OPEN ACCESS Freely available online

ISSN: 0974-8369
Biology and Medicine

Perspective

Impact of Ocean Acidification, Sea Level Rise on Marine Life and Ecosystem

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DESCRIPTION

The Earth's oceans, covering more than 70% of its surface, play an important role in regulating the planet's climate and supporting a vast array of marine life. However, human-induced climate change has led to significant alterations in the oceans, resulting in phenomena such as ocean acidification and rising sea levels. Ocean acidification is a consequence of increased carbondioxide (CO_2) emissions. When CO_2 is absorbed by the seawater, it reacts with water to form carbonic acid, leading to a decrease in the ocean's pH. This shift towards acidity has far-reaching implications for marine organisms, particularly those with calcium carbonate shells or skeletons.

Coral reefs, vital marine ecosystems, are highly susceptible to ocean acidification. Acidic waters hinder the ability of corals to build their calcium carbonate structures, leading to weakened and bleached corals. This disrupts the entire reef ecosystem, affecting the diverse marine life that depends on coral reefs for habitat and sustenance. Mollusks, like oysters, clams, and pteropods as well as certain types of plankton, rely on calcium carbonate to build their shells. Acidic waters make it harder for these organisms to maintain their shells, making them more vulnerable to predation and disease. This jeopardizes not only these species but also the industries and communities that depend on them. Ocean acidification can impact fish behavior, impairing their sensory and cognitive abilities. Studies suggest that fish exposed to acidic conditions exhibit altered responses to predators and reduced ability to locate prey, which could disrupt entire marine food webs.

Sea level rise is primarily driven by the melting of polar ice caps and glaciers due to global warming, causing thermal expansion of seawater. As sea levels rise, coastal ecosystems and communities face unprecedented challenges. Rising sea levels lead to increased coastal erosion, destroying habitats such as salt marshes and mangroves. These habitats serve as nurseries for numerous marine species and act as natural buffers against storm surges. Their loss endangers the survival of various organisms and heightens the risk of flooding for coastal communities. Rising sea levels force marine species to migrate to higher ground or new areas. This migration can disrupt established ecosystems, leading to competition for resources, altered predation patterns, and potential extinction of vulnerable species unable to adapt quickly enough. Rising sea temperatures, coupled with sea level rise, contribute to coral bleaching events. Corals expel the symbiotic algae living in their tissues, resulting in a loss of color and energy. This weakens the corals, making them more susceptible to diseases and reducing their ability to support the diverse marine life that depends on them. Rising sea levels can lead to saltwater intrusion into coastal aquifers, compromising freshwater sources for both human populations and ecosystems. Saltwater intrusion harms plants, animals, and microbes that depend on freshwater, disrupting entire ecosystems.

Global action is necessary to mitigate these impacts, including reducing carbon emissions, implementing sustainable fishing practices, protecting coastal habitats, and establishing marine protected areas. Furthermore, scientific research and public awareness are crucial. By understanding the intricate relationships between climate change, ocean acidification, sea level rise, and marine ecosystems, by developing innovative solutions, and work collectively to preserve the oceans and the life they support. Only through concerted efforts can we hope to safeguard the diverse and fragile marine ecosystems, ensuring their resilience and vitality for generations to come.

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Received: 25-Sep-2023, Manuscript No. BLM-23-23978; **Editor assigned:** 27-Sep-2023, Pre QC No. BLM-23-23978 (PQ); **Reviewed:** 11-Oct-2023, QC No. BLM-23-23978; **Revised:** 18-Oct-2023, Manuscript No. BLM-23-23978 (R); **Published:** 25-Oct-2023, DOI: 10.35248/0974-8369.23.15.615.

Citation: Anunya S (2023) Impact of Ocean Acidification, Sea Level Rise on Marine Life and Ecosystem. Bio Med. 15:615.