-N	0.27	0.27	0	0.12	0.15	0.17	0.19	0.23	0.22	0.22	0.22	0.22
	Pacific-S	0.15	0.18	0	0.08	0.08	0.08	0.1	0.1	0.1	0.1	0.09	0.14
	Atlantic-S	0.14	0.14	0	0.07	0.08	0.09	0.1	0.11	0.11	0.13	0.12	0.17
	Indian	0.13	0.14	0	0.06	0.06	0.07	0.08	0.08	0.1	0.1	0.1	0.13
	Southern	0.14	0.12	0	0.07	0.08	0.1	0.1	0.1	0.1	0.1	0.1	0.12
RF	Arctic	1.1	1.2	0	0.8	0.9	0.9	1.1	0.9	1	1	1.1	1.3
	Pacific-N	0.4	0.4	0	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.5
	Atlantic-N	0.4	0.4	0	0.2	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.4
	Pacific-S	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Atlantic-S	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	Indian	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Southern	0.3	0.3	0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4