

The implications of ozone depletion on the fauna of the Australian Alps

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Abstract

The expected increases in ultraviolet-B radiation due to anthropogenic ozone depletion appear likely to have particular impact on the Australian Alps, as it is situated at high elevations, middle to high latitudes, and in the Southern Hemisphere. A number of studies have affirmed that ozone-related changes in UV-B will probably be most pronounced at such locations. While complete clarification of the effects of UV-B on many different organisms remains elusive, existing research indicates that in many cases, UV-B can have deleterious consequences. For example, UV-B radiation has been directly linked to skin cancer, corneal tumors, and immunosuppression. This is of specific significance in alpine regions where levels of UV-B radiation are expected to be high, particularly given the albedo of snow in the UV-B wavelengths. Many plant species have also been shown to be negatively impacted by UV-B, although some of these impacts may take a number of years to manifest. Furthermore, complex interactions between trophic levels and differential UV-B sensitivities may lead to substantial changes in species composition. As there appears to be a paucity of long-term data on the effects of increases in UV-B radiation, it seems that the most acceptable solution is to initiate rigorous sampling and monitoring studies, and simultaneously assess and test the effects of UV-B in conjunction with other stresses, such as low temperatures. Finally, research has determined that existing levels of UV-B in the south-eastern alpine region of Australia are likely to be a significant causative factor in the decline of populations of a high altitude frog species. This finding, in conjunction with previous research, leads to concern over the potential vulnerability of other species in the Australian Alps to pervasive increases in UV-B radiation.

Notes to readers

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