We Don't Put Lead In Our Gas Anymore, But These 3-D Maps Show It's Still In The Ocean

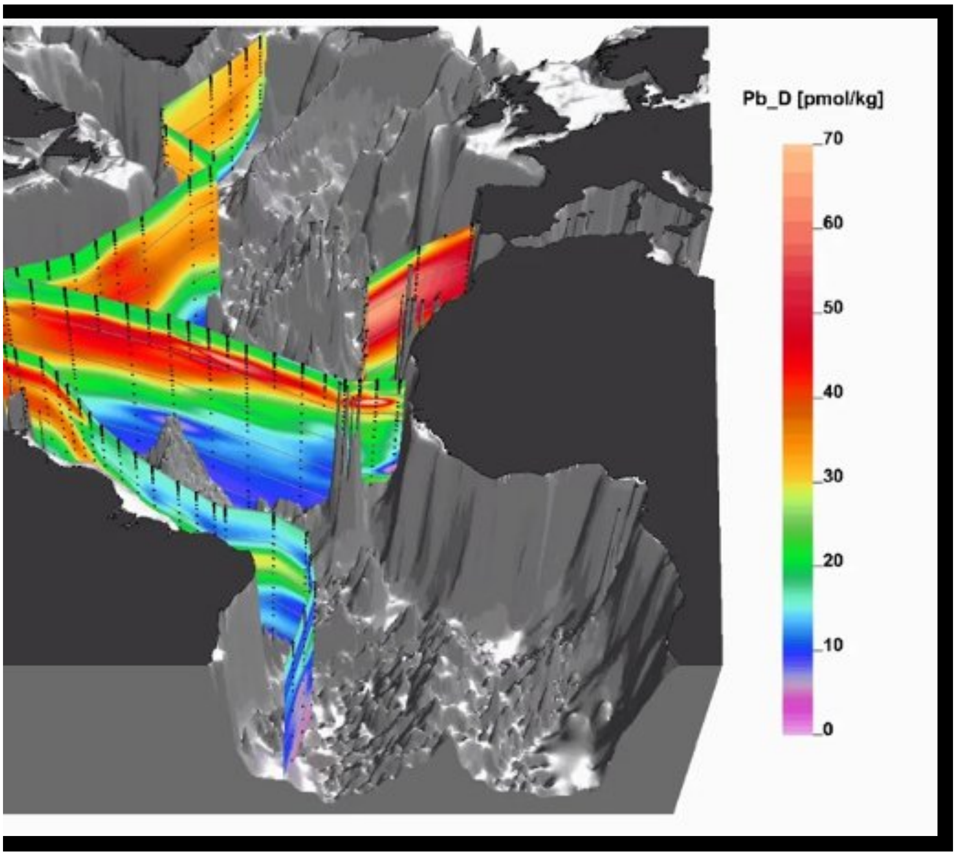
The ocean is recording the past history of human pollution. Case in point: A global case of lead poisoning.

The pollution we breathe in is pretty difficult to ignore. Pollution sucked up by the sea, however, is another matter entirely. Unlike contamination we can see, smell, and choke on, there's been a dearth of research on what kinds of chemicals the ocean has absorbed.

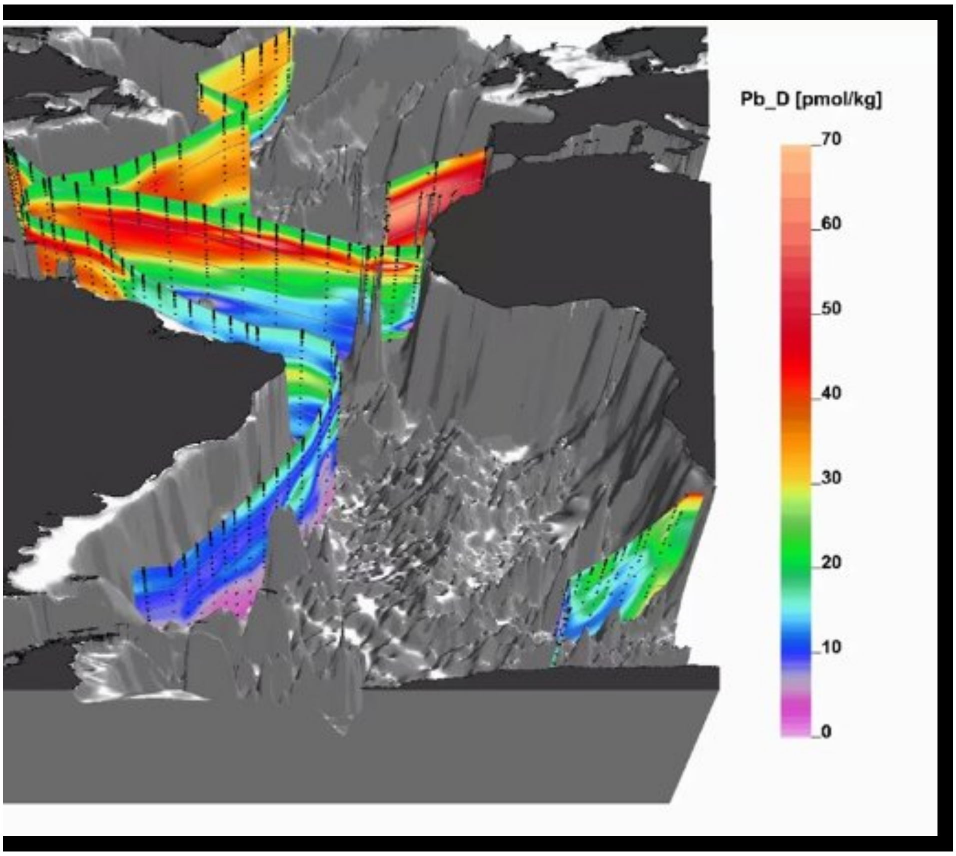
Ten years ago, an international group of scientists decided to join forces to tackle this massive gap in knowledge. By coordinating scientific projects funded by governments all over the globe, last week, GEOTRACES, comprising hundreds of researchers from more than 20 countries, released 3-D maps (http://www.geotraces.org/) showing the ocean's concentration of lead. What the $300 million effort found reveals a legacy of reliance on leaded gasoline, even nearly 20 years after most industrialized countries phased the stuff out.

"It's certainly 20 to 50 times greater than before humans started releasing lead into the environment," says Bob Anderson (//www.fastcompany.com/person/bob-anderson), a founding co-chair of the GEOTRACES group and a professor at Columbia University's Lamont-Doherty Earth Observatory. "The ocean is recording the past history of human pollution, basically."

Two things happened in the '60s and '70s that determined the ocean's current case of lead poisoning. First, surface water in the North Atlantic Ocean was losing heat to the atmosphere and sinking to lower depths. At the same time, the United States was in peak leaded gasoline consumption mode, emitting roughly 250 million tons of the pollutant in 1970. Gusts carried those emissions and contaminated dust (http://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias%3Daps&field-keywords=dust&tag=fastcomp08-20) out over the water, which then locked in the lead and sank to a



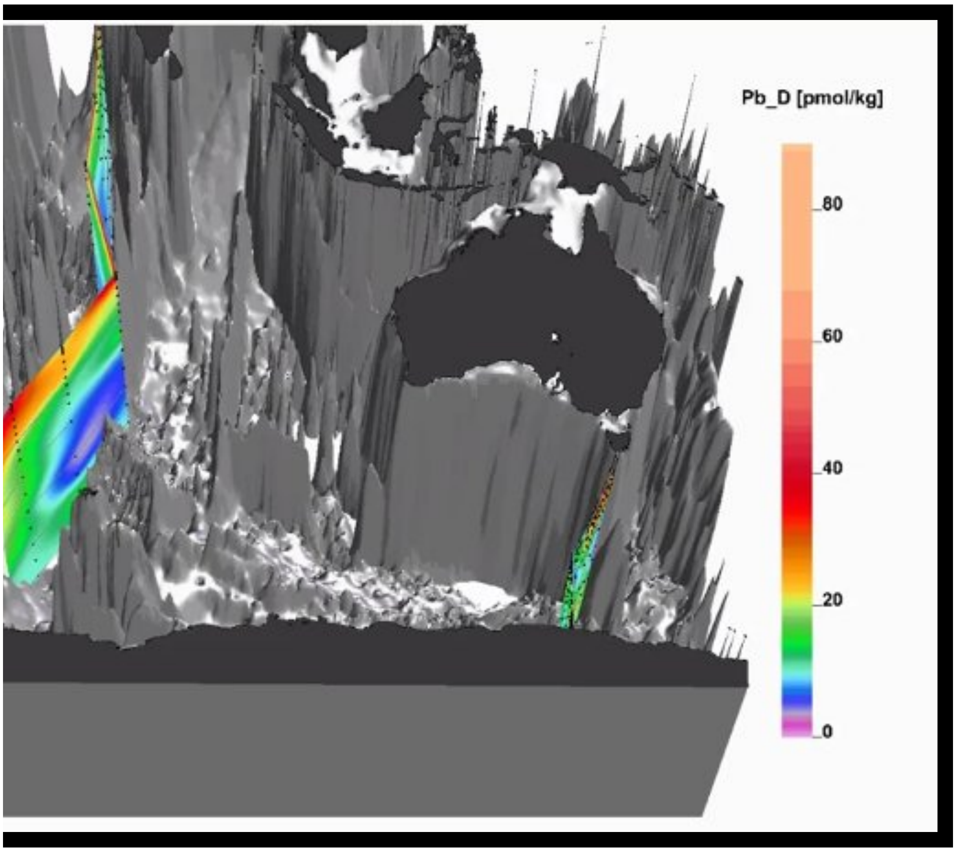
depth of about 1,000 feet.



Right now, that's not enough to do much damage--partly because GEOTRACES' research shows that lead concentrations have significantly decreased since the leaded gasoline phaseout. "The good news is that the emissions controls are working," Anderson says. "We can see the lead decreasing in the ocean."

But the ocean does more than just record the past--its cocktail of chemicals and nutrients also has significant bearing on the future, too. Part of the reason the team logged some 30,000 samples from 787 sites is to study what will happen to the ocean as the climate warms and becomes more volatile.

Climate change could make the ocean more toxic, depending on what happens to the world's major manufacturing centers. One of the main pathways for introducing contaminants into the sea is through airborne pollutants and dust. If major production regions around the world grow arid, dry out, and generate more dust, it's possible that gusts of wind will sweep more pollutants out to sea.



But the project isn't just monitoring toxic elements. It's also keeping tabs on the keystones of the food chain: Iron, zinc, and cobalt. The same week that GEOTRACES released the lead maps, the team also published 3-D maps of the ocean's iron, a critical nutrient for the photosynthetic diets of the multitudinous plankton in the sea. Those maps represent a nearly three-decades-old desire to understand exactly how much of these critical resources we have, Anderson explains.

"People who are now in their 60s can remember when it first became possible to measure these trace elements in the ocean, but for 20 to 25 years it was really slow, because it's just so slow to do something yourself," he says. "Bringing in hundreds of scientists from

10 to 20 different countries working on this as a team--it's really accelerated the progress in our research. It's international cooperation on an almost unprecedented scale."

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