

Microplastics could be hampering the ocean's ability to capture carbon

A global survey of microplastics in oceans reveals that tiny particles of plastic are prevalent throughout the water column, which could harm marine ecosystems and affect carbon storage in the deep sea

By [James Dinneen](#) on April 30, 2025



A free diver surrounded by plastic pollution. Sebnem Coskun/Anadolu Agency via Getty Images

Microplastics aren't floating on only the surface of the ocean. A global survey of the tiny particles reveals they are prevalent throughout the water column – even at the deepest depths – which could affect [the ocean's ability to remove carbon from the atmosphere](#).

“It's millions and millions of metric tonnes of this stuff throughout the interiors of the ocean,” says [Tracy Mincer](#) at Florida Atlantic University.

Mincer and his colleagues have reviewed microplastic measurements taken over the past decade from nearly 2000 sites around the world. While most microplastic measurements focused on the shallow surface of the ocean, the dataset included samples from a range of depths, including [the deepest parts of the ocean](#).

They found that microplastics have been recorded virtually everywhere people have looked for them. That includes the [Mariana trench](#), where more than 13,000 microplastic particles per cubic metre were measured nearly 7 kilometres down.

The researchers were surprised to see that the smallest particles are distributed almost evenly throughout the water column – not sinking or floating at the surface, but suspended. “We expect to find plastics at the bottom of the ocean, and at the top of the ocean. But not everywhere,” says [Aron Stubbins](#) at Northeastern University in Massachusetts.

They also found that the polymers in these plastics account for a significant proportion of the carbon particles floating around. At depths of 2000 metres, where there is less biological activity than nearer to the surface, they make up as much as 5 per cent of the carbon.

The ecological consequences of this are largely unknown, but one concern is that buoyant plastic consumed by plankton could reduce the volume of carbon that sinks to the depths in their faecal pellets and dead bodies. That could hamper the ocean’s ability to take up [CO₂ from the atmosphere](#) via the [biological carbon pump](#), says Stubbins. However, he points out that we are far from being able to estimate the size of this effect. “We’re just now discovering the extent of plastics across the ocean,” he says.

“It can’t be ignored any longer by chemists or biologists trying to sort out how vast chunks of the oceans work,” says [Douglas McCauley](#) at the University of California Santa Barbara. He says the survey helps explain disagreements between estimates of the millions of tonnes of plastic flowing into the ocean and the amount actually measured there. “It didn’t disappear, unfortunately. It’s distributed in microplastic form across the water column,” he says.

Journal reference

Nature DOI: [10.1038/s41586-025-08818-1](https://doi.org/10.1038/s41586-025-08818-1)