

Forum: Environment Commission I

Issue: Reducing the rise of ocean acidification

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Introduction

The rise of ocean acidification features one of the most important issues which should be resolved by the United Nations in order to conserve the marine ecosystem. Many marine species ranging from mollusks to fishes are facing direct threat from the decrease in pH level of the ocean water, and thus affecting other species that feed on such species. Unfortunately, even though many experts attempted to raise awareness of the issue, the problem of ocean acidification still seems quite inconspicuous compared to other oceanic problems, such as the rise in sea level. Therefore, in order to reduce the rise of ocean acidification effectively, scientific aspects such as carbon emission and social aspects such as raising awareness should be considered simultaneously.

Definition of Key Terms

Acid

Any compound that releases hydrogen ions when dissolved in water. Also, a water solution that contains a surplus of hydrogen ions. (Wright 681)

pH value

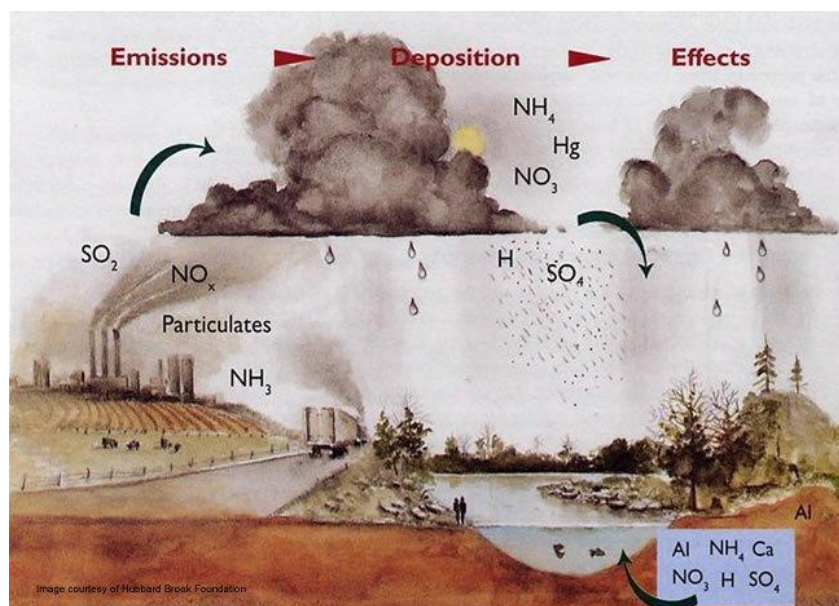
Scale used to designate the acidity or basicity (alkalinity) of solutions or soil, expressed as the logarithm of the concentration of hydrogen ions. pH 7 is neutral; values decreasing from 7 indicate increasing acidity, values increasing from 7 increasing basicity. Each unit from 7 indicates a tenfold increase over the preceding unit. (Wright 696)

General Overview

The sources of ocean acidification

Acid precipitation

Acid precipitation refers to any precipitation (rain, fog, mist, snow, etc.) that is more acidic (pH value smaller than 5.5) than usual. Some chemical wastes emitted by the factories, such as sulfur dioxide (SO_2) and nitrogen oxide (NO_2), combine with water vapors in the cloud and thus form acids such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3), and go back on the earth via precipitation. Since the clouds, the source of the precipitation, can be moved in response of the movement of winds, the ocean is not excluded from the danger of acid precipitation.



Caption #1: The model of Acid Precipitation

CO_2 absorption of the ocean water

Ocean water tends to absorb carbon dioxide (CO_2) in the open air. As the ocean water absorbs CO_2 , it forms carbonic acid (H_2CO_3). The problem with carbonic acid is not only that it decreases the pH value of the ocean water, but also that it decreases the concentration of carbonate ion, which plays a pivotal role in the production of shells of some organisms. This should be an alerting fact, because the ocean today absorbs 20 million tons of CO_2 from the atmosphere per day. Moreover, the ocean acidity has increased 30% compared to that in the beginning of the Industrial Revolution. Such rate of change is about 100 times faster than any change in ocean acidity in past millions of years (Orr, 2008). Therefore, regulation of carbon emission to the atmosphere can be deemed as an important issue in terms of reducing the level of ocean acidification.

Danger imposed on the marine species

Decrease in the concentration of carbonate ion

The dissolution of CO_2 causes the decrease in amount of carbonate ion (CO_3^{2-}), which is a very important form of inorganic carbon that helps organisms such as corals and mollusks to form their shells and plates via the process of calcification. Even though the ocean today is supersaturated with aragonite and calcite, two forms of calcium carbonate (CaCO_3) that helps the organisms to form their shells and plates, the constant acidification of ocean water will eventually break the current supersaturated status of CaCO_3 . Then, the calcifying organisms will decrease in numbers, and the entire food chain will be disrupted.



Caption #2: *The damaged shell of a shield limpet due to acidic ocean water*

Physiological danger of change in pH value to an organism

Most organisms are adapted to the environment where pH value ranges from 6 to 8. Therefore, change in pH value can interfere with their established metabolisms, and eventually results in killing them. The organisms may die even when an environment presents a change in pH value as slight as one unit. The eggs, sperms, and juvenile forms of organisms are especially susceptible to the change in pH value (Wright 591).

The previous measures taken on the ocean acidification

The United Nations is attempting to develop a regular process that regularly reports and assesses the status of the marine environment. In addition, General Assembly has recommended creating ad hoc committee and expert panel to further elaborate on this issue. The experts occasionally provide alert to the policymakers. For instance, they have warned the policymakers present on the Climate Change Conference in Copenhagen in the year 2009.

Timeline of Events

Date	Description of event
December 12, 2002	A reporting and assessment system on the status of marine system was recommended in resolution A/RES/57/141
August-September, 2009	The Ad Hoc Working Group of the Whole reviewed the plans on ocean acidification in New York.
September 3, 2009	The Expert Panel on ocean acidification was held.
December 10, 2009	Experts warned the danger of the ocean acidification in the Climate Change Conference in Copenhagen.

UN Involvement, Relevant Resolutions, Treaties and Events

The United Nations considers the issue of the ocean acidification as one of the parts of the current ocean problems. However, there are some cases where the significance of ocean acidification is outlined by clauses that suggest the establishment of an ad hoc committee or expert panel on this issue.

- Oceans and the law of the sea, 12 December 2002 (**A/RES/57/141**)
- Oceans and the law of the sea, 5 December 2008 (**A/RES/63/111**)
- A summary report of the Expert Panel on Ocean Acidification, 5 September 2009

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