

Arctic and subarctic seas are hot spots of two CO₂-caused global phenomena: global warming and ocean acidification

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Observational data and future projection results show that high latitudes have already experienced tremendous influences of global warming, especially due to rise in the temperature and that the influences are considered to be even accelerated in next decades. Many previous studies predict northward migration of aquatic habitats in the northern hemisphere and enhanced fish catches in high latitudes caused by global warming. However, recent studies have suggested that the influences would be much more complicated if ones take other multiple phenomena such as ocean acidification into account. Ocean acidification is a phenomenon that the alkalinity of surface oceans is weakened by injection of the atmospheric CO₂ that is acidulous in the water. Ocean acidification has recently been concerned because the phenomenon presumably affects sea creatures, especially calcifiers of which bodies are partly made of calcium carbonate such as shellfish and pteropods can be dissolved. Even non-calcifiers such as fishes are anticipated to be affected by ocean acidification through changes in food webs. Although there are several sorts of procedures proposed to mitigate global warming, such as geoengineering, reducing anthropogenic CO₂ emission is considered to be the only way to mitigate ocean acidification and its effects on marine ecosystems. In this presentation, recent future projection results of combined effects of global warming and ocean acidification on marine ecosystem will be introduced.

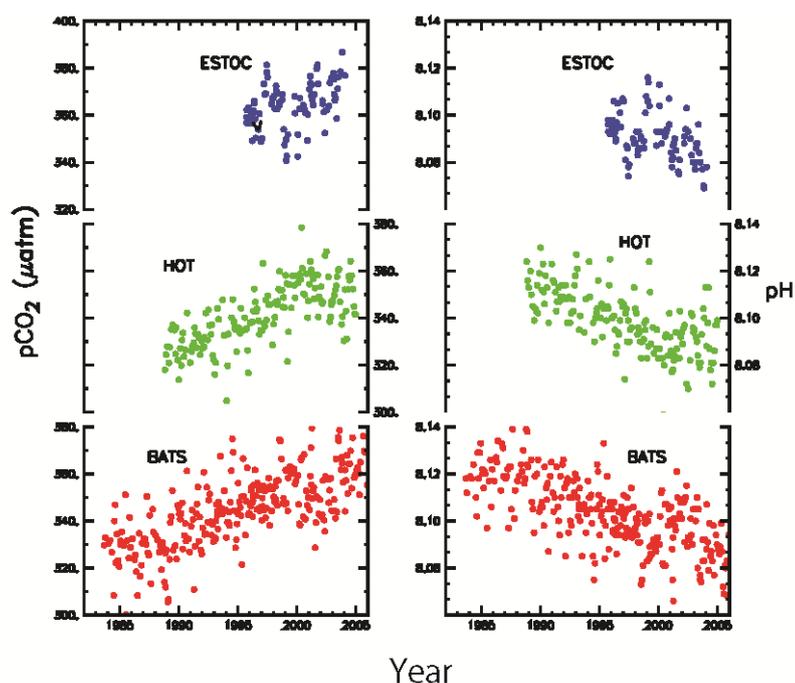


Figure 1. Time series of sea surface pCO₂ (left) and pH (right) at Stations ESTOC (European Station for Time-series in the Ocean; 29°N, 15°W), HOT (Hawaii Ocean Time-series; 22°N, 158°W), and BATS (Bermuda Atlantic Time-series Study; 31/32°N, 64°W) (Modified from IPCC, 2007)

References

IPCC, Climate Change 2007. The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, 996pp, 2007.