

High temperatures found to boost biodiversity in Arctic and sub-Arctic seas

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A new study by the Nord University (Norway) in which the Institut de Ciències del Mar (ICM-CSIC) in Barcelona has participated has confirmed that the high temperatures in the Arctic and sub-Arctic

seas—especially affected by global warming—are promoting the settlement in these waters of species that previously lived in warmer areas located further south.

Details of the research are reported in a paper recently published in the journal *PNAS*. To carry out the study, data acquired from more than 20,000 trawl surveys in the Norwegian and Barents Seas between 1994 and 2020 were analyzed.

"In 1994, an average of 8 [fish species](#) were caught in each trawl in the Norwegian and Barents Seas, while in 2020 the number rises to more than 13, which represents an increase of 66%. The results of the study also shown increases, albeit less significant, in the richness of adjacent areas," explains lead author Cesc Gordó-Vilaseca, from the Nord University.

This proves that the warming of waters due to [climate change](#) is leading to a redistribution of [species](#), not only in the warmer areas—much more studied—but also in colder areas such as the polar zones, that are warming at a much faster rate than the rest of the planet.

Different responses to warming

On the other hand, the study shows different species' responses to warming. Of the 193 species included, 71 relatively warm-water species are now more common in the northern seas, while 23 species that were previously more common in the study area are now less common.

However, the study also shows the expansion of some Arctic species that may be adapting well to the rising temperatures. Among the relatively warm-water species that are increasing are some of great commercial interest, such as the common cod (*Gadus morhua*). In contrast, according to the study, most of the Arctic species that have declined are not fished

on a large scale, although they may play key ecological roles, such as the Arctic cod (*Arctogadus glacialis*).

"The shift in frequency of species, sometimes favored by high temperatures and sometimes not, could lead to a reconfiguration of ecological interactions and, therefore, could cause changes in the structure and functioning of the entire ecosystem," warns Marta Coll, researcher at the ICM-CSIC and co-author of the study.

Studies like this one are essential, as they can contribute to the design of more effective conservation and management strategies. For this reason, for future research, researchers will delve deeper into the changes at the level of the entire ecosystem that may be caused by the increase in temperatures in polar areas. The possible effects on [fisheries management](#) and protection measures that these changes may cause will also be analyzed.

More information: Cesc Gordó-Vilaseca et al, Three decades of increasing fish biodiversity across the northeast Atlantic and the Arctic Ocean, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2120869120](https://doi.org/10.1073/pnas.2120869120)

GitHub: github.com/CescGV

Provided by Institut de Ciències del Mar (ICM-CSIC)

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