

Impact of Climate Change and Other Human Pressures on Polar Ecosystems

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Talk Summary

In marine ecosystems, rising atmospheric CO₂ and climate change are associated with concurrent shifts in temperature, circulation, stratification, nutrient input, oxygen content, and ocean acidification, with potentially wide-ranging biological effects. Population-level shifts are occurring because of physiological intolerance to new environments, altered dispersal patterns, and changes in species interactions. Together with local climate-driven invasion and extinction, these processes result in altered community structure and diversity, including possible emergence of novel ecosystems. Impacts are particularly striking for the poles because of the sensitivity to sea-ice retreat and poleward species migrations. Aggregated effects from climate change and other human factors--for example pollution, overfishing--may modify energy and material flows as well as biogeochemical cycles, eventually impacting the overall ecosystem functioning and services upon which people and societies depend.

BIO

Scott Doney is a Senior Scientist in the Department of Marine Chemistry and Geochemistry, and presently the Director of the Ocean and Climate Change Institute at the Woods Hole Oceanographic Institution (WHOI). He graduated with a BA in chemistry from the University of California, San Diego in 1986 and completed his PhD in Chemical Oceanography from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography in 1991. His science interests span oceanography and climate and biogeochemistry, with particular emphasis on the application of numerical models and data analysis methods to global-scale questions. Much of his research focuses on how the global carbon cycle and ocean ecology respond to natural and human-driven climate change. A current area of interest is on ocean acidification due to the invasion into the ocean of carbon dioxide and other chemicals from fossil fuel burning. He was the inaugural chair of the U.S. Ocean Carbon and Biogeochemistry (OCB) Program, and he is currently on the steering committees for the Ocean Carbon and Biogeochemistry Program and the U.S. CLIVAR/CO₂ Repeat Hydrography Program and a convening lead author for the Oceans and Marine Resources chapter of the U.S. 2013 National Climate Assessment.