

Dispatches

Ships steam slowly toward emissions reductions

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From clothes to gadgets, cargo ships deliver. But they also contribute to anthropogenic nitrogen oxide (NO_x) emissions – noxious particles that are central to smog, acid rain, and ground-level ozone. Today, in Europe alone, one out of every seven NO_x molecules can be traced to those vessels; in 2005, that share was only one in nine. The numbers appear in a recently published, first of its kind study (*Environ Res Lett* 2015; doi: 10.1088/1748-9326/10/7/074007).

In the past, those interested in retrieving information on ship-based emissions had to rely on data provided by individual vessels. However, by using the Ozone Monitoring Instrument on NASA's *Aura* satellite, researchers from the Netherlands and France observed tropospheric NO₂ columns in European shipping lanes. "The technique allowed us nuanced views of air pollution", explains lead



Ships contribute substantially to air pollution.

author Folkert Boersma (Wageningen University and KNMI, the Netherlands).

The team analyzed 7 consecutive years' worth of data taken over the Baltic Sea, the North Sea, the eastern Atlantic, and the Mediterranean Sea. Ship emissions increased by 15% between 2005 and 2008, dropped by 12% in 2009, and held steady thereafter until 2012. The 2005–2008 rise matches a globally growing economy with an increase in shipping traffic. But the 2009 drop, in response to the worldwide economic downturn, was proportionally much larger than a decrease in ships alone could explain. Instead, slower speeds were responsi-

ble for much of the reduction; ships in the Mediterranean that reduced speed by over 30% reduced emissions by 45%. "Slow-steaming", as the practice is called, saves on fuel costs. Ships have continued to "go slow" since 2009, but not much else has changed. "NO_x emissions from land sources have been rapidly coming down since 2005", Boersma says, "so the relative share by ships has been growing despite slow-steaming".

As the world economy grows, especially in developing countries, vessel-based emissions are expected to increase further. "They are a major cause of air pollution in Europe", says Sotiris Raptis of the sustainable transport group Transport & Environment (Brussels, Belgium). "We urgently need measures to control harmful emissions from the existing fleet as well as meaningful standards for new ships." So slow is great, but experts ask for additional changes, such as installing solar panels or kite-like sails, improving vessel designs, and switching to cleaner-burning fuels. The ships may have no choice. Ports around the world are beginning to refuse access to any that fail to comply with emissions standards. ■