Swimming over underwater habitats

When it comes to environmental observation, data is often lacking. To assess the health of coastal ecosystems, we need better monitoring of variations in shallow ocean habitats, such as coral reefs and seagrass beds.

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Mapping of coastal marine habitats using very high resolution remote sensing, west of Grande-Terre, Mayotte.

In a few years' time, it will be possible to map the habitats in a seagrass bed or coral reef in less than an hour! At least, that is the vision of a scientific team based in Reunion Island, which is developing new methods for mapping areas in the ocean's shallow waters, particularly coral reefs.

These areas are teeming with diverse habitats that are not always easy to describe or monitor as they evolve. High-resolution satellite images can be used to detect habitats, but are not sufficient to produce reliable maps on their own, even if the water is clear.

Hence the idea of combining approaches and supplementing satellite imagery with underwater videos, taken 1 to 2 metres below the surface by a diver swimming over the coral reef, equipped with a GPS tracker and propelled by a sea scooter. The huge quantity of video thus obtained is then analysed using an artificial intelligence model which, once trained, will interpret and classify the images to produce a high-resolution habitat map. A first!

In Mayotte, this method was used to map the habitats of a reef that was very close to the beach and therefore impossible to assess by boat. The results show that the algorithms are able to classify certain

"The project is a fantastic opportunity to capitalise on our marine environment expertise in collaboration with IRD, to develop innovative R&D tools that meet the growing expectations of managers of marine protected areas. By integrating the cumulative pressures from land and sea, our results will help better plan and preserve coral reefs, which is essential for the sustainable development of island territories."

Alexandre Sneessens, Créocéan Océan Indien, France

IRD/D. Theuerkauff

Underwater photography with camera and high-resolution positioning system, east of Grande-Terre, Mayotte.

habitats with over 90% reliability. Such an approach could therefore make it possible to monitor variations in habitats from one season to the next and, consequently, the evolution of coral ecosystems or seagrass beds over time.

••• A new, inexpensive approach, combining satellite imagery, underwater video and algorithms, is helping to speed up the mapping of coastal habitats •••

Eventually, this mapping technique could be carried out automatically by underwater drones. It is inexpensive, and would enable all countries to monitor the health of their coastal ecosystems at a low cost. As we know, these ecosystems are particularly vulnerable to the impact of human activity, whether fishing, tourism, transport or climate change.

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