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Supplement of

Effect of ocean acidification and elevated $f\text{CO}_2$ on trace gas production by a Baltic Sea summer phytoplankton community

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Supplementary Figures

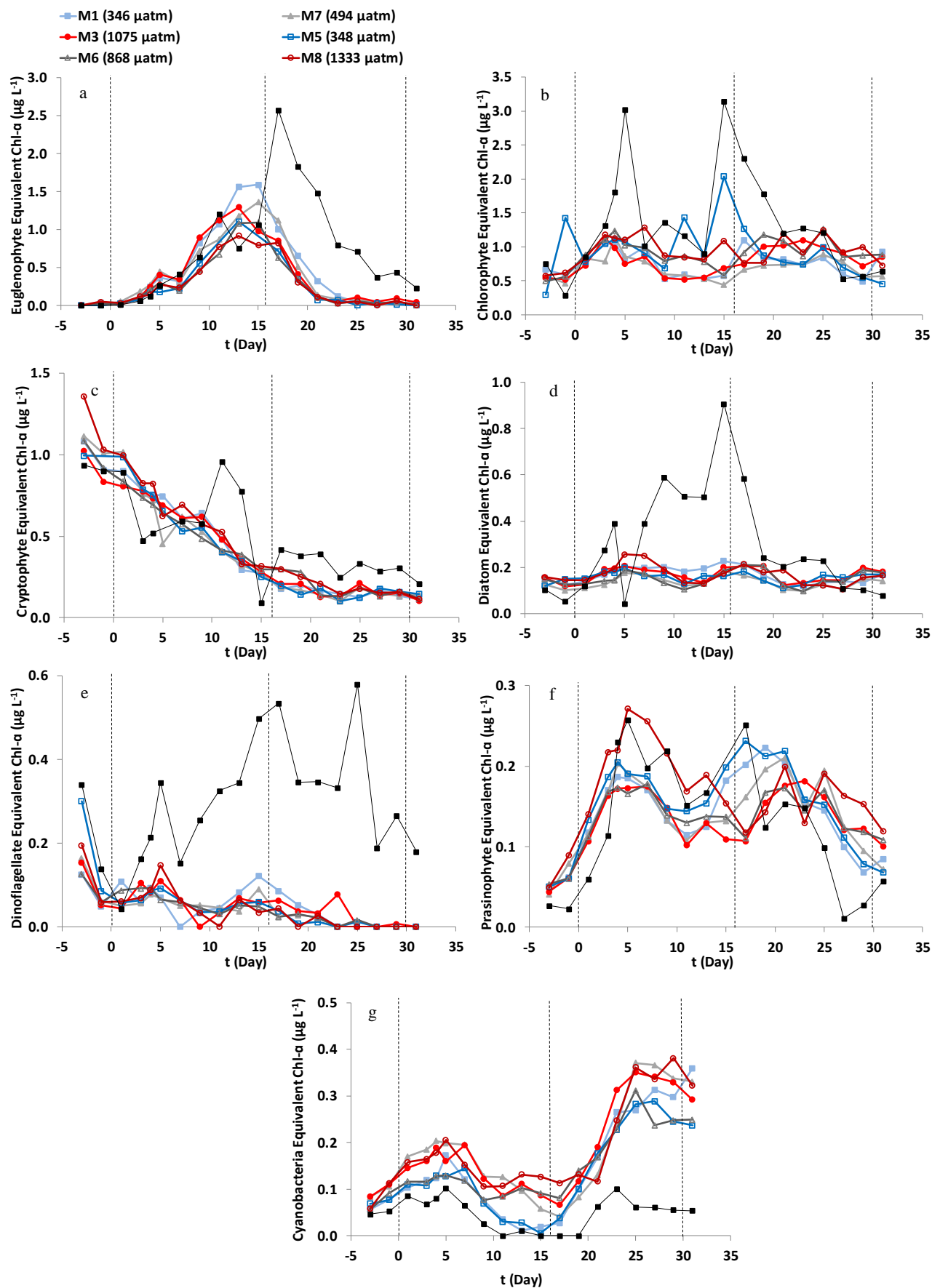


Figure S1. Temporal development of equivalent Chlorophyll- α concentrations ($\mu\text{g L}^{-1}$) for (a) Euglenophytes, (b) Chlorophytes, (c) Cryptophytes, (d) Diatoms, (e) Dinoflagellates (f) Prasinophytes and (g) cyanobacteria identified using HPLC and calculated using the CHEMTAX algorithm. Concentrations are the mean of a sample integrated over the total 17m of the mesocosms Dashed lines show the different phases of the experiment, $f\text{CO}_2$ shown in the legend are mean $f\text{CO}_2$ across the duration of the experiment. Data from Paul *et al.* (2015).

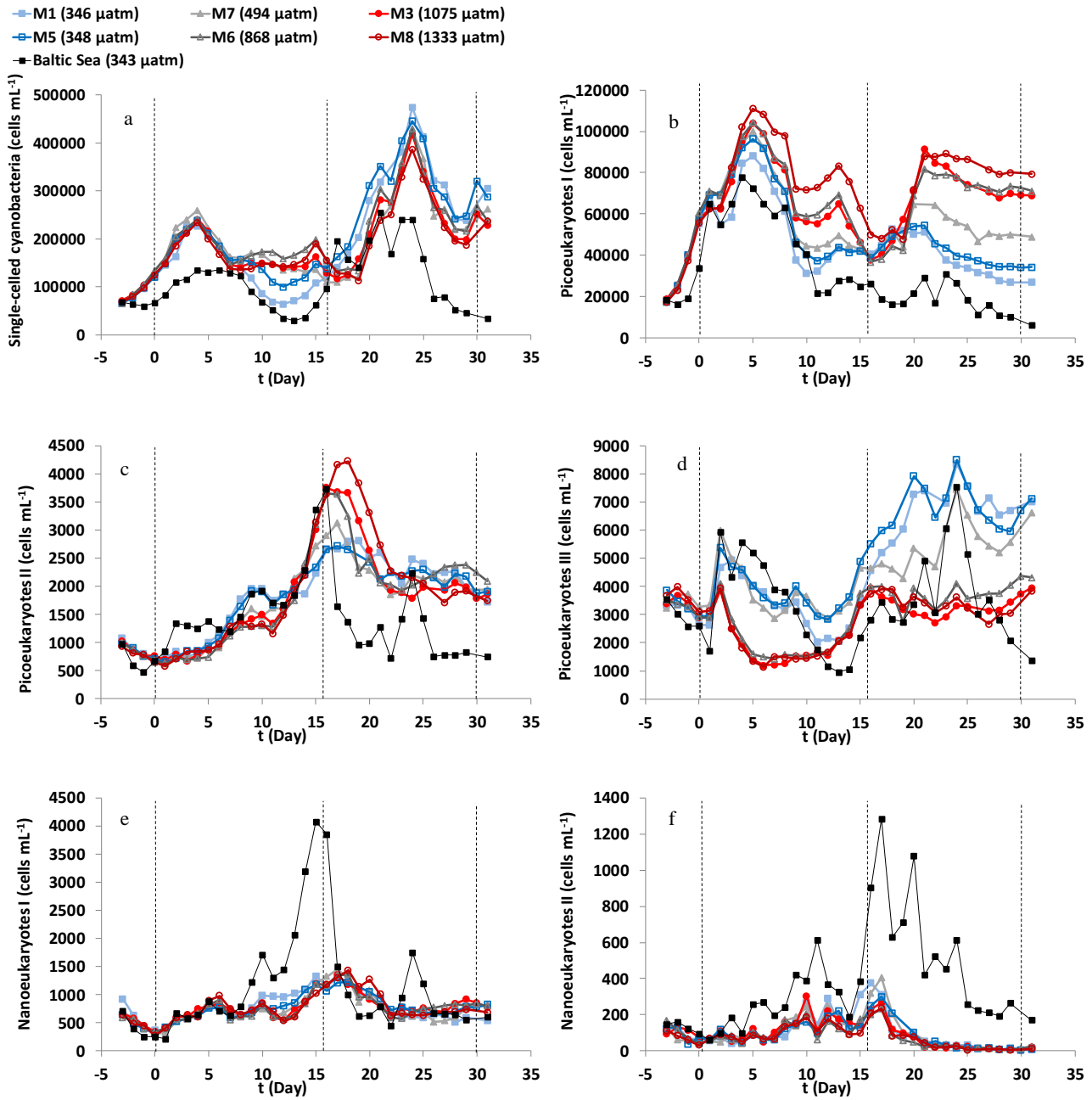


Figure S2. Cell enumeration (cells mL⁻¹) by flow cytometry for identified groupings in the mesocosms: (a) single-celled cyanobacteria, (b) picoeukaryotes I, (c) picoeukaryotes II, (d) picoeukaryotes III, (e) nanoeukaryotes I, and (f) nanoeukaryotes II from an integrated sample from the surface 10m of the mesocosms. Dashed lines show the different phases of the experiment, $f\text{CO}_2$ shown in the legend are mean $f\text{CO}_2$ across the duration of the experiment. Data from Crawford *et al.* (2016).

Table S1. Spearman's Rank Correlation Coefficients for all trace gases measured in the mesocosms compared to total Chl-*a* (Paul *et al.*, 2015), CHEMTAX analysis of derived Chl-*a* (Paul *et al.*, 2015) and phytoplankton abundance (Crawford *et al.*, 2016). Coefficients are significant at 99% confidence limits, except where highlighted (*) which are significant at 95%. NC: non-correlated.

| | DMS | CH ₃ I | CH ₂ I ₂ | C ₂ H ₅ I | CH ₂ ClI | CHBr ₃ | CH ₂ Br ₂ | CHBr ₂ Cl |
|---|---------|-------------------|--------------------------------|---------------------------------|---------------------|-------------------|---------------------------------|----------------------|
| Chlorophyll-<i>a</i> (µg L⁻¹) | -0.604 | -0.224 | -0.406 | 0.405 | -0.521 | -0.209* | 0.518 | NC |
| Phytoplankton Taxonomy (Equivalent Chl-<i>a</i> µg L⁻¹) | | | | | | | | |
| Total Equivalent Chl-<i>a</i> | -0.607 | -0.324 | -0.601 | 0.418 | -0.465 | -0.373 | 0.337 | NC |
| Cyanobacteria | 0.424 | NC | 0.379 | NC | 0.230* | NC | -0.379 | -0.229* |
| Prasinophytes | NC | NC | NC | 0.375 | NC | -0.307 | NC | NC |
| Euglenophytes | NC | NC | -0.351 | 0.287 | NC | NC | NC | NC |
| Dinoflagellates | -0.618 | -0.459 | -0.499 | 0.276 | -0.517 | NC | 0.652 | NC |
| Diatoms | -0.243* | NC | NC | NC | -0.264* | -0.235* | NC | NC |
| Chlorophytes | NC | NC | NC | NC | NC | -0.330 | NC | NC |
| Cryptophytes | -0.695 | -0.513 | -0.672 | 0.454 | -0.582 | -0.222* | 0.864 | NC |
| Small Phytoplankton (<10 µm) abundance (cells mL⁻¹) | | | | | | | | |
| Cyanobacteria | 0.575 | NC | 0.520 | -0.276 | 0.314 | NC | -0.519 | NC |
| Picoeukaryotes I | -0.256 | -0.293 | NC | NC | -0.339 | -0.443 | NC | NC |
| Picoeukaryotes II | 0.502 | 0.586 | 0.621 | -0.441 | 0.335 | 0.222 | -0.752 | NC |
| Picoeukaryotes III | 0.603 | 0.234 | 0.466 | -0.208* | 0.376 | 0.223 | -0.262 | NC |
| Nanoeukaryotes I | NC | 0.367 | 0.346 | -0.274 | NC | NC | -0.477 | NC |
| Nanoeukaryotes II | -0.512 | NC | -0.375 | 0.323 | -0.297 | NC | 0.342 | NC |

Table S2. Spearman's Rank Correlation Coefficients for trace gases measured in the Baltic Sea compared to total Chl-*a* (Paul *et al.*, 2015), CHEMTAX analysis of derived Chl-*a* (Paul *et al.*, 2015) and phytoplankton abundance (Crawford *et al.*, 2016). Coefficients are significant at 99% confidence limits, except those highlighted (*) at being significant at 95%. NC denoted non-correlated parameters.

* 95% significance level.

| Compound | DMS | CH ₃ I | CH ₂ I ₂ | C ₂ H ₅ I | CH ₃ Cl | CHBr ₃ | CH ₂ Br ₂ | CHBr ₂ Cl |
|--|--------|-------------------|--------------------------------|---------------------------------|--------------------|-------------------|---------------------------------|----------------------|
| Chlorophyll- <i>a</i> (µg L ⁻¹) | 0.842 | NC | NC | NC | NC | 0.654* | NC | NC |
| Phytoplankton Taxonomy (Equivalent Chlorophyll µg L⁻¹) | | | | | | | | |
| Total Equivalent Chlorophyll-<i>a</i> | 0.860 | NC | NC | NC | NC | NC | NC | NC |
| Cyanobacteria | -0.746 | -0.725 | NC | NC | NC | NC | NC | NC |
| Prasinophytes | NC | NC | NC | NC | NC | NC | NC | NC |
| Euglenophytes | 0.888 | NC | 0.629* | NC | 0.678 | NC | NC | 0.622* |
| Dinoflagellates | 0.608* | NC | NC | NC | 0.769 | NC | NC | 0.671* |
| Diatoms | NC | NC | NC | NC | NC | NC | -0.615* | NC |
| Chlorophytes | NC | NC | NC | NC | NC | NC | NC | NC |
| Cryptophytes | NC | NC | NC | NC | -0.671* | NC | -0.734 | NC |
| Small Phytoplankton (<10 µm) abundance (cells mL⁻¹) | | | | | | | | |
| Cyanobacteria | NC | NC | NC | NC | 0.653 | 0.605 | NC | NC |
| Picoeukaryotes I | NC | -0.800 | -0.731 | NC | -0.489* | NC | -0.510* | NC |
| Picoeukaryotes II | NC | NC | NC | NC | NC | NC | NC | NC |
| Picoeukaryotes III | NC | NC | NC | NC | NC | NC | NC | NC |
| Nanoeukaryotes I | NC | NC | NC | NC | NC | NC | NC | NC |
| Nanoeukaryotes II | 0.880 | 0.463* | 0.527 | NC | 0.577 | 0.563 | NC | NC |

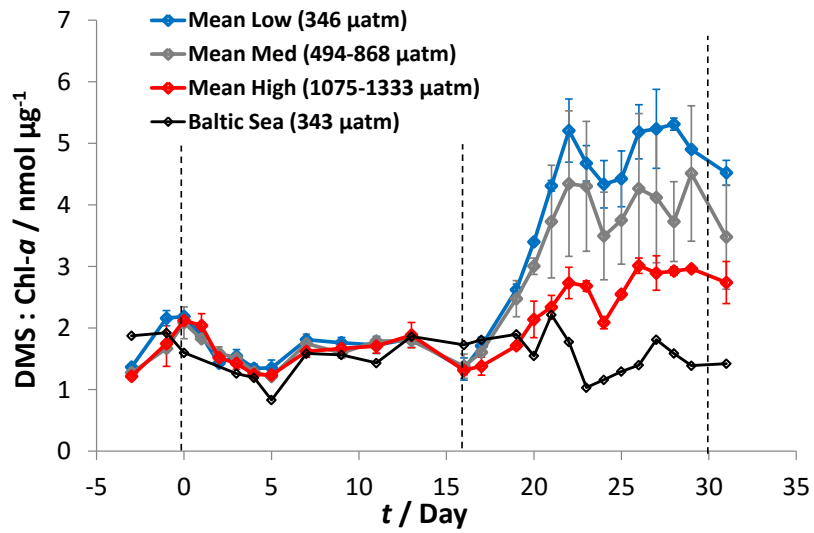


Figure S3. Ratios of DMS: total Chl-*a* ($\text{nmol } \mu\text{g}^{-1}$) plotted as means for the different $f\text{CO}_2$ concentrations with error bars denoting the standard deviation. Chl-*a* data from Paul *et al.* (2015)