

# Global warming affects Arctic and Antarctic regions differently

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(Phys.org)—The robustness of food webs of Arctic and Antarctic ecosystems has been compared for the first time, revealing that global warming can affect the biodiversity of these ecosystems in different ways despite the similarities between them.

The research, co-authored by the Director of The University of Western Australia's Oceans Institute, Winthrop Professor Carlos Duarte, in conjunction with the Spanish National Research Council (CSIC), is based on the study of more than 700 species.

The International Laboratory on Global Change (LINCGlobal) research analysed the feeding relationships among 145 Arctic and 586 [Antarctic](#) species. The results, published in the journal Marine Ecology Progress Series, show that [global warming](#) can affect the biodiversity of these ecosystems in different ways.

The research found that the [Arctic ecosystem](#), which has a higher proportion of predator species, is more susceptible to disturbances affecting species such as whales and polar bears higher up the food chain. According to the researchers, this phenomenon - called "trophic cascade" - represents a major threat to the ecosystem because disturbances among predator species are more likely to affect species at lower levels.

The Antarctic food web, however, has a higher proportion of prey species and the effects of disturbances are most likely to affect species

lower down the food chain. One example is evidence of a decrease of Antarctic krill caused by overfishing and climate change.

"By applying complex [network theory](#) to understand the topology of polar food webs, we have found distinctive elements - which are also relative to non-polar food webs - that show polar [food webs](#), particularly the Arctic one, are highly vulnerable to functional extinctions of key species, such as Antarctic krill in the Antarctic food web," Professor Duarte said.

The study also shows that the Arctic food web has more omnivorous species than the Antarctic (80.71% vs. 41.13%). The loss of these species makes the Arctic more susceptible to invasion by other species.

Arctic and Antarctic Poles are two of the regions where the effects of climate change are more intensely observed in the planet. While for the rest of the world an average increase in mean annual temperature of 0.5°C (32.9°F) since 1950 has been recorded, for the Arctic and Antarctic Peninsula, an increase of about 1.5°C (34.70°F) has been recorded.

Provided by University of Western Australia

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