**Impacts of Ocean Acidification**

Increasing atmospheric concentrations of CO2 result in an incremental flux of CO2 into a mildly alkaline ocean, leading to a decrease of pH, carbonate ion concentration, and the capacity of seawater to buffer changes in its chemistry. Such phenomenon is considered as one of emerging potential climate change effects that decision makers have to deal with.

Changes in open ocean, surface water chemistry for year 2100 based on representative concentration pathways compared to preindustrial values range from a pH change of -0.14 unit to -0.43. Projections of regional changes, especially in the highly complex coastal systems follow similar trends.

Under current CO2 emission scenario, the global pH of coastal waters has been projected to decrease from about 8.16 in the year 1850 to 7.83 in 2100. Investigations of the effect of such acidification on marine organisms include harmful algal blooms, stimulation of nitrogen fixation leading to decrease of the rate of calcification of most of sea-floor calcifiers such as reef-building corals, coralline algae, bivalves and gastropods reducing the competitiveness with non-calcifiers.

Ocean warming and acidification promote higher rates of calcium carbonate dissolution resulting in the net dissolution of carbonate sediments and frameworks and loss of associated habitat. At ecosystem level, impact on food webs and higher trophic levels has been projected. Shifts in community structure have also been documented in regions with rapidly declining pH.

Ocean acidification also impacts the goods and services that marine organisms provide to coastal societies such as fisheries, tourism and coastal protection. In terms of economic impacts, a potential of decrease of the production of commercially-exploited shelled mollusks would result in a reduction the global production with a loss over 100 billion USD by 2100.

Recent studies suggested that ocean acidification generally reduce fish biomass and catch. The annual economic damage of ocean-acidification-induced coral reef loss by 2100 has been estimated to be 870 and 528 billion USD. Although this number is small compared to global GDP, it can represent a very large GDP loss for the economies of many coastal regions or small islands that rely on the ecological goods and services of coral reefs.

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