

Solar UVR-induced DNA damage and inhibition of photosynthesis in phytoplankton from Andean lakes of Argentina

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With 7 figures and 2 tables

Abstract: During January 1999, studies were carried out in temperate lakes of the Andean region of Argentina (41° S, 71° W) to determine the short-term effects of solar ultraviolet radiation (UVR, 280–400 nm) upon natural phytoplankton assemblages. Organisms from one 'clear' (Lake Moreno) and two 'opaque' lakes (Morenito and El Trébol) were exposed to different radiation regimes to assess photosynthesis inhibition and cyclobutane pyrimidine dimers (CPDs) accumulation/repair. UV-B caused significant DNA damage in organisms from 'opaque' lakes, especially those from Lake Morenito. Organisms from the 'clear' Lake Moreno, on the other hand, presented lower CPDs accumulation rates. UV-B had relatively low effects inhibiting photosynthesis in these opaque lakes (2 and 9.5 %, for lakes Morenito and El Trébol, respectively) and most of the inhibition was due to UV-A (75 and 71 % inhibition for lakes Morenito and El Trébol, respectively). In Lake Moreno, photosynthetic inhibition was 35 and 15 % for UV-A and UV-B, respectively. A number of causes seems to account for the different responses observed among phytoplankton assemblages, being one of the most important underwater radiation fields, and hence for the light acclimation history of cells. In addition, factors such as differences in type and effectiveness of the strategy used by the organisms to cope with solar UVR, as well as differences in the size structure and taxonomic composition of the community, are also important at the time to evaluate the overall impact of solar UVR in these lakes.

Key words: Andean lakes, CPD, DNA, Patagonia, photosynthesis, phytoplankton, UVR.

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