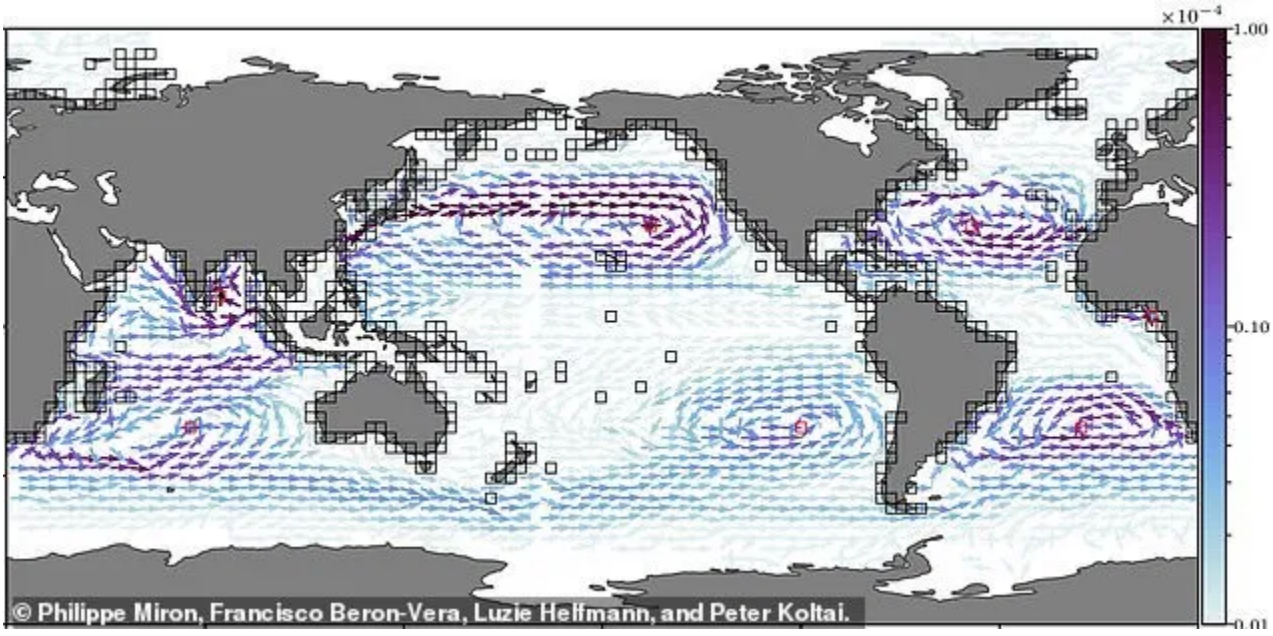
Great Pacific Garbage Patch has a ‘connection path to East Asia’ that can feed the debris

By **Jacky** On **Mar 2, 2021** **AUSTRALIA**



The North Pacific is home to a massive swirl of plastic waste twice the size of Texas, known as the Great Pacific Garbage Patch, but how the waste made its way into the region has been a mystery among scientists until now.

Researchers from the US and Germany set out to find roads that transport debris to the huge floating landfill, along with the relative strengths of several subtropical eddies, or a large system of circulating ocean currents, in the oceans and how they accumulate debris. long term.

Using the Marvok model, the team described the likelihood of plastic waste being transported from one region of the ocean's surface to another.

The model identified a very likely transition channel connecting the Great Pacific Garbage Patch to the coast of East Asia, suggesting the area is a major source of plastic pollution.

The model also revealed that the weakness of the Indian Ocean circulation system is also a trap for plastics, and that the North Pacific subtropical eddy current attracts the most debris.

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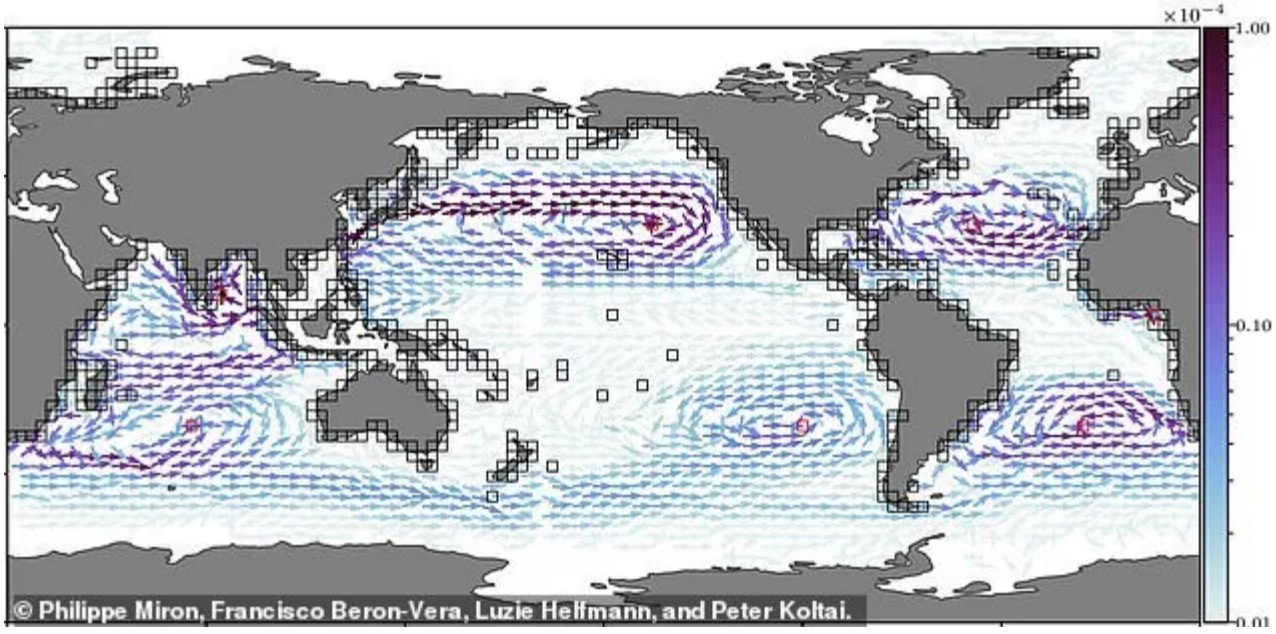


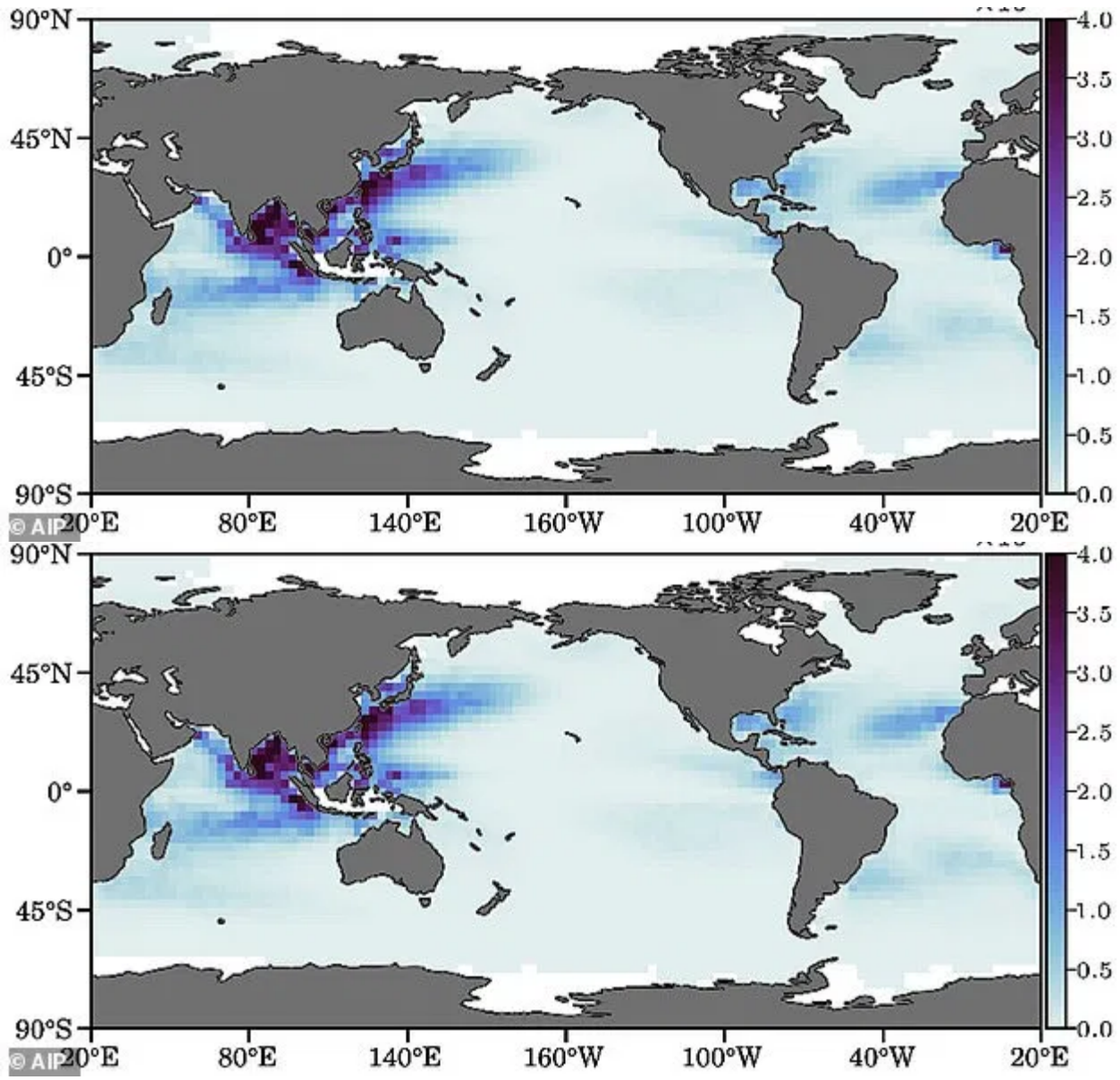
Using the Marvok model, which looks at the probabilities of different states and the speeds of transitions between them, the team described the likelihood of plastic debris being transported from one area of the ocean's surface to another.
Tons of plastic waste end up in the oceans every day and as of 2020 there were some 5.25 trillion pieces of waste of which 269,000 tons floated on the surface.

However, most of the trash accumulates in garbage spots, especially the most famous – the Great Pacific Garbage Patch.

Also known as the Pacific Trash Vortex, this marine landfill contains an estimated 1.8 trillion pieces of plastic.

The study was conducted by Philippe Miron, Francisco Beron-Vera, Luzie Helfmann and Peter Koltai who created a Markov chain model of the ocean's surface dynamics based on historical trajectories of surface buoys.

"Surface debris is released from the coast and is distributed based on the proportion of their location in the global plastic waste entering the ocean," said Miron, an assistant scientist at the University of Miami.



The model identified a very likely transition channel connecting the Great Pacific Garbage Patch to the coast of East Asia

The findings suggest east coasts along Asia (pictured) could be a major source of plastic pollution

“To observe the long-term spread of floating debris, stranded debris is re-injected into the system according to the same distribution.”

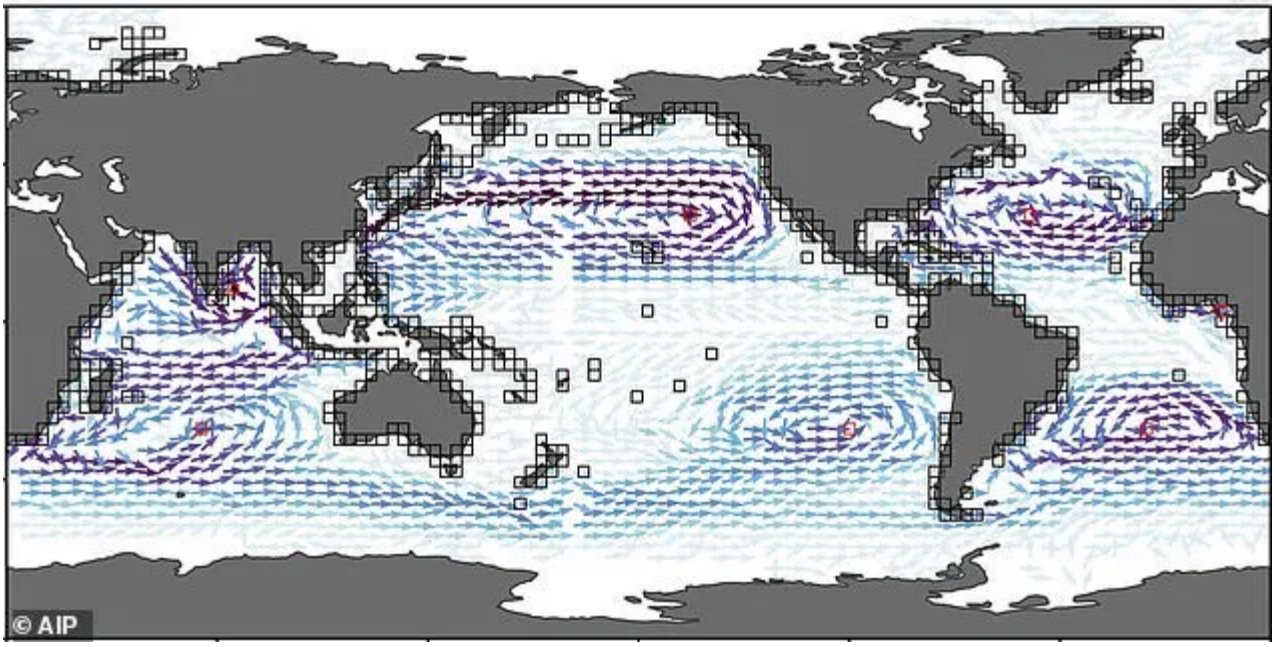
'We call this model' pollution-aware 'because it models the injection, distribution and recirculation of waste in the system.'

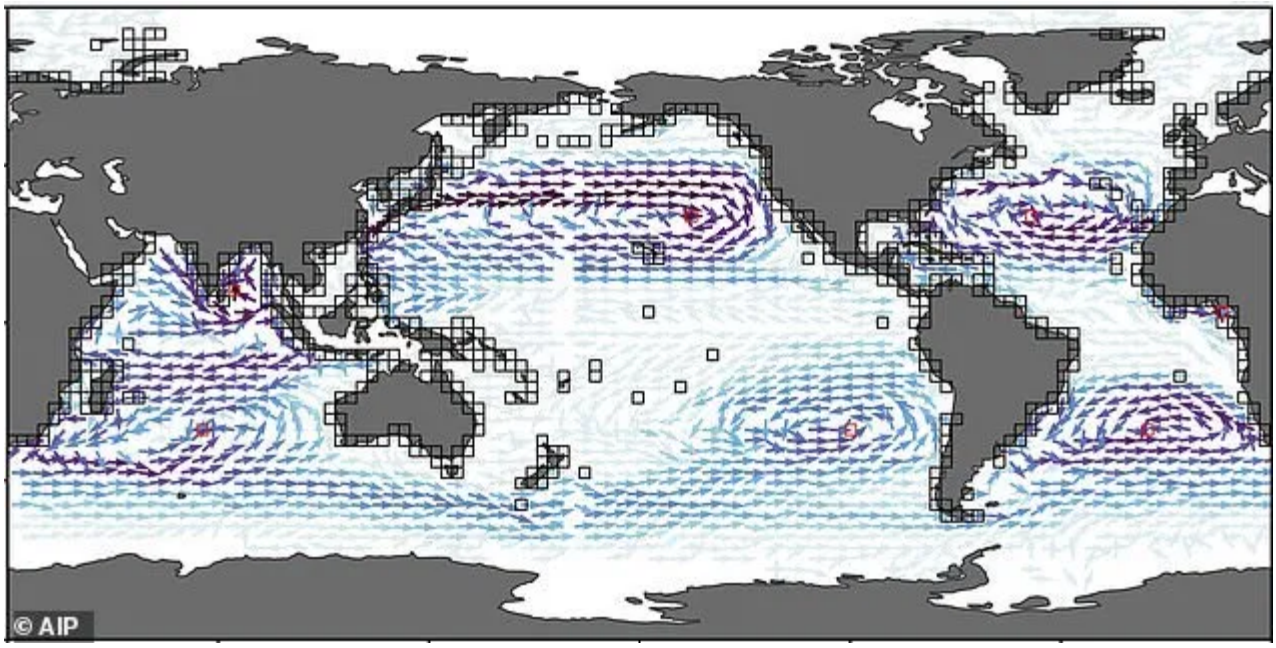
Transition path theory allows the researchers to identify paths or transition paths that directly connect a source to a target.

"In this work, we focus on pathways from the coast to the subtropical vertebrae, from one vertebra to another, and from the vertebrae to the coast," Miron said.

Using the model, the team tracked debris paths and analyzed the stability of the landfill to understand the link between them and their ability to hold waste.

"We have identified a very likely transition channel connecting the Great Pacific Garbage Patch to the coasts of East Asia, indicating a major source of plastic pollution there," Miron said.





The model also revealed that the weakness of the Indian Ocean circulatory system is also a trap for plastics, and that the subtropical eddy current in the North Pacific attracts the most debris.

“And the gyre’s weakness in the Indian Ocean as a trap for plastic waste is consistent with the transitional paths that don’t converge in the gyre.”

The team found that gyres are generally weak or disconnected from each other.

“In the case of abnormally intense winds, one subtropical vortex is more likely to export debris to the shorelines than to another vortex,” Miron said.

One of the greatest discoveries the group has made is that while the North Pacific subtropical eddy attracts the most debris, consistent with previous reviews, the Pacific eddy is the most durable because debris has fewer paths to other gyres.

“Our results, including the prospects for garbage spots that are not yet to be observed immediately or forcefully, namely in the Gulf of Guinea and in the Bay of Bengal, have implications for ocean clean-up activities,” said Miron.

“The reactive pollution routes we have found provide targets – aside from the major garbage spots themselves – for those clean-up efforts.”

WHAT DOES THE DEEP-SEA DEBRIS DATABASE REVEAL ABOUT OCEAN PLASTIC POLLUTION?

Plastic pollution is a scourge that ravages the surface of our planet. Now the polluting polymer is sinking to the bottom of the ocean.

The deepest part of the ocean can be found in the Mariana Trench, located in the western Pacific Ocean, east of the Mariana Islands. It extends nearly 36,100 feet (11,000 meters) below the surface.

A plastic bag was found 35,754 feet (10,898 meters) below the surface in this region, the deepest known stretch of man-made pollution in the world. This single-use piece of plastic was found deeper than 33 Eiffel towers would reach from tip to base.

While plastic pollution is sinking rapidly, it is also spreading further to the center of the oceans. A piece of plastic was found more than 1000 km from the nearest coast – that's beyond the length of France.

The Japan Agency for Marine-Earth Science and Technology (Jamstec) Global Oceanographic Data Center (Godac) was launched for public use in March 2017.

This database contains data from 5,010 different dives. From all these different dives, 3,425 man-made debris were counted.

More than 33 percent of the debris was macro-plastic, followed by metal (26 percent), rubber (1.8 percent), fishing equipment (1.7 percent), glass (1.4 percent), fabric / paper / lumber (1.3 percent), and 'other' anthropogenic items (35 percent).

It was also discovered that of all the waste found, 89 percent of it was designed for one-time use. This is defined as plastic bags, bottles and packaging. The deeper the research looked, the more plastic they found.

Of all man-made items found deeper than 6,000 meters (20,000 feet), the proportions have increased to 52 percent for macro plastic and 92 percent for single-use plastic.

The direct damage this caused to the ecosystem and the environment can be clearly seen, as deep-sea organisms were seen in the 17 percent of the images of plastic debris created by the study.