

# U.S. ocean observation critical to understanding climate change, but lacks long-term national planning

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The ocean plays a critical role in climate and weather, serving as a massive reservoir of heat and water that influences tropical storms, El Niño, and climate change. In addition, the ocean has absorbed 30 percent of the carbon dioxide associated with human activities, lessening the climate effects of fossil fuel combustion.

Ocean observing systems are important as they provide information essential for monitoring and forecasting changes in Earth's climate on timescales ranging from days to centuries. A new report by the National Academies of Sciences, Engineering, and Medicine finds that continuity of [ocean observations](#) is vital to gain an accurate understanding of the climate, and calls for a decadal, national plan that is adequately resourced and implemented to ensure critical ocean information is available to understand and predict future changes. The report notes that federal activities provide an opportunity for sustained and coordinated ocean-observing in the U.S., but require coordinated and high-level leadership to be effective. Additional benefits of this observational system include improvements in weather forecasting, marine resource management, and maritime navigation.

The United States' contributions to the international network of ocean-observing activities are substantial today, and have advanced our understanding of global climate. Particularly, the U.S. is a leader in the efforts of the Global Ocean Observing System, an international

organization that identifies priority ocean variables for understanding climate and technical requirements for their measurements. But issues related to flat or declining funding are jeopardizing the country's leadership and creating challenges in maintaining long-term ocean-related climate observations, the report says. Funding mechanisms that rely on annual budget approval or short-term grants may result in discontinuity of ocean-climate measurements, reducing the value of the observations made to date and in the future.

The reports also identifies other challenges that impact sustained observations, such as the declining investment in new technological development, increasing difficulty in retaining and replenishing the human resources associated with sustained ocean observing, and a decreasing number of global and ocean-class research vessels.

The vast ocean area and harsh environment presents a challenge for observing systems, but new sensors, materials, battery technology, and more efficient electronics could increase the effectiveness, efficiency, and longevity of ocean-observing instruments. Ships will continue to be required to deploy and maintain ocean-observing platforms. The report says maintenance of a capable fleet of global and ocean-class research vessels are an essential component of the U.S. effort to sustain ocean observing. At the same time researchers and technicians in key government and academic laboratories are integral to success in the U.S. at sustained ocean observing and are a resource that requires support.

Given that ocean observations for [climate](#) provide a wide range of benefits to the agricultural, shipping, fishing, insurance, and energy-supply industries, the committee that wrote the [report](#) suggested that efforts could be made to draw support for ocean observing from the commercial sector. In addition, philanthropic organizations have provided support for technology and capacity building initiatives that benefit ocean observing. The committee concluded that establishing an

organization to enhance partnerships across sectors with an interest in [ocean](#)-observing, particularly nonprofits, philanthropic organizations, academia, U.S. federal agencies, and the commercial sector, would be an effective mechanism to increase engagement and coordination.

Provided by National Academies of Sciences, Engineering, and Medicine

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