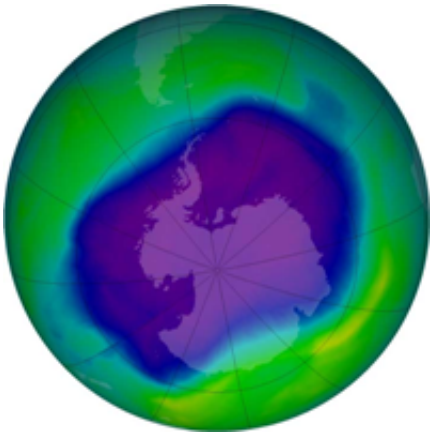
Ozone hole UV impacting marine life: study

July 26 2012



(Phys.org) -- Ultraviolet radiation has caused a steep increase in deaths among marine animals and plants, according to an international team including scientists at the Oceans Institute of The University of Western Australia.

The team synthesised 1784 published experiments on marine organisms around the world to evaluate the magnitude of impacts caused by increased ultraviolet B radiation (UVB) in a study published today in the journal *Global Ecology and Biogeography*. Until now, the role of UVB radiation as a possible cause of the global decline in the health of marine ecosystems had not been quantified.

The marine life most affected by UVB are protists (such as algae),

corals, crustaceans and fish larvae and eggs, thereby affecting marine ecosystems from the bottom to the top of the food web.

Since the 1970s, a continuous emission of fluorocarbon compounds (CFCs) has led to the reduction of the stratospheric ozone layer and consequent elevated levels of UVB, particularly in the Southern Hemisphere.

Winthrop Professor Carlos Duarte, Director of the UWA Oceans Institute and co-author, said the impact of increased UVB radiation had not been fully addressed to date because of two key misconceptions - that the Montreal Protocol (first signed in 1987) "fixed" the ozone layer and that UVB does not penetrate to significant depths in ocean waters.

"Whereas the Montreal Protocol was effective in preventing further deterioration of the ozone layer, this has not yet recovered, and now we know that damaging UVB radiation can penetrate to considerable depths in clear ocean waters," Professor Duarte said.

Today's study builds on evidence of considerable impacts of UVB radiation on marine plankton and ocean processes. The research was coordinated by UWA Professor Susana Agustí.

"The effects of ultraviolet radiation detailed in this study mainly affect organisms growing near the ocean surface, such as eggs and larvae of invertebrates and fish, which are exposed to very high UVB levels," Professor Agustí said.

"Our results provide evidence that marine organisms in the Southern Hemisphere are more resistant to elevated UVB radiation than those in the Northern Hemisphere, and that resistance of organisms in the Southern Hemisphere has increased over time. These observations suggest that high mortality of sensitive marine organisms in the Southern

Hemisphere, where UVB levels have increased the most, has already selected for the more resistant organisms.

"The experiments included in this research involve organisms and species that have survived after the erosion of the ozone layer caused by CFCs. Therefore, the results suggest that an increase in UVB radiation could have a heavy impact on marine biota. A clear evidence of this impact is the reduction of mortality rates of up to 81 per cent when reducing exposure to UVB present in larvae of commercial fish such as cod, anchovies and other organisms.

"Our results strongly suggest that increased UVB radiation over the past four decades may be a hidden driver of the widespread decline of marine life, from corals to fish, often attributed to other pressures, such as climate warming, overfishing and other impacts."

The Spanish National Research Council and the Catholic University of Chile were also involved in the research.

Provided by University of Western Australia

Citation: Ozone hole UV impacting marine life: study (2012, July 26) retrieved 23 April 2024 from https://phys.org/news/2012-07-ozone-hole-uv-impacting-marine.html