

The silent benefits of the oceans: the value of phytoplankton

Assessment of marine ecosystem services at the Latin-American Antares time-series network (CRN 3094)

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<https://antaresiaiproject.wordpress.com/>

Abstract:

The health of the oceans and their ability to absorb CO₂ relies mostly on phytoplankton. Research supported by the Inter-American Institute for Global Change Research (IAI) shows the value of these tiny plants as ecosystem service-providers.

The tiny unicellular marine plants that are the basic food source for marine life as a whole – including fish and whales – are also useful to human beings because of their ability to absorb carbon dioxide dissolved in water in the form of organic compounds.

We are talking about phytoplankton – a word that comes from Greek and means ‘wandering plant’. In fact, these organisms transport themselves freely by floating adrift in the sea. In this way, they provide what biologists call ‘ecosystem services’. One of them is key for our survival: they produce half of the available oxygen on the planet.

Researchers supported by the Inter-American Institute for Global Change Research (IAI) are studying phytoplankton as if it was a human patient that they must monitor – physically, chemically and biologically – in order to diagnose its condition, and therefore the health of the marine ecosystem. The scientists are looking for a connection between the dynamics of phytoplankton in the ocean and its benefits to society, through permanent monitoring in five observatories in Latin America: the Permanent Station of Environmental

Studies of Argentina (EPEA, in Spanish); Ubatuba in Brasil; Ensenada in Mexico; Instituto del Mar de Perú (IMARPE) and the town of Cariaco in Venezuela. The motive for this research centers around the fact that today's oceans are not the same as 40 years ago, because of natural causes as well as human activities that have generated climate change. In addition, phytoplankton plays a very important role in this process. Why?

The ocean alone provides the ecosystem services that benefit humanity the most: it absorbs around a third of the CO₂ emissions of the planet, but not homogeneously. It depends on biological and environmental conditions, such as the kind of phytoplankton and its size (big or small cells). Under some conditions there is a greater absorption of CO₂, and this study was able to prove that this is due to the different kinds of phytoplankton in certain areas.

This means that it is not only terrestrial forests that fulfill this carbon sink function. The ocean does too, even though society does not fully know about it. "To a large extent it remains invisible to society since it is not measured regularly", say the researchers, among which are the oceanographers Vivian Lutz and Milton Kampel. The phytoplankton, which is the basis of the oceanic food chain, works also as a "sensor of climate change", says the ecologist Rubén Negri, who is also part of the project.

This research was carried out within the collaboration of the Antares Network, composed of eight countries in the Americas. Scientists from other disciplines have also participated in order to understand not only the processes that occur in the sea around Latin America but also the socioeconomic factors. They aim to quantify the benefit of oceans for human beings. The researchers have also reviewed the literature on sea capture fisheries and its potential to facilitate climate change analysis.

This data will help to confirm the degree of importance of care of the oceans and to provide rigorous and convincing information to be addressed to decision makers. This is even more salient now that the planet will soon enter the Decade of Ocean Science for Sustainable Development (2021-2030), as declared by the United Nations. "We hope that scientific research will help reduce the uncertainty around policy formulation", the researchers conclude. Not only is it necessary to generate data and scientific information, but it is also important to know how to communicate it.

In the long term, the studies will include data from monitoring stations in Chile, Colombia, and Ecuador to ensure that all Latin American countries are represented in the Antares Network. However, studies that will produce long-term information about the conditions of phytoplankton and the oceanic environment are difficult and expensive, "which causes a knowledge gap about the limiting factors that affect the health of marine ecosystems, and how this impacts human society and food security".