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The rise in ocean plastics evidenced from 60 years of data

Scientists at the Marine Biological Association and the University of Plymouth are first to confirm a significant increase in open-ocean plastics in recent decades.

Plastics threaten the ocean environment with impacts on marine organisms, economies and human wellbeing. In a research paper published today in the journal *Nature Communications*, researchers present 60 years of data collected over 6.5 million nautical miles from the North Atlantic, showing a significant increase in larger plastic items such as bags, rope and netting (macroplastics) from 1957 to 2016.

The findings are based on records of when plastics have become entangled on a towed marine sampler (the Continuous Plankton Recorder or CPR). The CPR device is towed in surface waters and occupies a similar space to a marine mammal, and therefore is impacted by entanglements in a similar way.



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Dr Clare Ostle, lead author of the research, prepares a continuous plankton recorder (CPR) for deployment.



Since the 1950s there has been a rapid increase in plastic production for a wide range of uses. As the global population continues to increase, plastic waste will continue to grow. The realisation that plastics are ubiquitous, and that the consequent health impacts are yet to be fully understood, has increased the awareness surrounding plastics. However, long-term environmental datasets of plastic debris (particularly large plastic debris) are virtually non-existent.



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Professor Richard Thompson and Dr Ostle deploy the continuous plankton recorder (CPR).



Dr Ostle explaining her research on board the University of Plymouth research vessel *Wavedancer* in Plymouth Sound

Lead author Dr Clare Ostle said: *'What is unique about this work is we have been able to demonstrate the increase in ocean plastic since the 1990s. The Continuous Plankton Recorder survey data highlights the importance of maintaining long-term surveys, and their invaluable importance for retrospective analyses.'*

Contributing author Professor Richard Thompson OBE who leads the [International Marine Litter Research Unit](#) at the University of Plymouth: *'Quantities of marine litter are highly variable in time and space, making it very challenging to see temporal trends. Back in 2004 it was a collaboration between myself and colleagues using the CPR that was the first to show decadal increase in microplastic concentrations in the oceans. It is perhaps no surprise that quantities of litter are increasing, but having robust evidence such as this is essential to help inform policy interventions on a global scale'*.

Ends

Notes for editors:

The *Nature Communications* research paper can be accessed when the embargo lifts at: <http://dx.doi.org/10.1038/s41467-019-09506-1>

Since 1957, the Continuous Plankton Recorder (CPR) has been towed over 6.5 million nautical miles in the North Atlantic and adjacent seas. The primary purpose of the CPR has been to record pelagic plankton, which it has been doing since 1931 using ships-of-opportunity. Thompson *et al.* used this historical record, to retrospectively count the amount of microplastics (plastic <2 mm) within CPR samples along two transects in the northeast Atlantic. This study indicated a significant increase in microplastics from 1960-70 to 1980-1990, however no significant trend was observed between the 1980s and the 1990s.

The CPR consists of a torpedo shaped metal housing around a mechanical gear-shifted advancing mesh to collect and store the plankton, this design and technology has remained consistent since its inception in 1931. The CPR is towed off the back of ships-of-opportunity such as ferries and container ships, at approximately 7 m depth and from 10 – 20 knots speed. In this sense, the CPR is susceptible to entanglement in a similar way to marine mammals that spend time in surface waters. When the CPR mechanism is hauled back on to the ship, the crew report any issues such as entanglement on to a tow log, these are also noted and reported upon return to the CPR maintenance workshop.

Contact for this story: Dr Clare Ostle claost@mba.ac.uk +44 (0)1752 426307 @ClareOstle
For assistance with media matters please contact MBA Communications Co-ordinator Guy Baker on +44(0)1752 426239 (l) or +44(0)7876 831267 (m) email guba@mba.ac.uk

The Marine Biological Association (MBA) is a professional body for marine scientists with some 1,600 members world-wide. Since 1884 the MBA has established itself as a leading marine biological research organization contributing to the work of several Nobel Laureates and over 170 Fellows of the Royal Society. In 2013, the MBA was awarded a Royal Charter in recognition of its long and eminent history and its status within the field of marine biology. The award strengthens the Association's role in promoting marine biology as a discipline and in representing the interests of the marine biological community. The Association is based at its world-class marine research laboratory in Plymouth.

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About the University of Plymouth

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It has a strong track record for teaching and learning excellence, and has one of the highest numbers of National Teaching Fellows of any UK university. With 21,000 students, and a further 17,000 studying for a Plymouth degree at partner institutions in the UK and around the world, and over 100,000 alumni pursuing their chosen careers globally, it has a growing global presence.

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* Research Fortnight Research Power League Table 2014.