

ARGO: A GLOBAL NETWORK FOR OCEAN OBSERVATION

The Argo program is a global array of autonomous profiling floats that collect vital data on ocean temperature, salinity, and other key parameters.

Since its launch in December 1999, Argo has transformed oceanography by providing continuous, real-time observations—even from remote and previously inaccessible areas. U.S. Argo, a major contributor to the international effort, is funded by the National Oceanic and Atmospheric Administration (NOAA) and the National Science Foundation (NSF).

This international program includes more than 50 participating nations, about 25 of which deploy floats. Argo is known for its rapid, open-access data policy, making information available to scientists, policymakers, forecasters, industry, and the public in near real-time. The program continues to expand with new float types capable of deeper dives and biogeochemical measurements, improving our understanding of the ocean and its impacts on people everywhere.



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How Argo Floats Work

Each Argo float follows a 10-day cycle. It begins at the surface, where it transmits GPS coordinates and previous data via satellite, then sinks to a “drift” depth of 1,000 meters. It remains there for about nine days, drifting with currents and taking occasional measurements. The float then descends to 2,000 meters and slowly rises, collecting high-resolution profiles of conductivity, temperature, and pressure—which are used to calculate salinity. Upon surfacing, it uploads its data and receives new mission instructions before repeating the cycle. Each float typically lasts around six years. Invented in the U.S., these autonomous tools have revolutionized ocean data collection without relying on costly research vessels. Impressively, the entire array operates on just 70 watts—equivalent to a single gaming console.

Core Argo

Core Argo comprises the bulk of the global float network, focused on measuring temperature, salinity, and pressure in the upper 2,000 meters of the ocean. In the U.S., the program is implemented by a consortium including the Scripps Institution of Oceanography, Woods Hole Oceanographic Institution, University of Washington, NOAA’s Pacific Marine Environmental Laboratory (PMEL), with data management by NOAA’s Atlantic Oceanographic and Meteorological Laboratory (AOML). Core Argo data underpin nearly 6,800 peer-reviewed publications covering topics such as El Niño and La Niña variability, sea level rise, storm forecasting, fisheries management, and the global water cycle.

Biochemical Argo (BGC-Argo)

BGC-Argo expands Argo’s reach to include biological and chemical ocean properties. Funded mainly by NSF, the U.S. is deploying 500 floats equipped with sensors to monitor pH, oxygen, nitrate, chlorophyll, suspended particles, and light penetration. These measurements help researchers study seasonal to long-term changes in ocean productivity, nutrient cycling, ocean acidification, low-oxygen zones, and carbon dioxide uptake. In the U.S., BGC Argo is implemented by the Argo consortium and the Monterey Bay Aquarium Research Institute (MBARI). Currently, the global BGC array is at 40% of its deployment goal.

Deep Argo

Deep Argo is designed to explore the ocean down to the seafloor. These specialized floats collect temperature, salinity, and pressure data from the abyssal ocean—a region vital for understanding long-term climate trends and that is seeing more industrial activity, but that is historically under-observed due to the cost and complexity of access. Deep Argo supports studies of deep ocean circulation and energy storage. However, only 20% of the global target array has been deployed so far.

Polar Argo

Polar Argo focuses on high-latitude oceans north of 60°N and south of 60°S—areas excluded from the original Argo design due to seasonal sea ice cover. Engineering innovations now allow floats to operate under ice during winter and collect data from these harsh, under-sampled regions to help close major observational gaps in climate models. Deployment is ongoing, with the current array at about 40% of its target.

Status and Support

While Core Argo receives long-term support from NOAA, sustained U.S. funding for the Deep, Polar, and BGC missions remains uncertain. These extensions are considered pilot programs and may not continue without stable funding.

Argo by the Numbers

~4,000 active floats

800+ deployments per year

25+ years of continuous data

3+ million temperature and salinity profiles

~6,800 scientific publications

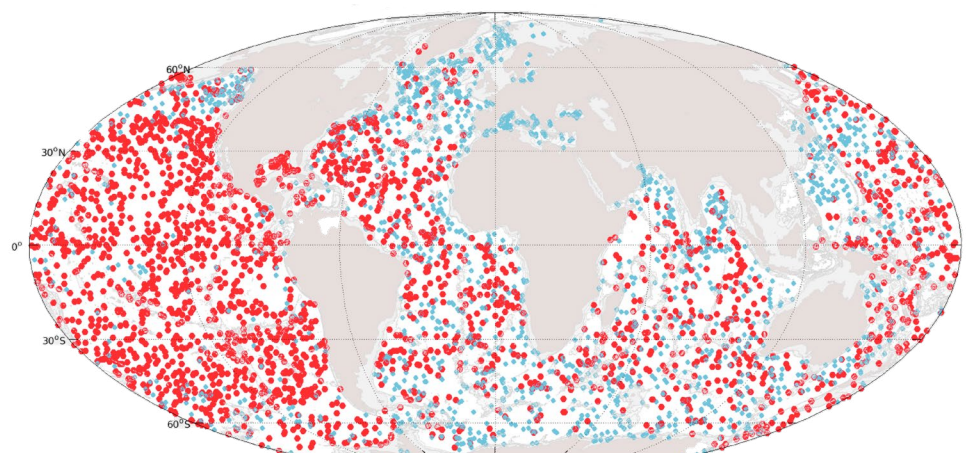
50+ participating countries

94% of data shared within 24 hours

Key:

● U.S. (2328)

● Other Nations (1779)



Active floats as of May 6, 2025