

# Ocean Acidification

Richelle Choi, Environmental Science

## What is Ocean Acidification?

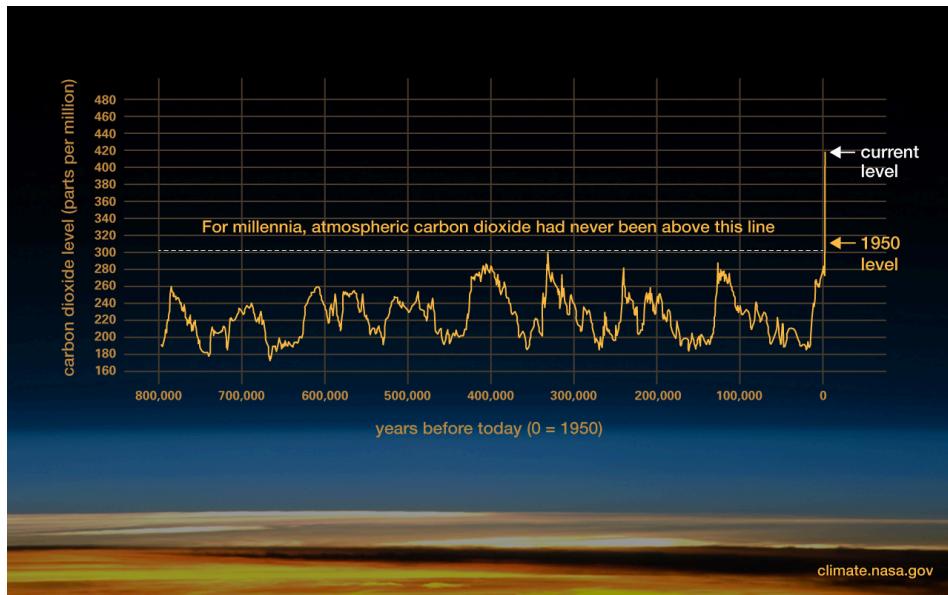
Ocean acidification refers to the lowered levels of pH in the ocean due to the increase of CO<sub>2</sub> in the atmosphere. Since the oceans absorb up to 30-40% of carbon dioxide emitted by humans, the former alkali-based ocean waters are becoming more acidic. The increase in carbon dioxide emissions leads to the increase of hydrogen ions in the ocean. After a series of chemical reactions, the carbonate ions in the water become much less abundant. This can pose a huge problem, because carbonate ions are an important building block of creatures with seashells and exoskeletons. The acidic water and decrease of an abundance of carbonate ions can cause these shells to break, thus increasing the chances for these animals to die. The acidic waters will also affect coral skeletons, which can result in coral death.



The decrease in shellfish and coral population can cause an imbalance in the food chain, which is already unstable due to a series of anthropogenically caused issues, such as overfishing, thermal pollution, biomagnification. Since many economies rely on the fishery industry, ocean acidification can severely affect humans as well.

## What are the causes of ocean acidification?

Since the Industrial Revolution, CO<sub>2</sub> levels have risen exponentially. Scientists have unanimously agreed that the rise in carbon dioxide levels in the past 200 years is not due to the naturally occurring ice ages or other natural geographical processes, but due to human activity.



Due to the natural carbon sink properties of the ocean, the carbon dioxide released by humans may initially reside in the atmosphere, however the carbon cycle means the CO<sub>2</sub> will ultimately find its way back into the ocean. About one fourth of the carbon dioxide released in fossil fuels burned by humans dissolves in the ocean. In the past 200 years, ocean waters have become 30 percent more acidic, and since industrialization, the ocean has taken in 525 billion tons of CO<sub>2</sub> and around 22 million tons per day. Carbon dioxide levels till this day are going up in an exponential upward trend, and if this trend doesn't stop, the lives of sea creatures will be lost and the food chains will be severely damaged.

## How can we help?

Since burning fossil fuels emit the most amount of carbon dioxide, the aim should be to cut carbon emissions. Though what can YOU do to help?

1. Eat locally produced food  
Eating locally produced food can not only reduce, if not completely eliminate, the transportation process of the food that produces CO<sub>2</sub> emissions, but it can also boost your domestic economy and help your local farmers or stores!
2. Consider switching from gas-powered vehicles to electric vehicles  
Using electric vehicles can help reduce your own individual carbon footprint. By using cleaner sources of energy such as electricity, we can minimize the world's carbon emissions by burning less fossil fuels such as petroleum.

## Work Cited

Carbon Brief (2019). How does ocean acidification affect coral reefs? YouTube. Available at: <https://www.youtube.com/watch?v=ccYvlbcBlTY> [Accessed 1 Oct. 2023].

National Ocean Service (2023). What is Ocean Acidification? [online] Noaa.gov. Available at: [https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2\)%20from%20the%20atmosphere](https://oceanservice.noaa.gov/facts/acidification.html#:~:text=Ocean%20acidification%20refers%20to%20a,CO2)%20from%20the%20atmosphere). [Accessed 1 Oct. 2023].

NASA (2022). Graphic: The relentless rise of carbon dioxide – Climate Change: Vital Signs of the Planet. [online] Climate Change: Vital Signs of the Planet. Available at: [https://climate.nasa.gov/climate\\_resources/24/graphic-the-relentless-rise-of-carbon-dioxide/](https://climate.nasa.gov/climate_resources/24/graphic-the-relentless-rise-of-carbon-dioxide/) [Accessed 1 Oct. 2023].

Shellfishrestoration.org.au. (2023). Australian Shellfish Restoration. [online] Available at: <https://shellfishrestoration.org.au/> [Accessed 1 Oct. 2023].

Smithsonian Ocean. (2023). Ocean Acidification. [online] Available at: <https://ocean.si.edu/ocean-life/invertebrates/ocean-acidification> [Accessed 1 Oct. 2023].