

Scientists from around the world studied Oxygen Minimum Zones at University of Concepción Symposium



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- Liberator General Bernardo O'Higgins Region (Sixth Region), Chile

Organized by the Oceanography Department of the Universidad de Concepción, fifty experts from different countries gathered at the Santa Cruz Hotel (Sixth Region) to participate in the International Symposium **"Microbial ecology and biochemistry of the waters in Oxygen Minimum Zones."**

These marine zones have been studied in depth by scientists from the University of Concepción, who published a groundbreaking scientific paper in the journal *Proceedings of the National Academy of Sciences* in which they provided a new nomenclature for the marine areas where the oxygen concentration is extremely low, or zero in some cases, which they have called Anoxic Marine Zones.

"The dissolved oxygen concentration is a critical principle of marine ecosystems, because when this index decreases there is potential for anaerobic microbial growth, which translates into a significant change of the environment, as well as a loss of fixed nitrogen and gas emissions that contribute to the greenhouse effect," pointed out Dr. Osvaldo Ulloa, investigator at the University of Concepción.

This phenomenon, which was detected on the coast of Iquique and also occurs seasonally by Dichato, has been of international interest because Anoxic Marine Zones have also been detected in the Arabian Sea, in the Baltic Sea and in the China Sea.

"Obviously, our first intention is that we want to understand the phenomenon, which we have been investigating for several years," indicated Dr. Ulloa, who added that "We have noticed that other groups in the world have become interested in the subject. Therefore it is necessary for everyone to gather and discuss and compare results, so we can identify patterns that can be applicable in all systems."

"From this point of view, we are meeting the expectations of bringing all of the world experts in the field and note that many of the things that we have observed are the same that are occurring in other areas, meaning there are patterns that are consistent for all of these Oxygen Minimum Zones," the investigator indicated.

One of the critical elements that has been discovered is the relationship of these zones with the global warming phenomenon, establishing through mathematical models that human impact will expand these zones.

"We must identify the gaps that exist in the knowledge of the subject, meaning that we must define what we must study during the upcoming years. To predict what will occur in the future, we must understand how the system works, not only as an investment, but what as an international community we can do about it," Ulloa explained.

Another of the elements that emerged during the discussion was that this phenomenon in the ocean can expand, and deeply affect human activities. "When a system becomes anoxic, it also becomes toxic due to the presence of hydrogen sulfide, which impedes life, so the first ones to be affected will be local fishing communities," Ulloa affirmed. He pointed that "In fact, this phenomenon already exists in Iquique, but what will happen if it expands? Our predictions through models, contrary to what was believed, are that it will appear at our southern latitudes, and it can be very dangerous to the economy."

Dave Karl has the same opinion, a member of the Symposium committee and a participant of the Nobel Prize awarded for the Global Warming Studies, and he added that "Chile has the most prestigious scientists, experts on Oxygen Minimum Zones, a phenomenon that occurs around the world." With respect to the international experience, he pointed that "For example, in the case of the Baltic Sea, today the issue is that oxygen is being injected into seawater to restore these systems, and that has a cost that must be covered by someone or some entity. What is interesting is that we know that this anoxic process is not the product of global climate change, but it is a direct product of human activities, due to fertilizer usage and nutrient runoff that reaches the sea."

In relation to future studies, he added that, "Like in astronomy, Chile has a worldwide reputation for studies of Oxygen Minimum Zones because the researchers have much to say."