Supplementary table 1: Summary of the mesocosm volume determination by means of saturated NaCl addition (see section 2.3.1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mesocosm | Salinity before addition | δsal | Salinity after addition | Calculated mesocosm-volume [L] |
| M1 | 31,616 | 0,196 | 31,812 | 58578 |
| M2 | 31,461 | 0,206 | 31,667 | 56138 |
| M3 | 31,662 | 0,200 | 31,862 | 57563 |
| M4 | 31,660 | 0,188 | 31,848 | 61010 |
| M5 | 31,683 | 0,189 | 31,872 | 60463 |
| M6 | 31,584 | 0,194 | 31,778 | 59139 |
| M7 | 31,573 | 0,194 | 31,766 | 59210 |
| M8 | 31,544 | 0,191 | 31,735 | 60084 |

Supplementary table 2: Overview of the added volumes of CO2 enriched seawater [L] to every mesocosm (see section 2.3.2)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day of experiment | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
| 05/12/15T0 | 0 | 0 | 150 | 0 | 150 | 150 | 0 | 150 |
| 05/14/15T2 | 0 | 0 | 100 | 0 | 100 | 100 | 0 | 100 |
| 05/16/15T4 | 0 | 0 | 150 | 0 | 150 | 150 | 0 | 150 |
| 05/18/15T6 | 0 | 0 | 50 | 0 | 50 | 50 | 0 | 50 |
| 05/26/15T14 | 0 | 0 | 75 | 0 | 75 | 75 | 0 | 75 |
| 06/03/15T22 | 0 | 0 | 45 | 0 | 50 | 30 | 0 | 43 |
| 06/09/15T28 | 0 | 0 | 75 | 0 | 75 | 75 | 0 | 75 |
| 06/21/15T40 | 0 | 0 | 50 | 0 | 54 | 46 | 0 | 46 |
| 06/27/15T46 | 0 | 0 | 50 | 0 | 50 | 50 | 0 | 50 |

Supplementary table 3: Summary of the significant treatment effects detected by similarity percentage analysis (SIMPER) performed on the normalized abundance/concentration data. Significant negative impacts indicated with red, significant positive effects with green background color.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Phase I** | **Phase II** | **Phase III** | **Phase IV** |
| **Biogeochemistry** |  |  |  |  |
| TPCWATER |  |  | **p = 0.029** | **p = 0.031** |
| TPNWATER |  |  |  |  |
| POCWATER |  |  | **p = 0.029** | **p = 0.007** |
| PONWATER |  |  | **p = 0.029** |  |
| TPPWATER |  |  | **p = 0.029** | **p = 0.031** |
| BSiWATER |  |  |  |  |
| POC:PONWATER |  |  |  |  |
| PON:TPPWATER |  |  |  |  |
| POC:TPPWATER |  |  |  |  |
| TPCSED | **NA** |  |  |  |
| TPNSED | **NA** |  |  |  |
| POCSED | **NA** |  |  |  |
| PONSED | **NA** |  |  |  |
| TPPSED | **NA** |  |  |  |
| BSiSED | **NA** |  |  |  |
| **Phytoplankton** |  |  |  |  |
| Chlorophyceae |  |  |  | **p = 0.029** |
| Chrysophyceae |  |  |  | **p = 0.029** |
| Cryptophyceae |  |  |  | **p = 0.029** |
| Cyanophyceae | **p = 0.026** |  |  | **p = 0.029** |
| Bacillariophyceae |  |  | **p = 0.029** |  |
| Dinophyceae |  |  | **p = 0.029** |  |
| Prasinophyceae |  |  |  |  |
| Prymnesiophyceae |  |  | **p = 0.029** |  |
| **Microzooplankton** |  |  |  |  |
| Autotrophic |  |  | **p = 0.029** | **p = 0.029** |
| Heterotrophic |  |  |  | **p = 0.029** |
| **Mesozooplankton** |  |  |  |  |
| *Acartia* spp. copepodites |  |  | **p = 0.029** |  |
| Bivalvia |  |  |  | **p = 0.029** |
| Bryozoa |  |  |  |  |
| *Calanus* spp. adults |  |  |  |  |
| *Calanus* spp. copepodites |  |  |  | **p = 0.029** |
| *Centropages* spp. adults |  |  |  |  |
| *Centropages* spp. copepodites |  |  |  |  |
| Cirripedia |  |  |  |  |
| *Clupea harengus* larvae |  |  |  | **p = 0.029** |
| Echinodermata |  |  | **p = 0.029** |  |
| Gastropoda |  |  | **p = 0.029** | **p = 0.029** |
| Hydrozoa |  |  |  | **p = 0.029** |
| *Microsetella* spp. |  |  |  | **p = 0.029** |
| *Para-/Clausocalanus* adults |  |  |  |  |
| *Para-/Clausocalanaus* copepodites |  |  |  |  |
| Copepod nauplii |  |  |  |  |
| *Oikopleura dioica* |  | **p = 0.031** |  | **p = 0.029** |
| *Oithona* spp. adults |  |  |  |  |
| *Oithona* spp. copepodites |  |  |  | **p = 0.029** |
| *Oncaea* spp. adults |  |  |  |  |
| Polychaeta |  |  |  |  |
| *Temora* spp. adults |  |  |  |  |
| *Temora* spp. copepodites |  |  |  |  |

Supplementary table 4: Summary of statistical analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A**Plankton nMDS | **Phase I** | **Phase II** | **Phase III** | **Phase IV** |
| Distance | Bray-Curtis | Bray-Curtis | Bray-Curtis | Bray-Curtis |
| Dimensions | 2 | 2 | 2 | 2 |
| Stress | 0.1066 | 0.1203 | 0.0916 | 0.0197 |
|  |  |  |  |  |
| **B**Betadisper on vegdist + ANOVA |  |  |  |  |
| F-value | 0.1481 | 0.6613 | 0.5023 | 0.1442 |
| Pr (>F) | 0.7136 | 0.4472 | 0.5051 | 0.7172 |
| **C**PERMANOVA |  |  |  |  |
| F model | 1.2028 | 1.5240 | 3.7741 | 7.4774 |
| R2 | 0.1670 | 0.2026 | 0.3861 | 0.5548 |
| Pr (>F) | 0.1133 | 0.1463 | 0.0302 | 0.0289 |