National Science and Technology Council
Subcommittee on Ocean Science and Technology

June 27, 2024

Re: Statement of Support for OneArgo

Dear Ocean Policy Committee,

We, the ocean science and technology agencies represented on the Subcommittee for Ocean Science and Technology (SOST), would like to take this opportunity to articulate the value OneArgo brings to all of our agency missions and to the wider ocean community.

The Earth's climate and ocean are changing rapidly, forcing our Nation to face complex social, economic, and national security decisions. There is a clear and urgent need for more ocean observations to improve weather and climate predictions, extreme weather forecasting, and impacts to coastal communities.[1,2] Collecting these data requires new, cost-effective tools such as the next-generation OneArgo observing array. Achieving this global coverage, real-time data delivery, and multi-disciplinary application would make it an invaluable tool for monitoring the ocean, understanding climate change, validating models, and advancing ocean sciences. A fully implemented array will enable data-driven decisions for existing and emerging sectors in the ocean economy to thrive and will allow innovators to explore and develop new applications and products that will benefit the broader U.S. GDP.

Since 1999, the United States has supported half of the "core Argo" floats (~4,000). Each float drifts freely with the currents, measuring a vertical temperature and salinity profile and transmitting the data to land via satellite. These measurements have revolutionized our understanding of the ocean and its role in the Earth system by providing ocean data that are integral to weather and ocean forecasting and underpin climate models and assessments. Argo floats have provided four times as many ocean profiles in the last 25 years than every other tool combined since the 1800s. [3] Producing each Argo profile costs less than $200, compared to $10,000 for one ship-based hydrographic profile.[4,5] Maintaining global coverage is crucial for national-security-related functions as we grapple with the impacts of climate change, extreme weather events, and impacts to coastal communities. However, annual float deployments have declined by 20% since their peak in 2016, primarily due to rising costs not being offset by increased investment, and

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[1] National Academies of Sciences, Engineering, and Medicine. 2017. *Sustaining Ocean Observations to Understand Future Changes in Earth's Climate.* Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/24919

[2] Argo and climate change. Argo. (n.d.). https://argo.ucsd.edu/science/argo-and-climate-change/

[3] Page 15, National Research Council. (2015) *Sea Change: 2015-2025 Decadal Survey of Ocean Sciences*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21655 (accessed April 23, 2024).

[4] Jayne, S.R., D. Roemmich, N. Zilberman, S.C. Riser, K.S. Johnson, G.C. Johnson, and S.R. Piotrowicz. 2017. The Argo Program: Present and future. *Oceanography* 30(2):18–28, https://doi.org/10.5670/oceanog.2017.213.

[5] Page 15, National Research Council. (2015) *Sea Change: 2015-2025 Decadal Survey of Ocean Sciences*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21655 (accessed April 23, 2024).

the core Argo array is shrinking despite widespread use of the data by the government, private industry, and academia.

Meanwhile, over the last decade, scientists have equipped Argo floats with new capabilities, created a new "OneArgo" design for a next-generation network, and begun pilot deployments of innovative floats. OneArgo has added two new missions: Biogeochemical-Argo (BGC-Argo), which adds sensors to measure oxygen, pH, nitrate, chlorophyll, irradiance, optical backscatter, and other essential ocean variables that are critical for understanding low oxygen (hypoxic) zones and ocean acidification;[6] and Deep Argo, which extends Argo to the full ocean depth, collecting temperature and salinity data from the remaining bottom half (50%) of the ocean volume not reachable by the original core mission.

The United States has responded to this opportunity with leadership, implementing more than half of the Deep and BGC-Argo pilot arrays. However, the effort faces rising equipment costs and stagnated investments. The current priority is to rebuild and maintain the core array because of its essential role in providing data for weather forecasts essential for national security and for predicting decadal changes to the Earth system. Funding shortfalls are precluding the ability to complete and sustain the Deep and BGC-Argo missions.

This has been a strong, decades-long collaboration between agencies and demonstrates successful transition from research to operations, supported by leadership and contributions from NOAA, the National Science Foundation, and Navy. Its impact is reflected across all ocean science and technology agencies and throughout our multi-sector partners in the domestic and international community. The United States risks undermining its legacy as the global leader in ocean observations if we miss the opportunity to realize the enormous scientific, economic, and security benefits of a fully implemented and sustained OneArgo array.

Sincerely,

SOST Co-Chairs

Danielle Farelli, OSTP

Dr. Alexandra Isern, NSF

Dr. Steve Thur, NOAA

Dr. Tom Drake, ONR

[6] Tollefson, J. (2016) Massive network of robotic ocean probes gets smart upgrade. *Nature* 531:421–422. http://dx.doi.org/10.1038/531421a.