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Supplementary material

Effects of iron limitation and UV radiation on *Phaeocystis antarctica* growth and dimethylsulfoniopropionate, dimethylsulfoxide and acrylate concentrations

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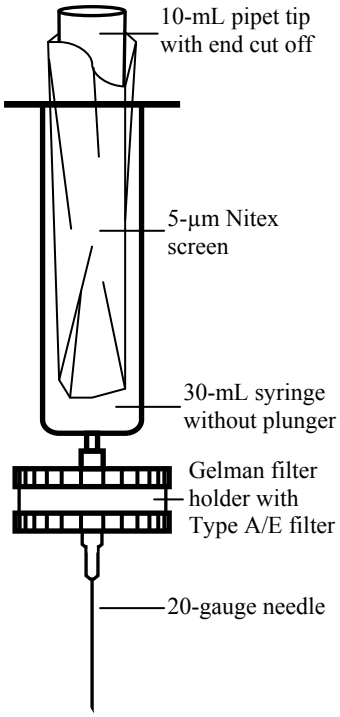

Fig. S1. Diagram of the double, in-line filtration set up used for filtering *P. antarctica* culture samples. For this set up, the 5-µm Nitex screen was loosely wrapped around a 10-mL pipette tip that had the end cut off to widen the tip opening and placed into a 30-mL polypropylene syringe without the plunger. The syringe was connected to a Gelman, screw-together Delrin filter holder containing a baked Type A/E glass fibre filter (550 °C, 6 h). A 20-gauge bevelled needle was attached to the outlet of the filter holder.

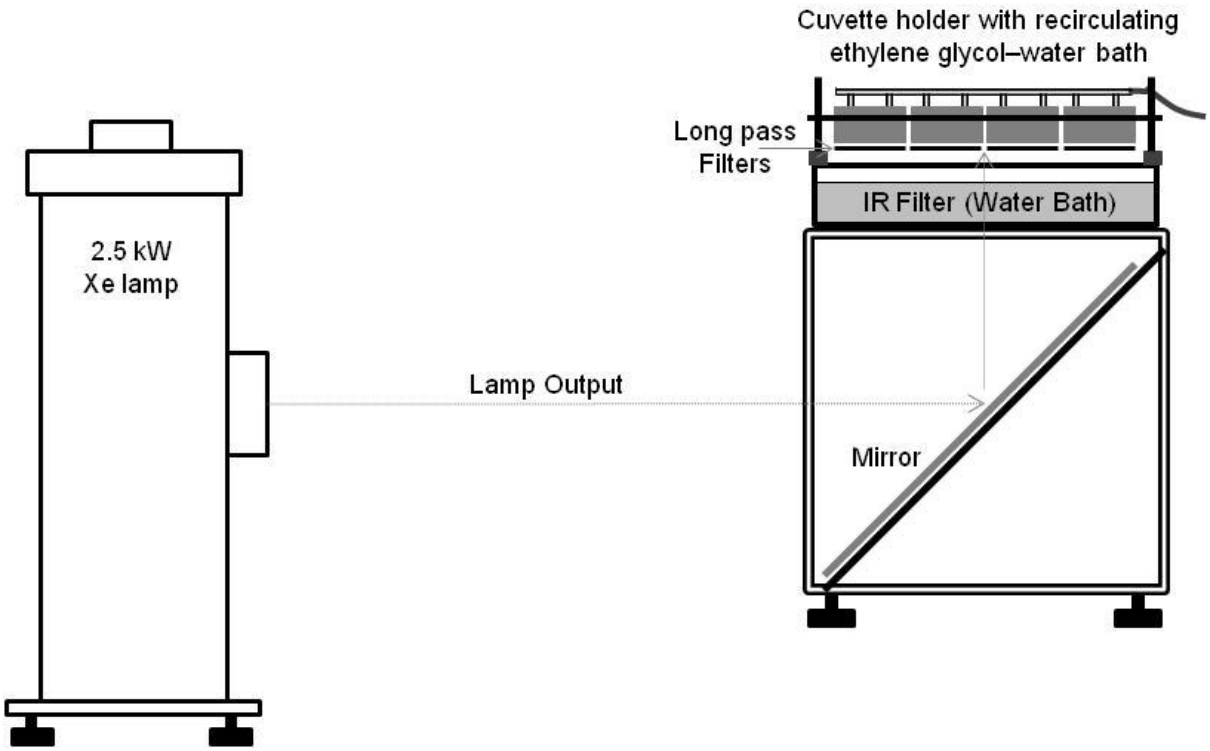

Fig. S2. Diagram of the photoinhibitron set up that consisted of a 2.5-kW xenon arc lamp, a mirror to redirect the lamp output to pass through an infrared filter consisting of a 7-L water bath made with UVR-transparent Plexiglas. The culture aliquots contained in quartz cuvettes were placed in cylindrical wells that were drilled out of each aluminium block. A long pass cutoff filter assembly (consisting of either a single 3 mm thick plate of WG305 Schott glass for the UVR+PAR treatments, or a combination of a 3-mm GG395 Schott glass and Courtgard film joined together using silicone optical grease for the PAR-only treatments) covering the full 16.5 × 7-cm bottom surface of each aluminium block allowed samples to be exposed to different spectral treatments. Nickel or stainless steel screening of different mesh sizes was placed directly underneath individual sample wells to control UVR+PAR and PAR-only intensities. Each aluminium block was machined to allow ethylene glycol–water to recirculate through it and maintain sample temperatures in the cuvettes at 2.0 °C. The coolant was contained within each aluminium block in a closed system that was not exposed to the samples or cuvettes.

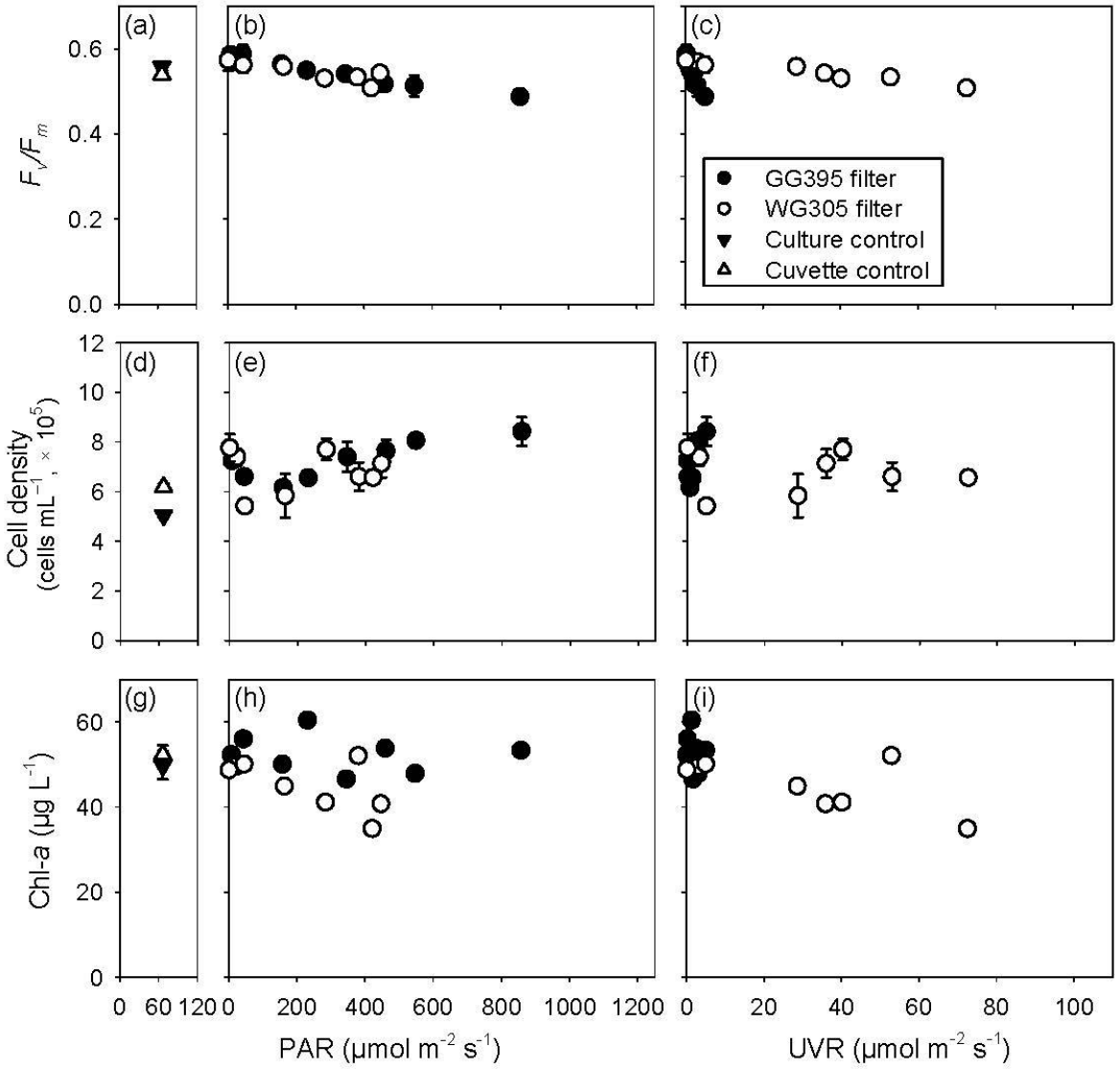

Fig. S3. Photosynthetic efficiency (F_v/F_m) (a–c), cell-number density (d–f) and Chl-*a* concentration (g–i) for iron-replete cultures of *P. antarctica* plotted as a function of PAR intensity for controls (a,d,g) and photoinhibitron samples (b,e,h), and UVR intensity for photoinhibitron samples (c,f,i). Samples were exposed in the photoinhibitron for 4 h using either a GG395 with a Courtgard filter (PAR only, closed circles) or a WG305 long pass filter (UV+PAR, open circles). Culture control samples (closed triangle) were taken from the iron-replete cultures before and after samples were dispensed for UVR+PAR and PAR-only exposures, and directly processed for quantification of F_v/F_m, cell-number density and Chl-*a*. Cuvette controls (open triangles) were placed in quartz-bottomed cuvettes and returned to the Percival growth chamber and sampled after 4 h. Error bars denote the standard deviation. The *P. antarctica* culture used for this experiment was grown to day 27.

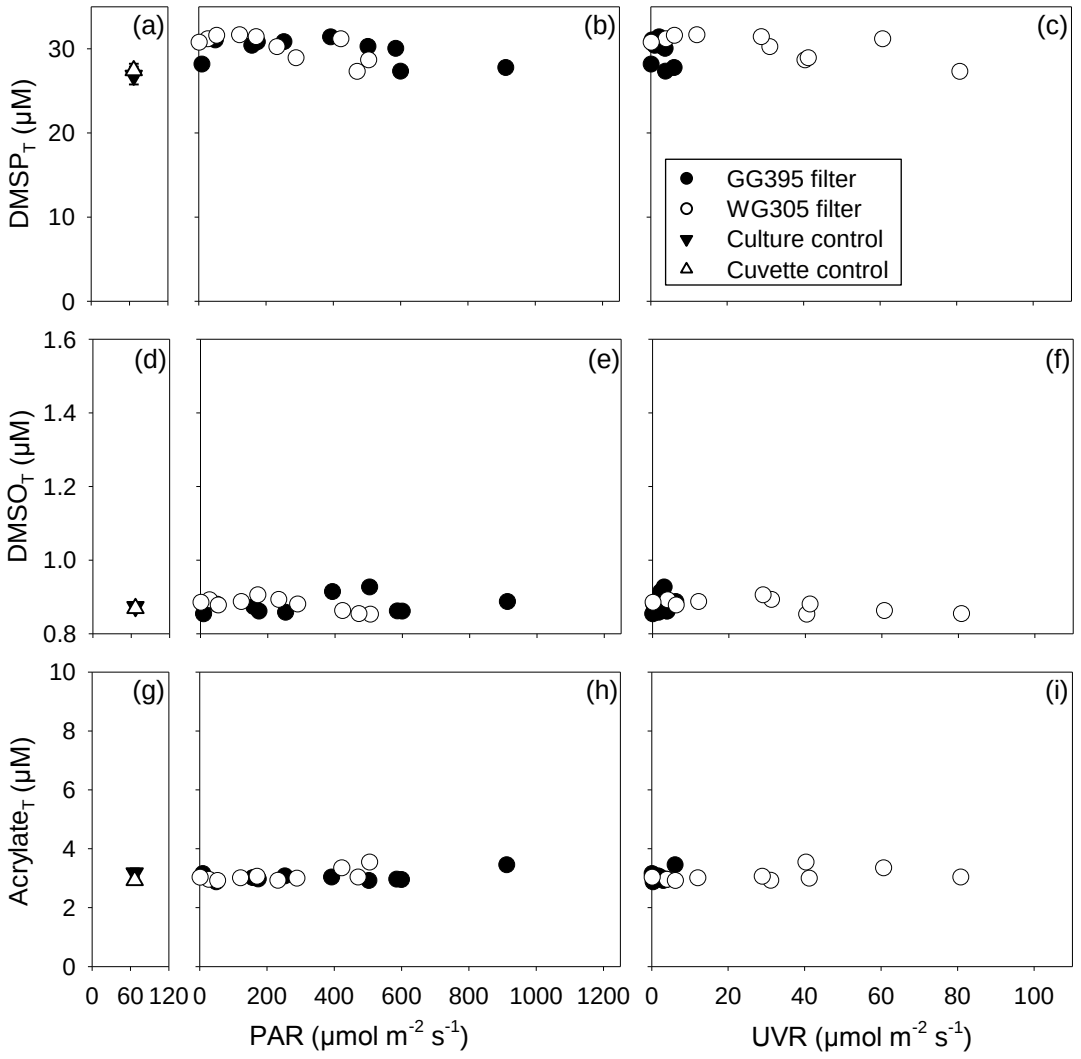

Fig. S4. Total dimethylsulfoniopropionate (DMSP) (a–c), dimethylsulfoxide (DMSO) (d–f) and acrylate (g–i) concentrations for iron-replete cultures of *P. antarctica* plotted as a function of PAR intensity for controls (a,d,g) and photoinhibitron samples (b,e,h), and UVR intensity for photoinhibitron samples (c,f,i). Samples were exposed in the photoinhibitron for 4 h using either a GG395 with Courtgard filter (PAR only, closed circles) or a WG305 long pass filter (UV+PAR, open circles). Culture control samples (closed triangles) were taken from the iron-replete cultures before and after samples were dispensed for UVR+PAR and PAR-only exposures, and directly processed for total DMSP, DMSO and acrylate concentrations. Cuvette controls (open triangles) were placed in quartz-bottomed cuvettes and returned to the Percival growth chamber and sampled after 4 h. Error bars denote the standard deviation. The *P. antarctica* culture used for this experiment was grown to day 27.