

Delegate Shane E. Pendergrass
Chair of the Health and Government Operations Committee
Maryland General Assembly

Professor James A. Carton and Distinguished University Professor Eugenia Kalnay, University of Maryland, College Park, MD

March 10, 2021

Support for House Bill 1078: Attorney General - Climate Change Actions - Authorization

The earth's climate is being permanently altered by rising atmospheric levels of carbon dioxide and nowhere is this change more evident than in the Arctic. We are professors of meteorology and oceanography at University of Maryland who have devoted our careers to studying the earth's climate and its change and we are writing to express our alarm over the stunning 23% increase in atmospheric carbon dioxide levels since 1979 (scrippsco2.ucsd.edu). We are alarmed because a wide variety of our own studies with computer models of the earth system, and those of our colleagues, directly connect this increase in carbon dioxide to a reduction in the Arctic's ability to cool by infrared radiation. This reduction in the Arctic's ability to cool has led to warming of winter surface air temperatures in the past four decades by 4-8°F. The Intergovernmental Panel on Climate Change Assessment Reports, the latest of which will be released next month, convincingly tie winter warming to elevated levels of atmospheric carbon and show that further increases in levels of atmospheric carbon will continue to accelerate climate change in this region.

Rising carbon dioxide and warming winter temperatures have a wide variety of biological and human impacts such as destabilizing structures built on permafrost. Rising carbon dioxide levels also makes the Arctic surface ocean acidic. This increasing acidity will interfere with the growth of Arctic phytoplankton by dissolving away their shells, disrupting that ecosystem. Another dramatic consequence of warming is the reduction in the area and thickness of the Arctic ice pack due to increasing melt. The Arctic ice pack consists of perennial sea ice whose thickness is measured in meters, and thinner seasonal sea ice which melts each summer and refreezes each winter. The warming the Arctic has experienced since 1979 has caused a stunning 40% reduction in the annual minimum extent of ice cover (**Figure 1**) as well as the volume of perennial sea ice. Reductions in ice volume and cover come with many negative consequences. Loss of ice cover from parts of the Arctic Ocean that were previously kept shielded and insulated by ice warms the surface ocean and causes further damage to marine plants and animals. In winter this warming ocean and the moisture it releases to the atmosphere can modify storm systems throughout the northern hemisphere, including over the United States.

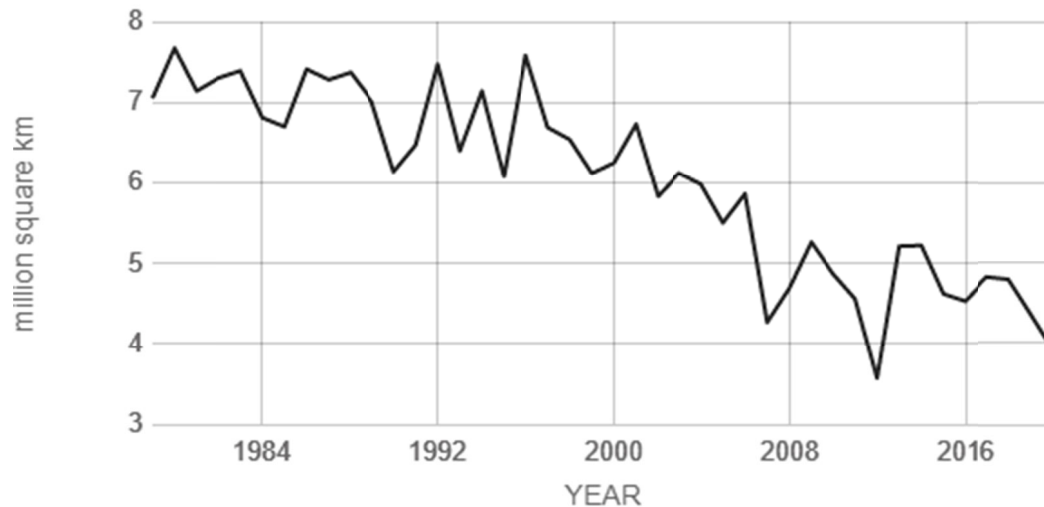


Figure 1 Annual minimum Arctic sea ice extent in September of each year since 1979 in millions of square kilometers. The data is provided by the National Snow and Ice Data Center. The image was produced by the NASA Scientific Visualization Studio.

Atmospheric carbon is an invisible pollutant whose rising levels will have horrific consequences for the earth’s climate and weather as well as to biological systems such as Arctic plankton. We note that it is not just the Arctic Ocean that it is horribly affected, but also the whole global ocean, including the destruction of coral reef ecosystems. We are writing to lend our support to the efforts to reduce this insidious pollutant. Thus we support House Bill 1078 to use the law to bring action against companies whose business depends on releasing this pollutant.

James Carton
 Professor, Department of Atmospheric and Oceanic Science

Eugenia Kalnay
 Distinguished University Professor, Department of Atmospheric and Oceanic Science