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IPN studies Gulf of California for ocean warming

- **This phenomenon causes a decrease in the productivity and diversity of the ocean, and affects the region's fishery, which accounts for about 70 percent of the country's total catch of species or organisms**

- **As marine ecosystems are less productive, it impacts specimens that feed on plankton**

An interdisciplinary group of experts led by the National Polytechnic Institute (IPN) analyzes the decrease in productivity and species diversity of the Gulf of California, caused by the increase in global surface warming of the ocean, which since 2014 stood on average at 0.9 degrees, which affects the fishery, and the food chain of marine ecosystems.

Dr. Jaime Gómez Gutiérrez, a researcher at the IPN's Interdisciplinary Center for Marine Sciences (CICIMAR), and scientists from the National Autonomous University of Mexico (UNAM) and the United States, determined that the phenomenon has affected fishing activity, which represents approximately 70 percent of the total catch in the country, and has an economic impact on 11 million people living around the area.

The polytechnic expert pointed out that, globally, the days when unusual sea heat waves are recorded increased by up to 50 percent, which are more frequent and prolonged, leading to ecosystem problems such as deoxygenation and acidification, which affects smaller phytoplankton and zooplankton organisms, as well as species that prey on them and that are at higher trophic levels (squid , fish, birds, turtles, mammals, among others).

As a result of this phenomenon, the oceans are less productive because a barrier is formed in the mixture of water, affecting the efficiency of the vertical exchange of heat, carbon, dissolved oxygen concentration and nutrients. In addition, it impacts organisms that feed on plankton.

Dr. Gómez Gutiérrez indicated that the decrease in nutrients near the surface causes less abundance of phytoplankton that damages organisms that feed on plankton species, the basis of the trophic plot.

In addition, the change in the structure of the ecosystems of the Gulf of California has also been a consequence of anthropogenic activities, that is, by coastal fishing.

An example of this is that during the 1970s-80s, the fishery for giant squid, sardines and shrimp boomed economically. Subsequently, the squid disappeared, and reappeared during the 1997-1998 El Niño event. In the 2000s they captured up to 250 thousand tons of the mollusc annually, with large individuals with a length of up to 90 centimeters of mantle.

Since 2010, the ecosystem has presented an increase in ocean temperature, which caused the capture of giant squid of smaller average size (dwarf) due to lack of food and high temperatures in the fisheries of Guaymas, Sonora and Santa Rosalía, Baja California Sur, said the CICIMAR scientist.

Currently, the expert Jaime Gómez and his team are investigating the biovolum and structure of zooplankton with the support of historical information from 1957 to date, the year in which the first systematic expeditions of zooplankton in the Gulf of California were carried out by Edward Brinton and Annie Townsend of the Scripps Institution Oceanography, University of San Diego , California, United States.

In addition, it is recorded that, from the year of 1535, Hernan Cortes began the exploitation of the Gulf of California in an attempt to colonize northeastern Mexico.

On the other hand, Dr. Gómez Gutiérrez in collaboration with the researcher Carlos J. Robinson, director of the Institute of Marine Sciences and Limnology of the National Autonomous University of Mexico (ICML-UNAM) promote an international effort to study the "Effect of global warming on diversity, productivity and fisheries in the Gulf of California" to understand the resilience of the ecosystems of this productive region of the country.