safety and environmental standards for the global shipping industry. The IMO is under pressure from campaigners and representatives of other, regulated sectors to agree a global cap on shipping emissions.

Following sharp increases in the early 2000s, the sector's emissions have remained more or less stable since the global financial crisis of 2008. But that is unlikely to continue. The current overcapacity in the maritime cargo market means that ship traffic (and emissions) can increase quickly to meet demand. Moreover, the shipping industry at large — including the cruise sector — has potential to grow, and rapidly.

The IMO has a specialist greenhouse-gas working group that is grappling with the idea of a cap. But its latest meeting, held last week in London, closed without declaring much progress. Overall, the IMO is committed to tightening environmental standards for new ships. Yet its technology-oriented strategy — including an Energy Efficiency Design Index that requires the engines of vessels to burn less fuel — is unlikely to be enough. Cleaning up the industry will require adequate market instruments and economic incentives to encourage owners and operators of both ships and ports to adopt climate-friendly practices, such as enforcing lower speeds.

Owing to the peculiarities of this volatile business, the routes, speed and fuel consumption of tens of thousands of container ships are hard to monitor and verify. An emissions-trading system, for example, would be difficult to implement and even harder to manage. The IMO agreed last year to set up a global $CO_2$ data-collection system that will yield welcome knowledge, as will improvements in tracking the positions and movements of ships from space. But a tax by national governments on fossil fuels used by ships — incurred at refinery level — might be a more effective economic mechanism.

Voluntary efforts alone will not do. The industry has set up a series of half-hearted and overlapping eco-ratings schemes since the 2000s. But an analysis published online on 16 October shows that these have had no notable effect on the environmental performance of ships (R. T. Poulsen *et al. Mar. Policy* **87,** 94–103; 2018). Whereas eco-ratings can steer companies to make more-efficient refrigerators and washing machines in line with the preferences of consumers and regulators, maritime transport is different. The pressure of end-users is too distant to influence ship owners and operators. And price remains the dominant factor for builders and buyers of cargo ships.

***"As a global business, shipping must be tackled by global regulations."***

As a global business, shipping must be tackled by global regulations, and not through a patchwork of voluntary efforts and regional laws. It is true that some regional efforts, such as the European Union's scheme to monitor, report and verify $CO_2$ emissions from large ships using its ports, might be a step towards global regulations.

The IMO has already shown that it can tackle other environmental issues. Measures it introduced in the wake of the *Exxon Valdez* oil spill in 1989 ensure that oil tankers are now much safer. An international convention for ballast-water management, which aims to control the spread of harmful invasive species, came into force in September after years of preparation (although it does not address biofouling on ships' hulls, which is potentially more harmful to local ecology). The IMO has also agreed measures to encourage environmentally responsible ship recycling and minimize uncontrolled shipbreaking, much of which occurs on South Asian beaches. However, this 2009 Hong Kong convention is still not implemented and is awaiting ratification by most member parties.

When it comes to the impact on climate, there is no excuse for delay. Emissions from shipping largely escape the public scrutiny and criticism attracted by those from aviation. Parties to the IMO should step up and hasten the implementation of the necessary standards. ■

# Late developers

*Citations diversity reflects the variety of editorial judgements in selecting papers.*

What makes good science? And how do *Nature*'s editors select papers to publish? The answers to both questions are many and varied. But they have one thing in common: neither is necessarily reflected in citations.

*Nature* publishes about 800 papers each year. Over, say, two years following publication, the pattern of citations typically ranges from a few papers with citations in the hundreds, to a large number with tens of citations, and a tail with single figures.

We are pleased when our papers make an impact. But there is much more to scientific impact than citations. For example, last week, in an 'In Retrospect' article in News & Views, Ronald Larson described a remarkable story (R. Larson *Nature* **550,** 466–467; 2017). In 1997, *Nature* published a paper by Robert Deegan and his colleagues that provided an explanation of the 'coffee-ring effect' in spilt liquids, based on considerations of evaporation and surface interactions (R. D. Deegan *et al. Nature* **389,** 827–829; 1997). For several years, the paper sat proudly in our pages, typically gathering about 20 citations per year. In 2006, as new implications and applications became clear, the rate picked up to well over 100 a year. So far, it has attracted about 4,000 citations. The paper is worth highlighting as an example of the varied types of judgement that *Nature* editors use to select papers.

Our most highly cited papers are indeed often key landmarks in their fields. But there are papers that turn out to have low citations that we are equally happy to have published. The work by Deegan *et al.* was selected not because of any editorial ability to anticipate advances years in the future, but because, at the time, we considered it to be a noteworthy and pleasing piece of insight. Nothing more, nothing less. The developments celebrated by Larson are an editor's unexpected bonus.

Most papers that we publish, with the invaluable help of our reviewers, are selected with a view to their scientific significance, whether as a powerful insight or an unusually empowering resource. And often that will correlate closely with citations (although citation patterns differ across disciplines). But it's important also, for editors in all the disciplines from which we publish, sometimes to appreciate the interest in a paper using quite different criteria. It may be compelling for its sheer creativity or logical elegance, for making the reader stop and think very differently about a question, or for a stimulating and even mysterious observation. Many of these may be slow burners citation-wise — or simply be textbook examples that never get taken up in abundance. Here are other examples, drawn from the physical sciences, that, despite low citations, we like to celebrate.

One such paper illustrated how images could be taken using X-rays radiated when sticky tape was peeled (C. G. Camara *et al. Nature* **455,** 1089–1092; 2008). The citations are not huge by physics standards (165 since 2008) but we still love it, and we did not fully anticipate how it would go viral on social media. Another (11 citations) reported an actual sample of Cretaceous seawater from 145 million years ago. (W. E. Sanford *et al. Nature* **503,** 252–256; 2013). And finally, a theoretical paper providing an exact textbook solution for the capacity of noisy quantum communication channels has been cited just six times since 2013 (G. Smith and J. A. Smolin *Nature* **504,** 263–267; 2013), but we value it for what it is and anticipate that its take-up could increase as research moves from idealized 'noise-free' systems to more realistic noisy ones.

There are examples in other disciplines too. Why highlight such papers? Because we are glad to have published them. And because it's perhaps salutary to appreciate just how unrelated scientific interest (at least, as we at *Nature* see it) and citation numbers can be. ■