



Carbon Dioxide a Potential Threat to Marine Life

Worldwide emissions of carbon dioxide from fossil fuel burning are dramatically altering ocean chemistry and threatening marine organisms, including corals that secrete skeletal structures and support oceanic biodiversity. A recent report summarizes the known effects of increased atmospheric carbon dioxide on these organisms, and recommends future research to determine the extent of the impacts. “It is clear that seawater chemistry will change in coming decades in ways that will dramatically alter marine life,” says the report’s lead author. Others look to the ocean as a huge carbon storage sink (countering the negative effects of higher levels of atmospheric carbon dioxide).

The new report warns that oceans worldwide absorbed approximately 118 billion metric tonnes of carbon between 1800 and 1994. Oceans are naturally alkaline, and they are expected to remain so, but the interaction with carbon dioxide is making them less alkaline and more acidic. The increased acidity lowers the concentration of carbonate ion, a building block of the calcium carbonate that many marine organisms use to grow their skeletons and create coral reef structures. “This is leading to the most dramatic changes in marine chemistry in at least the past 650,000 years,” said another scientist.

Experimental studies show that coral calcification consistently decreases as the oceans become more acidic. This means that these organisms will grow more slowly, or their skeletons will become less dense, a process similar to osteoporosis in humans.

As a result, reef structures are threatened because corals may be unable to build reefs as fast as erosion wears away the reefs. However, the predicted effects have not yet been observed. “This threat is hitting coral reefs at the same time that they are being hit by warming-induced, mass bleaching events,” say scientists.

Many calcifying organisms, including some forms of marine plankton, are affected by the chemistry changes. These are an important food source for salmon, mackerel, herring, and cod. If calcifying organisms such as these are unable to sustain their populations, many other species may be affected. Several other major ecosystems that are supported by marine calcifiers may be particularly threatened by ocean acidification. These include cold-water reefs, which are extensive structures that provide habitats for many important fish species, particularly in the coastal waters of British Columbia and Alaska.

While mechanisms for global warming are still hotly debated, this new report outlines future research to understand this previously unknown consequence of climate change. At present, scientists cannot yet predict how much marine calcification rates will change in the future. The report warns that the more critical question is: “What does this mean in terms of organism fitness and the future of marine ecosystems?” Meanwhile, some environmental scientists still see the potential of the oceans to absorb still greater amounts of carbon dioxide in their attempt to counter the elevated levels we find in our atmosphere due to the burning of fossil fuels.

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Courtesy of Florida Keys National Marine Sanctuary

