

UVR-induced photoinhibition of summer marine phytoplankton communities from Patagonia

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Abstract During austral summer 2006, experiments were carried out to evaluate the effects of ultraviolet radiation (UVR, 280–400 nm) on carbon fixation of natural phytoplankton assemblages from Patagonia (Argentina). Surface water samples were collected (ca. 100 m offshore) at mid morning using an acid-cleaned (1 N HCl) dark container. The short-term impact of UVR (measured as radiocarbon incorporation) was immediately assessed by exposing samples to three artificial illumination treatments: PAR (400–700 nm), PAR + UV-A (320–700 nm), and PAR + UV-A + UV-B (280–700 nm). Pico-nanoplankton characterized the assemblages, and taxon-specific pigment fingerprinting combined with CHEMTAX and supplemented with microscopic observations showed varied proportions of diatoms, chlorophytes, and cyanobacteria throughout January–February 2006. Photosynthetic efficiency, as assessed through assimilation numbers, was high [between 4.4 and 10.4 $\mu\text{g C } (\mu\text{g chl-a})^{-1} \text{ h}^{-1}$], and it was probably favored by the supply of inorganic nutrients from the Chubut River. UVR-induced photoinhibition appeared to be related to the taxonomic composition: in general,

higher photoinhibition was observed when diatoms dominated, whereas this was lower when samples were dominated by chlorophytes. Our data suggest that xanthophyll pigments might have provided only limited protection in these already highlighted acclimated assemblages.

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