Institut de Ciències del Mar

EXCELENCIA SEVERO OCHOA

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Montserrat Demestre: "We must find a balance between using and protecting resources provided by the sea"

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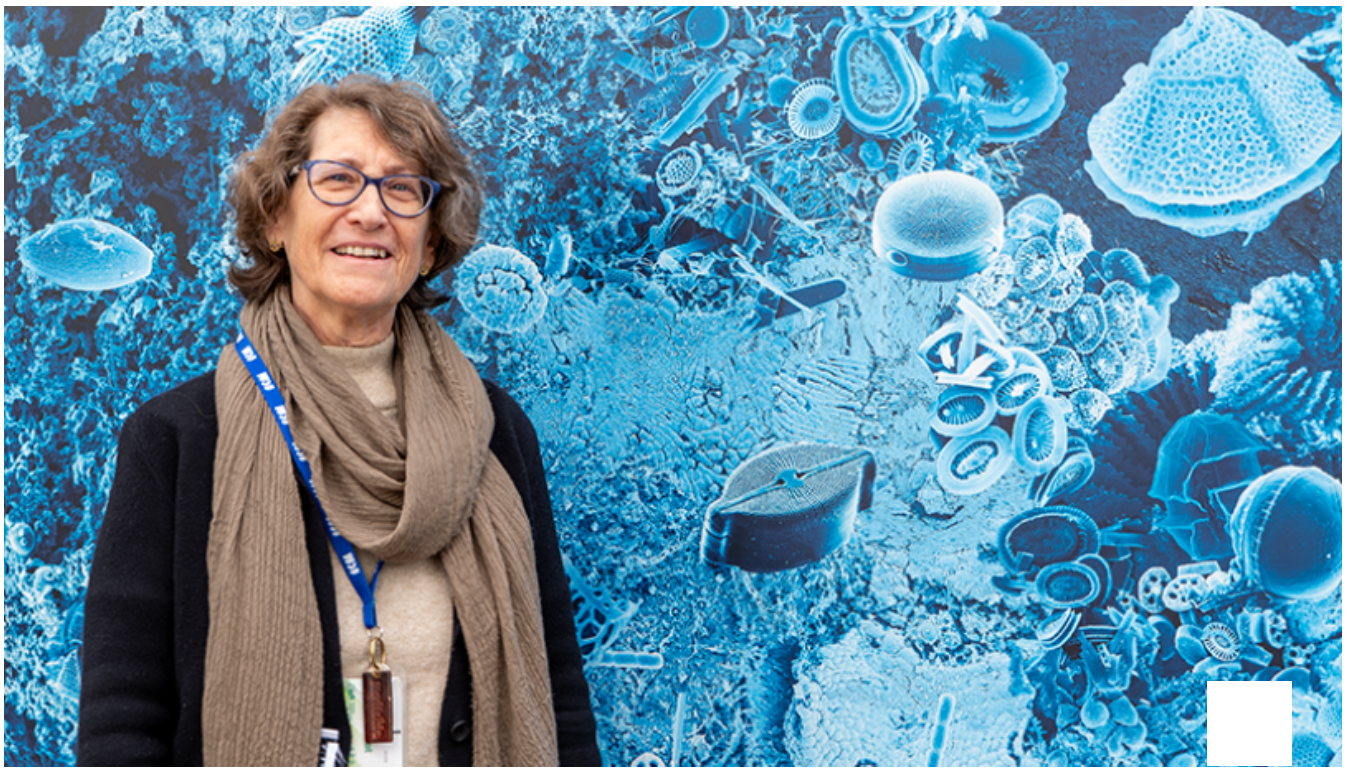
In this January's "In Depth" section we interview our colleague Montserrat Demestre, with extensive experience in benthic ecosystems and sustainable fisheries.



The researcher studies the effects of fishing on organisms and habitats of the seabed / ICM-CSIC.

specialized in the ecology of the benthic system and the effects of fishing on organisms and seabed habitats. During her professional career, the researcher has participated in several multidisciplinary projects that have revealed the urgent need to protect and care for the seafloor, which is essential for the proper functioning of the ocean.

1. What is your main area of research?

My main area of research has always been the sea, a passion I have always had. I have focused my research on benthic ecosystems, i.e., the deep sea. These ecosystems are little known due to the difficulty of access. My research has addressed various aspects of the biology and ecology of the organisms that inhabit them, and I have participated in several multidisciplinary projects that have revealed little-known characteristics of these ecosystems. This has brought to the table their richness in biodiversity, but also their vulnerability.

2. What threats do those living in contact with the seabed face?

The main threat is the modification of their habitat, of their ideal place to reproduce, feed, grow... and with this comes a loss of life on these seabeds due to a change in the characteristics of the sediment and a decrease in biodiversity.

3. How has your research evolved over the years?

Initially, I focused on fishery species and populations, but over time I evolved to a broader perspective of the ecosystem and how fishing affects the seafloor. This shift involved collaborations with disciplines such as geology and oceanography to better understand the marine ecosystem. The main focus was on preserving marine habitats and species and achieving sustainable fisheries to maintain stocks. The new u[illegible] more accurate technologies for seafloor data collection has significantly impr[illegible] the ability to assess the impact of fishing and better understand these habitats.

Marine protected areas are crucial for the conservation of the seabed and its biodiversity, as they act as refuges for species and preserve marine ecosystems, protecting them from fishing pressure and maintaining the ecological balance. However, their effectiveness depends on factors such as the type of protection, location, extent and type of fishing that can be carried out, and above all on their sustainable management to ensure conservation.

5. How are seabeds studied?

The study of the seabed involves the use of various tools and techniques, depending on the conditions and depths of the underwater environment. On deep seabeds, generally sandy or muddy, samples must be taken indirectly using dredges, cores and other instruments to collect samples of both organisms and sediments. For bottoms closer to the coast, generally rocky, samples are much more direct, with visual observations to study the fauna and visual censuses. Studies carried out with oceanographic campaigns on ships equipped with specialized instruments complement the research, collecting data on oceanographic conditions, such as temperature, salinity, currents, etc. Increasingly, underwater observation techniques are becoming more common with remotely operated underwater vehicles (ROVs) or manned submersibles for very detailed visual filming.

6. As an expert on benthic species, could you explain what crinoids are?

Crinoids or sea lilies are fascinating creatures with eight arms similar to small feathers. They are echinoderms, just like starfish. They live on sea beds rich in organic matter and function as filter feeders, using their arms to trap particles. This activity creates a habitat rich in organic matter with a great variety of fauna, especially fish such as young hake, so the presence of crinoids favors the life of other organisms and es an environment rich in biodiversity. They also have anti-tumor properties, as we

7. What is maërl and why is it important?

The maërl is an underwater ecosystem of an impressive liliaceous red, formed by calcareous red algae in the form of calcium carbonate pellets called rhodoliths. They grow slowly (less than 1 mm per year) capturing the carbon present in seawater. Its porous structure, full of spaces, offers places of refuge to many small animals, such as bryozoans and other invertebrates. In addition, other algae and photosynthetic organisms can settle on it, also contributing to primary production in this environment. Like the crinoid beds, the maërl beds are both highly productive and at the same time very vulnerable, as both are exposed to the negative impacts of trawling. Therefore, knowing them is key to protect them.

8. What are the main threats and conservation measures to protect these two essential habitats?

Trawling has an impact on the bottom and can destroy, fragment and affect its biodiversity, as is especially the case in the maërl bottoms, so it is necessary to protect these CO2–absorbing calcareous algal habitats. To conserve these ecosystems, it is necessary to regulate other negative effects such as overfishing, establishing sustainable catch limits, as well as addressing the effects of climate change, pollution and the introduction of plastics into the seas. It is also important to educate society about the importance of conservation and sustainability. People must understand that all components of an ecosystem are interconnected and that protecting one part benefits the whole. We must strike a balance between using and protecting these resources. Sustainability is the key.

9. What projects in which you participate or have participated would you highlight?

I would highlight the CriMa project, which I coordinated between 2019 and 2022 and

maërl biodiversity and abundance in no-trawl areas compared to areas affected by trawling, revealing that marine protected areas can be effective in conserving these unique marine ecosystems. Specifically, we propose the expansion of no-trawl protected areas to ensure adequate protection of maërl and other marine habitats considered vulnerable. We must act quickly, as without intervention these ecosystems could be severely threatened in the future.

10. What advice would you give to novice researchers to encourage them in this endeavor?

I would encourage them to follow their passions and not lose their enthusiasm. Research can be a complicated journey and there can be difficult times, but perseverance and dedication pay off, and I would also advise them to be patient and be willing to invest many hours in research. The rewards will come in time, but being able to contribute to the knowledge and conservation of our ecosystems is a very rewarding task.

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