Facebook Live Summary

From microorganisms to whales, this is the biodiversity of the high seas.

In a recent Facebook Live two great researchers shared their knowledge about life in the ocean, from its depths to the most colorful marine mammals. Here are some of their insights.

Many mysteries lie beneath the ocean waters, especially in the high seas. These oceanic regions, which represent 50% of the Earth's surface, have been little explored due to their vast extent and depth.

They are located beyond 200 nautical miles from the coasts, outside the national jurisdiction of countries. They are known as ABNJ (Areas Beyond National Jurisdiction) and are common spaces of humanity, therefore, they are under the responsibility of all the countries of the world.

Few people have dedicated themselves to studying the biodiversity of these waters, among the privileged are two women researchers who, from different but complementary angles, have put the magnifying glass on how life is in these areas, from the tiny microorganisms to the most colorful mammals.

One of them is the Spanish **Ariadna Mecho Lausac**, postdoctoral researcher in Benthic Ecology and currently working at the Laboratory of Environmental and Climate Sciences (LSCE), in France, analyzing the effects of climate change on mesophotic coral communities on a global scale. These types of corals are usually distributed between 30 and 150 meters deep, beyond the typical depth of the shallow coral reefs we know best.

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The other person is **Isabel Cristina Ávila**, Colombian marine biologist and PhD in Environmental Sciences from the Albert-Ludwigs-Universität Freiburg, Germany. She is currently working as a researcher in Marine Mammal Ecology at the Universidad del Valle (Cali, Colombia) and the Institute for Terrestrial and Aquatic Wildlife Research (Hannover, Germany).

Both shared much of their knowledge at the Facebook Live 'Mysteries of the ocean: what is life like under the waters of the high seas', held in October. This was carried out as part of the outreach strategy of the STRONG High Seas project, which aims to strengthen regional ocean governance for the conservation and sustainable use of marine biodiversity, in areas beyond national jurisdiction.
We leave here some of the ideas shared by both panelists and **Jaime Aburto Frías**, PhD in Biology and Applied Ecology and researcher at the Universidad Católica del Norte - UCN (Chile), who accompanied and moderated the meeting.

Jaime Aburto Frías, UCN Researcher

"The high seas constitute 95% of the volume of the ocean, 64% of its surface and represents about 50% of the surface of the earth", with these words Jaime Aburto Frias opened the meeting. He also assured that **all countries in the world are allowed to navigate, fly over, lay submarine cables, research and fish in the ABNJ, which exposes them to various uses and impacts.**

Regarding the importance of these areas, he **noted that they fulfill various functions that are vital to the functioning of the world and the lives of people**. "They provide habitats for multiple species, from microorganisms to large mammals; they absorb CO2 and thus help regulate climate and temperature, which is why they are key in the fight against climate change; they have a significant amount of fishery resources that sustain many economies; they produce a large amount of oxygen, and are essential for ecological connectivity, as they link the coastal with the oceanic," he said.
Despite their important functions, the health of ABNJs faces major threats, most of which are the effects of human activity. **Aburto noted that among the most important are unsustainable fishing; pollution, whether with chemicals, hydrocarbons, plastics or other waste; air and underwater noise pollution caused by marine transport; transport of invasive species; and climate change.**

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Against this backdrop, conserving ABNJ and ensuring their sustainable management is both a priority and a complex task. Because they are waters outside the jurisdiction of any country, their governance depends on the collective action of governments and international actors. Therefore, currently, as Aburto explained, the rules of the game in these areas depend on multiple institutions and instruments.

Ariadna Mecho Lausac, researcher at LSCE

Mecho focused her presentation on the deep-sea biodiversity of the Southeast Pacific, a region adjacent to the coasts of South America. In this regard, she highlighted the variety of habitats and ecosystems that exist in the deep ocean, from seamounts, canyons, plains to hydrothermal vents.

Her presentation focused especially on FAO Area 87, located in the Pacific Ocean and stretching from northern Colombia to southern Chile. **According to her, the area is characterized by high levels of volcanic activity and by the presence of three ridges (submarine cordilleras) that enclose it.**

As for the ecosystems found there, Mecho called attention to some in particular that stand out for their importance and peculiarities. **One of them are the whale corpses which, when they fall to the depths, create the propitious environment for the emergence of a whole network of life which, otherwise, could not grow there due to the scarce nutrients of these areas.** According to the researcher, "When a corpse arrives to a space poor in food, it is a considerable contribution. At the beginning, the most active scavengers arrive, such as sharks, octopuses, etc., and then, when there is no more meat, other kinds of fauna arrive, such as crustaceans".

Mecho explained that a whole series of small species have whale carcasses as their habitat and cannot survive in another environment, that is, they are endemic. **In this regard, the researcher affirmed that if the whales disappear, these deep water ecosystems will also cease to exist.**

On the other hand, she **highlighted the ecosystems associated with hydrothermal springs, seamounts and the abyssal plain.** In the first, live diverse species of fish, crustaceans and other organisms that are adapted to these chemosynthetic spaces, that is, they work from the energy released by chemical compounds and, therefore, they do not need solar energy. Hydrothermal vents function as marine fumaroles that expel water at high temperatures.

Regarding seamounts, **the researcher remarked that the high part of these aquatic mountains are a reservoir of food and nutrients and, consequently, they are rich in species, many of them endemic to a mount or series of mounts**. She also stated that "these mountains become service areas for migratory species. Species are migrating and they come to the seamounts, rest, feed easily, replenish their energy and move on again to another possible seamount".

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Regarding the abyssal plain, Mecho explained that this ecosystem consists of plains located between 2,000 and 6,000 meters deep. It is the largest habitat on the planet and covers 50% of its surface. Although little is known about its biodiversity, there is certainty that it is a very important habitat for biogeochemical cycles and functions as a great carbon sink. **Likewise, the researcher pointed out that the abyssal plain is an ecosystem highly sensitive to any alteration or damage.**

Finally, her presentation gave some clues as to how these deep-sea ecosystems are investigated. **According to Mecho, oceanographic campaigns are extremely expensive because they require large ships, infrastructure to take samples, equipment that includes even robots and long months of work.** So, "When there is an oceanographic campaign, you have to take advantage of it and you have to sample everything. Sampling the sediment, studying the water column and biodiversity," she said.

Isabel Cristina Ávila, researcher at the Universidad del Valle

In her presentation on biodiversity of marine mammals in the Southeast Pacific, Avila explained that they differ from other kinds of animals because they have lungs, take oxygen from the air, give birth to their young and breastfeed them, and feed, reproduce or live in seawater. **The researcher said that in June 2021, according to the Marine Mammal Society, there are 124 of these species registered.**

Based on some studies of marine mammals in the Southeast Pacific, Avila affirms that in the region there is a high probability of encountering these species, especially in the central zone, both coastal and offshore. According to the researcher, 37 species of odontocetes (cetaceans with teeth) are found in the region, including the common dolphin, bottlenose dolphin and spotted dolphin.

There are also a variety of mysticetes (baleen whales), such as the fin whale, the southern right whale, the tropical whale and the minke. In addition to them, there is the emblematic humpback whale that measures up to 18 meters, feeds in the polar areas during the summer and migrates to the tropical areas in the winter to reproduce. A population of these whales breeds in the waters of Colombia, Ecuador, northern Peru, Panama and Costa Rica. **Avila said the humpback whale population in the region is about 11,700 individuals.**

Regarding the role of marine mammals in the oceans, the researcher said that "they are very important in the ecosystem due to their wide distribution. With the production of feces, placenta or even when they die and their corpse remains in the bottom of the sea, they nourish and fertilize the ocean". She also stated that **the migration of these species, both throughout the ocean and at different depths, helps the circulation of nutrients in the water layers, facilitates oxygenation and contributes to the balance of phytoplankton.**

On the other hand**, marine mammals also have economic importance for those coastal populations that depend on tourist income from the sighting of these species**. An example of this is the humpback whale watching tourism in the Colombian Pacific during their breeding season.

Like other species, marine mammals in the Southeast Pacific face a variety of threats. Avila said one of the main threats is **bycatch in fishing nets, followed by pollution, boat traffic, hunting, habitat degradation and altered ocean physics, such as changing temperatures and ice masses.**

Finally, the researcher called attention to the urgency of implementing conservation measures that guarantee the subsistence of marine mammals**. Among them, she highlighted the different marine protected areas that exist in the Southeast Pacific and the need to ensure their connectivity through protected ecological corridors.**

About STRONG High Seas

STRONG High Seas is a five-year project that aims to strengthen regional ocean governance for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (ABNJ). It is coordinated by the Institute for Advanced Sustainability Studies (IASS) and implemented together with the Institute for Sustainable Development and International Relations (IDDRI), BirdLife International, the International Ocean Institute (IOI)-South Africa, the Catholic University of the North (UCN), WWF Colombia and WWF Germany. In collaboration with CPPS and the Secretariat of the West and Central African Regional Seas Programme (Abidjan Convention), this project aims to develop and propose specific actions to support the coordinated development of integrated, ecosystem-based management approaches to ocean management in the Southeast Pacific.

For more information on the STRONG High Seas project, please visit: https://www.prog-ocean.org/our-work/strong-high-seas/ or contact: stronghighseas@iass-potsdam.de.

Fomentado por el:
Ministerio Federal de Medio Ambiente, Protección de la Naturaleza y Seguridad Nuclear
en virtud de una resolución del Parlamento de la República Federal de Alemania

The STRONG High Seas project is part of the International Climate Initiative (IKI; www.international-climate-initiative.com/en/).
The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is promoting this initiative on the basis of a resolution of the German Bundestag.

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