OUR PACIFIC OCEAN, OUR STORIES

Getting to know Ocean Acidification

Savaii, Samoa © Stuart Chape

What is Ocean Acidification?

Our global ocean absorbs approximately 30% of the carbon dioxide (CO_2) released into the atmosphere.

This CO_2 combines with seawater to produce carbonic acid, turning the seawater more acidic and depleting the seawater of carbonate that many forms of sea life need to build their shells.

CO_2 is an acid gas, so the addition of CO_2 to the ocean from burning fossil fuels is making seawater more acidic; we call this process "ocean acidification."

Understanding ocean acidification in detail

As the ocean absorbs CO_2, the CO_2 combines with seawater forming carbonic acid. The carbonic acid quickly dissociates into hydrogen ions and bicarbonate ions. Some of the hydrogen ions then combine with naturally occurring carbonate ions to form more bicarbonate. This reduces the concentration of carbonate in the seawater.

A reduction in carbonate concentration is bad because carbonate is an important building block for sea life that builds calcium carbonate shells and skeletons, such as calcifying plankton and algae, clams, sea urchins, and corals.

This chemical reaction also results in decreasing the seawater's pH. pH is a measure of the concentration of hydrogen ions, also known as acidity; the lower the pH, the higher the concentration of hydrogen ions, and the more acidic the water.

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SPREP
Secretariat of the Pacific Regional Environment Programme

Climate and Oceans Support Program in the Pacific

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A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

Ocean acidification is happening now

For the last 20 million years, the pH of the ocean has remained relatively stable between approximately 8.1 and 8.2. Over the last 200 years, as humans have accelerated the burning of fossil fuels, the ocean's average surface pH has decreased by 0.1[1], representing a 28% increase in acidity since the start of the industrial revolution. Hence, ocean acidification is not a problem expected to occur in the future, ocean acidification is already happening and being observed now.

Projections for the end of this century indicate that our oceans' surface waters could be 150 times more acidic than pre-industrial revolution. This would result in an ocean that is more acidic than at any time over the last 20 million years. It would also mean a change in pH that is 100 times faster than at any time in the past.

What is the Pacific doing to address ocean acidification?

The Secretariat of the Pacific Regional Environment Programme (SPREP) is coordinating the Pacific Partnership on Ocean Acidification (PPOA) in collaboration with the University of the South Pacific (USP), and the Pacific Community (SPC) to build resilience to ocean acidification in Pacific island communities and ecosystems with financial support from the New Zealand Ministry of Foreign Affairs and Trade and the government of the Principality of Monaco. This partnership is tackling ocean acidification in the Pacific by supporting research and monitoring, building capacity, raising awareness, and implementing practical adaptation actions.

At pilot sites in Fiji, Kiribati, and Tokelau, work is underway to increase resilience to ocean acidification through practical adaptation activities such as planting mangroves to locally buffer pH; restoring and farming coral to enhance reef resilience; and establishing locally managed marine areas to reduce secondary reef stresses.

PPOA is also working with international partners like the Ocean Foundation and the Global Ocean Acidification Observation Network to build local capacity to monitor and report ocean acidification data. Monitoring ocean acidification is needed to understand baseline conditions and to help distinguish long-term anthropogenic acidification from natural variability.

Thirteen Pacific islands are signatories to the Paris Agreement, and are working to reduce their greenhouse gas emissions to limit global average temperature rise to 1.5 degrees Celsius. While reducing emissions of any combination of greenhouse gasses[2] can address the goal of limiting temperature rise, for ocean acidification, CO_2 is the only greenhouse gas that matters. Reducing methane emissions, for example, can limit temperature rise, but it will not help address ocean acidification; only by reducing CO_2 emissions can we directly mitigate ocean acidification.

Telling our Pacific Stories

There are several obstacles that make reporting on ocean acidification difficult. It can be challenging to explain to your audiences in a way that maintains interest while remaining factually and technically accurate. The name is clunky and evokes memories of boring chemistry class for many people. Though ocean acidification is happening now, there are few tangible, visible impacts of ocean acidification that are easy for reporters to show to help audiences relate to the problem.

There is also often confusion regarding the "acid" part of the name "ocean acidification." The ocean will not literally turn into an acid[3], rather it will become more acidic than it currently is. The projected changes in seawater pH may seem small, however the speed with which the changes are occurring may outpace many organisms' ability to adapt.

How can journalists address these challenges?

- **Keep learning!** Reading this is a great start. Ocean acidification is a topical issue, the more you know about it the better the foundation of your news articles and your ability to communicate this in a way that your audience will understand.
- **Keep a glossary of technical terms**, try defining them yourself and check with an expert that your definitions are correct and maintain consistency in using them.
- **Strengthen your networks and connect with experts in this area**. You can reach out to your government departments or your Pacific regional agencies. You may also want to request a special seminar for your news team with a government department, regional agency, or NGO that specialises in this area.

1 Since the pH scale is logarithmic, a 0.1 pH change represents approximately a 28% increase in acidity.
2 Gases that trap heat in the atmosphere are called greenhouse gases, and include carbon dioxide, methane, and nitrous oxide.
3 An acid is defined as having a pH less than 7. Projections for the end of the century are for an average surface ocean pH of ~8.01, depending upon emissions scenario.

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