# Scientists warn of hot, sour, breathless oceans

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Credit: Tiago Fioreze / Wikipedia

Greenhouse gases are making the world's oceans hot, sour and breathless, and the way those changes work together is creating a grimmer outlook for global waters, according to a new report Wednesday from 540 international scientists.

The world's oceans are getting more acidic at an unprecedented rate,

faster than at any time in the past 300 million years, the report said. But it's how this interacts with other global warming impacts on waters that scientists say is getting them even more worried.

Scientists already had calculated how the oceans had become 26 percent more acidic since the 1880s because of the increased carbon in the water. They also previously had measured how the world's oceans had warmed because of carbon dioxide from the burning of coal, oil and gas. And they've observed that at different depths the oceans were moving less oxygen around because of the increased heat.

But together "they actually amplify each other," said report co-author Ulf Riebesell, a biochemist at the Geomar Helmholtz Center for Ocean Research in Germany. He said scientists are increasingly referring to the ocean's future prospects as "hot, sour and breathless."

The 26-page report released by the United Nations and several scientific research organizations brings together the latest ocean science on climate change, related to a major conference of ocean scientists last year.

For example, off the U.S. Pacific coast, the way the ocean is becoming stratified and less mixed means lower oxygen in the water, and the latest studies show that means "80 percent more acidification than what was originally predicted," said study co-author Richard Feely of the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Lab in Seattle.

The theory is that species like squid can only live in waters at certain temperature, acidity and oxygen levels, and the sweet spots where the factors combine are getting harder to find, Feely and Riebesell said.

The world ocean pH already has gone from 8.1 to 8.0—it's considered a 26 percent increase in acidity because scientists measure hydrogen ions

for this. But computer models predict the world will hit 8.0 in the next 20 years to 30 years and 7.9 in about 50 years, Riebesell said. At those levels shells of some mollusks, like clams and mussels, start corroding, he said.

"This is another loss that we're facing," Riebesell said. "It's going to affect human society."