**Table S1. Overview of the results of the mixed linear models testing for the effect of treatment (1 × pCO2, 2 × CO3, and 3 × pCO2), time, and the interactions of these factors over the duration of the experiment for the suite of tested response variables.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Response variablea** | **Factor** | **Num df** | **Den df** | **F-value** | **p-valueb** |
| Nitrate (µmol L–1) c | Treatment | 2 | 6 | 4.1 | 0.076 |
| Time | 3 | 18 | 465.2 | **< 0.001** |
| Treatment × Time | 6 | 18 | 1.7 | 0.170 |
| Silicic acid (µmol L–1) | Treatment | 2 | 6 | 7.3 | **0.025** |
| Time | 3 | 18 | 348.6 | **< 0.001** |
| Treatment × Time | 6 | 18 | 2.2 | 0.095 |
| SRP (µmol L–1) c | Treatment | 2 | 6 | 5.6 | **0.042** |
| Time | 3 | 18 | 341.6 | **< 0.001** |
| Treatment × Time | 6 | 18 | 2.5 | 0.059 |
| Log Chl *a* (µg L–1) | Treatment | 2 | 6 | 4.3 | 0.069 |
| Time | 6 | 36 | 161.9 | **< 0.001** |
| Treatment × Time | 12 | 36 | 2.1 | **0.041** |
| Bacterial abundance (× 108 cells L–1) | Treatment | 2 | 6 | 12.3 | **0.007** |
| Time | 6 | 36 | 200.6 | **< 0.001** |
| Treatment × Time | 12 | 36 | 6.5 | **< 0.001** |
| PP (µmol L–1 d–1) | Treatment | 2 | 6 | 16.0 | **0.004** |
| Time | 5 | 30 | 54.4 | **< 0.001** |
| Treatment × Time | 10 | 30 | 2.3 | **0.039** |
| PD (µmol L–1 d–1) | Treatment | 2 | 6 | 14.6 | **0.005** |
| Time | 5 | 30 | 12.3 | **< 0.001** |
| Treatment × Time | 10 | 30 | 1.5 | 0.191 |
| DMSPt (nmol L–1) | Treatment | 2 | 6 | 9.4 | **0.014** |
| Time | 6 | 34 | 75.2 | **< 0.001** |
| Treatment × Time | 12 | 34 | 2.1 | **0.046** |
| DMSPd (nmol L–1) | Treatment | 2 | 6 | 0.3 | 0.763 |
| Time | 6 | 33 | 54.6 | **< 0.001** |
| Treatment × Time | 12 | 33 | 1.8 | 0.093 |
| Log DMS (nmol L–1) | Treatment | 2 | 6 | 27.2 | **< 0.001** |
| Time | 12 | 72 | 262.2 | **< 0.001** |
| Treatment × Time | 24 | 72 | 4.0 | **< 0.001** |
| *k*DMSPd (d–1) | Treatment | 2 | 6 | 7.3 | **0.025** |
| Time | 4 | 22 | 6.9 | **< 0.001** |
| Treatment × Time | 8 | 22 | 6.5 | **< 0.001** |
| Particulate yield (%) | Treatment | 2 | 6 | 7.1 | **0.026** |
| Time | 4 | 24 | 13.0 | **< 0.001** |
| Treatment × Time | 8 | 24 | 2.7 | **0.030** |
| Log Macromolecule yield (%) | Treatment | 2 | 6 | 13.3 | **0.006** |
| Time | 4 | 23 | 1.9 | 0.141 |
| Treatment × Time | 8 | 23 | 1.8 | 0.131 |
| DMS yield (%) | Treatment | 2 | 6 | 38.4 | **< 0.001** |
| Time | 4 | 24 | 37.8 | **< 0.001** |
| Treatment × Time | 8 | 24 | 5.3 | **< 0.001** |

**a** Concentrations of nitrate, silicic acid, soluble reactive phosphate (SRP), chlorophyll *a* (Chl *a*), bacterial abundance, rates of particulate primary production (PP), dissolved primary production (PD), total concentration of dimethylsulfoniopropionate (DMSPt), concentrations of dissolved DMSP (DMSPd), dimethylsulfide (DMS), DMSPd loss rate constant (*k*DMSPd), 35S-DMSPd fraction present in particles > 0.2 µm (particulate yield), 35S-DMSPd incorporated into macromolecules, and DMS yield (%). Some variables required log-transformation, as indicated.

b Significant results are indicated in bold, at the 0.05 significance level.

c Nitrate and SRP measurements are reported for days 0–6 only (values were below detection limit beyond day 6).