

# Ocean Acidification



# What Is Ocean Acidification?

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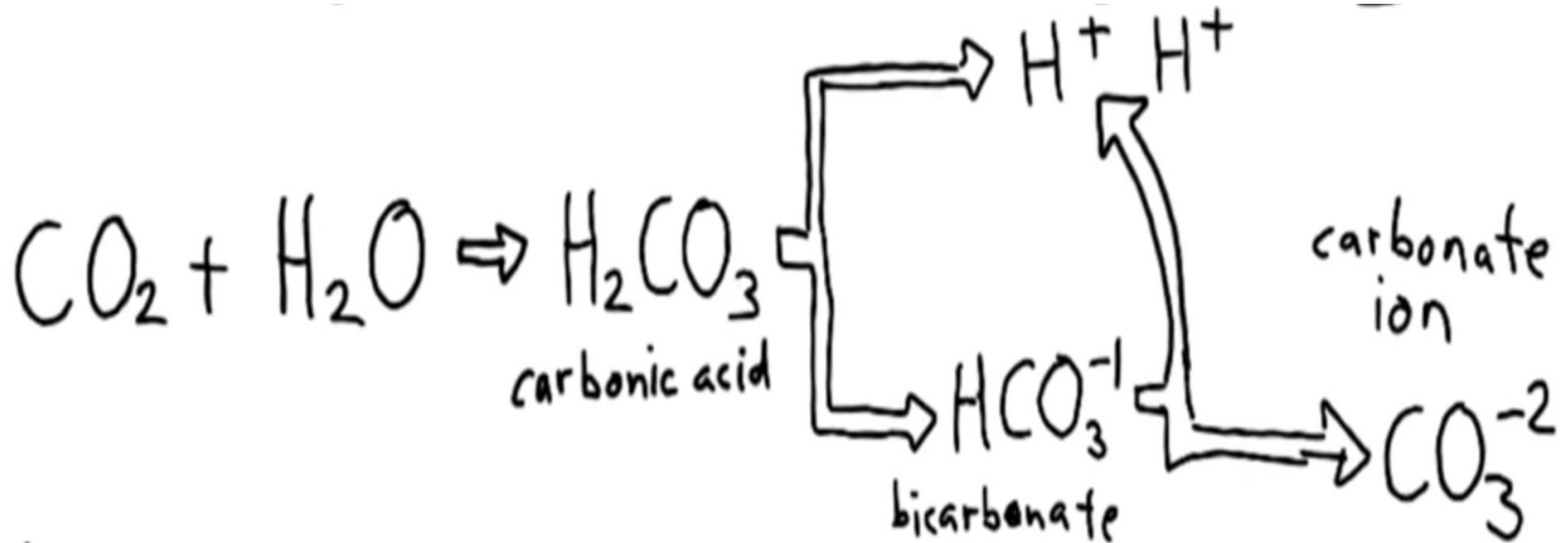
- It's the **reduction in the pH of the ocean** over an extended period of time, caused primarily by uptake of carbon dioxide ( $\text{CO}_2$ ) from the atmosphere.
- The concentration of carbon dioxide ( $\text{CO}_2$ ) in the atmosphere has increased due to the burning of fossil fuels, and land use change.
- The ocean absorbs about 30% of  $\text{CO}_2$  that is released in the atmosphere, so when the level of  $\text{CO}_2$  in the atmosphere increases, the level of  $\text{CO}_2$  in the ocean increases.

# The Chemical Reaction of OA

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-When  $\text{CO}_2$  is absorbed by seawater, a series of chemical reactions occur resulting in the increased concentration of hydrogen ions ( $\text{H}^+$ ). This increase causes the seawater to become more acidic and causes carbonate ions ( $\text{CO}_3^{2-}$ ) to be relatively less abundant.

# Chemical Reaction of OA



# The Impact

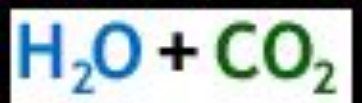
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- Carbonate ions are an important building block of structures such as sea shells and coral skeletons in the ocean
- When the amount of carbonate ions decreases, it becomes more difficult for calcifying organisms like shellfish, oysters, corals, and sea urchins to build and maintain their shells.

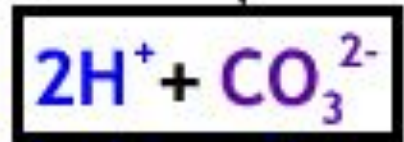
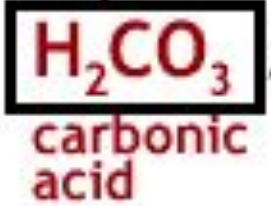
- These changes in ocean chemistry can affect the behavior of non-calcifying organisms as well. Certain fish's ability to detect predators is decreased in more acidic waters. When these organisms are at risk, the entire food web may also be at risk.

- Ocean acidification also affects humans in the way that many economies are dependent on fish and shellfish and people worldwide rely on food from the ocean as their primary source of protein.

water +  
carbon dioxide

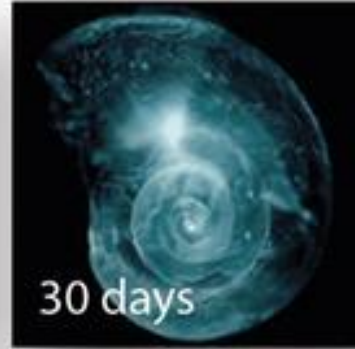


hydrogen ions +  
bicarbonate



hydrogen ions +  
carbonate





Effect of lack of carbonate ions on calcifying organisms.

# What Can We Do?

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- Start implementing solutions to dramatically reduce the use of fossil fuels therefore cut down the amount of CO<sub>2</sub> released into the atmosphere.

- Eating less meat reduces carbon footprint. This is because a major producer of greenhouse gases are produced by the meat industry.

- Drive less and instead use bikes, carpool or public transportation. This would significantly reduce carbon emissions, everybody started doing this.

- Buying less products that are superfluous to your lifestyle means that less goods are going to be produced.

- When buying products that are necessary to your life, try to shop for products that are local, because local products have a smaller carbon footprint.



# Ocean Acidification

CRUMBLING **the** SHELLS OF THE SEA...

JEAN-MICHEL COUSTEAU'S  
OCEAN  
FUTURES  
SOCIETY

## The Problem

1 Since the Industrial Revolution, human activities have rapidly increased the amount of carbon dioxide in the atmosphere

2 The ocean absorbs carbon dioxide from the atmosphere

3 The interaction between carbon dioxide and water creates acidic conditions (more  $H^+$  = more acidic  
▼ lower pH)

4 Increasing acidic conditions will harm many types of corals, shell-builders, and plankton

More difficult to build  
CALCIUM CARBONATE SHELLS

Less energy for  
GROWTH & REPRODUCTION

Smaller and  
WEAKER SHELLS

## Threatening

BIODIVERSITY

FOOD SECURITY

FISHERIES

TOURISM

GLOBAL ECONOMY

## The Solution is YOU

SPEAK UP  
SPREAD THE WORD  
END CARBON EMISSIONS

Thank you

# Work Cited

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