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U.S. federal cuts threaten international ocean science and diplomacy

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Recent disruptions in United States federal science are severely affecting multiple science and environment agencies, and universities. These developments are undermining ocean science and multilateral cooperation essential for marine conservation, sustainable resource management, and climate resilience globally. Budget cuts, program terminations, and restrictions on key research areas, including climate change and decarbonization, are eroding scientific capacity and compromising the integrity of international assessments, negotiations, and monitoring systems. We urge delegates to the third United Nations Ocean Conference, in June 2025, to recognize that these critical risks require responses that move beyond symbolic commitments and focus on institutional resilience, redundancy, and strategic rebalancing.

In early 2025, the White House proposed cutting the Earth science budget of the National Aeronautics and Space Administration (NASA) by over \$3.5 billion, including major reductions to Earth-observing satellite missions. These cuts occur just as data from NASA and other institutions confirm record-breaking ocean temperatures in 2023-2024¹, along with unexpectedly high rates of sea level rise². NASA missions are central to monitoring and understanding Earth's energy imbalance, cloud dynamics, aerosols, and the global carbon cycle—key elements for understanding ocean change and informing early warning systems for ecological impacts and natural disasters. Discontinuing these observations will break long-term data continuity, weaken our capacity to monitor ocean health, hinder climate attribution studies, lead to loss of ocean's benefits to people, and undermine the scientific basis for both domestic and international policies.

The National Oceanic and Atmospheric Administration (NOAA), a cornerstone of global climate and ocean services, faces a proposed 25% budget cut in FY2025. This threatens its Office of Oceanic and Atmospheric Research and core programs supporting the Global Ocean Observing System (GOOS), including the Argo program and the Tropical Atmosphere Ocean (TAO) array. Over 1,500 NOAA personnel have already been laid off or encouraged to retire. Closing the NOAA-Princeton Cooperative Institute eliminates scientific staff at the Geophysical Fluid Dynamics Laboratory, one of the world's premier centers for climate modeling. The impacts on ship and aircraft operations remain unclear, but severe disruptions to operational forecasts, data assimilation, and international collaboration are anticipated. Meanwhile, cuts at NOAA Fisheries threaten sustainable fisheries governance. Long-standing monitoring programs such as HOT, BATS, and OceanSITES, and coupled biogeochemical modeling efforts, depend on continuity in

NASA and NOAA operations. Disruptions to these platforms weaken the evidence base for ecosystem-based management, adaptation, and early warning systems.

Although less central to oceanography and the sustainable use of the ocean, the US Environment Protection Agency (EPA) plays a crucial role in coastal and estuarine monitoring. Recent budget reductions have suspended key water-quality initiatives and curtailed the agency's scientific independence. Research on marine pollutants—such as microplastics, heavy metals, and nutrient runoff—has slowed, likely affecting the U.S. greenhouse gas inventory, which depends on joint EPA-NOAA inputs. Weakened EPA enforcement further undermines U.S. commitments to international agreements like the Cartagena Convention for marine protection in the wider Caribbean region, and heightens risks to seafood safety.

Simultaneously, actions by the newly formed Department of Government Efficiency (DOGE) has frozen or cut several branches of the National Science Foundation's (NSF) granting process^{3,4}. The NSF is one of the world's largest funders of fundamental research, and this paralysis undermines critical assessments of risks to U.S. marine ecosystems. It jeopardizes data and models that inform national and global ocean and climate policy, while delaying progress on understanding and responding to extreme events such as cyclones, marine heatwaves, acidification, and loss of oxygen.

Though not a science-focused agency, the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) has supported research into renewable ocean energy, marine carbon dioxide removal, and technologies for the blue economy. DOGE-imposed constraints have cut EERE budgets by up to 60% and stripped offices of financial authority, threatening the continuity of research conducted by universities and national laboratories.

These U.S. science agencies have historically played crucial roles in major international environmental assessments, including the National Climate Assessment, the Intergovernmental Panel on Climate Change, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and the World Ocean Assessment. The current funding crisis and associated instability weakens the US's ability to support these assessments, with serious implications for developing countries that rely on U.S. technical assistance for their contributions. It also undermines progress on Sustainable Development Goal 14 (Life Below Water) and the broader global ocean agenda.

The current crisis affecting U.S. federal science poses a profound global challenge, weakening our shared capacity to observe, understand, and manage the ocean at a time of accelerating environmental and societal change. It acts as a stress test for the resilience of the global ocean observing system. Although some countries have demonstrated strong leadership and national commitment to ocean science, the situation reveals a structural overreliance on a small group of nations (e.g., Fig. 1), leaving the entire system vulnerable to geopolitical and institutional shocks. This vulnerability must not be interpreted as a rationale for reducing investments by leading contributors. On the contrary, it highlights the urgent need to broaden and reinforce international support for essential ocean observing systems, and to build in mechanisms that enhance their resilience to future disruptions.

Mitigating the diverse risks posed by this crisis will require coordinated, multi-level action. In the United States, scientists, academic institutions, state governments, and civil society are advocating to restore funding, defend scientific integrity, and preserve institutional capacities. At the international level, other countries and regional alliances must step up their engagement—by increasing investment in ocean science, expanding observation infrastructure, creating backups for U.S.-hosted data, and diversifying data sources.

It is also critical to strengthen international cooperation—particularly with and among developing countries—and to enhance open, interoperable data frameworks through platforms such as the

Global Ocean Observing System (GOOS) and IOC-UNESCO. Ideally, these measures should be consolidated under the UNOC Nice Action Plan, providing a coherent, science-driven response to the vulnerabilities revealed by recent U.S. disruptions. Such an approach would help ensure that global ocean science remains robust, inclusive, and resilient in the face of future crises.

Competing interests: The authors declare no competing interests.

¹ Cheng, L. et al. *Adv. Atmos. Sci.* 42, 1092-1109 (2025)

² Hamlington, B. D. et al. *Nat. Rev. Earth Environ.* 6, 246-248 (2025)

³ <https://www.scientificamerican.com/article/trump-administrations-science-cuts-come-for-nsf-funding/>

⁴ <https://www.nature.com/articles/d41586-025-01396-2>

⁵ <https://sdgs.un.org/conferences/ocean2025>

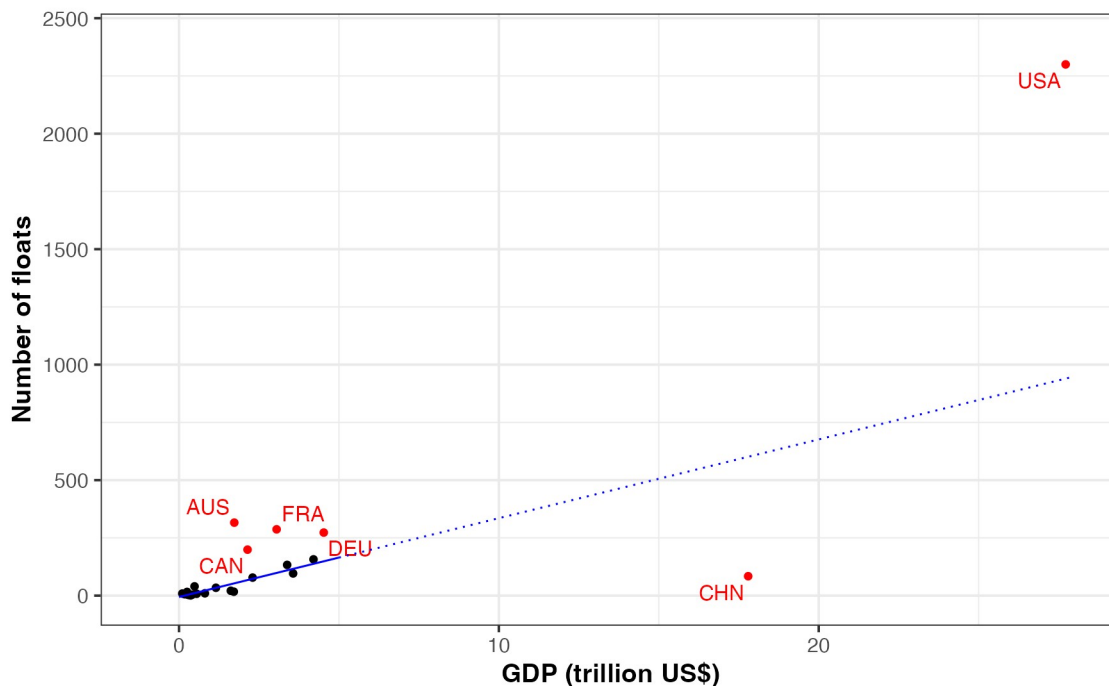


Figure 1| Structural vulnerabilities. The Argo program gathers critical oceanographic data through a fleet of autonomous profiling floats. 153 countries have a coastline but only 23 contribute to the Argo program. Among a subset of 17 contributing countries, the number of floats operated shows a strong positive correlation with national Gross Domestic Product (GDP; $r^2 = 0.85$, solid blue line). The United States, Australia, Canada, France and Germany stand out as notable outliers: they deploy more floats relative to their economic size. In contrast, China contributes fewer floats than would be expected based on its GDP. . GDP for the year 2023 from the World Bank, Argo floats in April 2025 from OceanOPS.