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Argo Robotic Instrument Network Now Covers Most of the Globe

International network reaches 1,500th float deployment—halfway to full array
Scripps Institution of Oceanography, UCSD

Scientists have crossed an important threshold in an international effort to deploy a global network of robotic instruments to monitor and investigate important changes in the world's oceans.

Researchers with the international Argo program announced they have reached the point where 1,500 ocean-traveling float instruments—half the target 3,000-float array—are now operating. This marks an important milestone in the program's mission to capture valuable data around the globe.

The Argo floats, which are robotically programmed to record and transmit data, are uniquely positioned to provide important information about climate and weather phenomena. Other applications of Argo information include: ocean heat storage and climate change; ocean salinity changes due to rainfall; ocean-driven events such as El Niño; impacts of ocean temperature on fisheries and regional ecosystems; interactions between the ocean and monsoons; and how the oceans drive hurricanes and typhoons.

“With 1,500 floats in the water we are now looking at almost the whole planet,” said Scripps Institution of Oceanography's John Gould, Argo international project director. “It's exciting to see so many countries involved in Argo and having them cooperate in

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monitoring the planet—oceanographers and climate scientists around the world now regard Argo as the key ocean element of an underwater global-observing system.”

With the number of instruments crossing the midpoint, the information being beamed back from the floats is increasingly being used for science and weather research. Twelve ocean and climate/weather centers around the world use Argo data in regional analyses and forecasts.

Scientists such as Scripps’s Dean Roemmich, chairman of the steering team for Argo, are using the data for new insights into ocean processes, information not available only a few years ago.

For example, a recent joint effort between Scripps Institution and a group from New Zealand has vastly increased the number of floats deployed in the south Pacific Ocean. The new data has allowed Roemmich to make new observations about the area’s ocean circulation and how currents have become stronger since last measured by ship-based techniques in the 1990s.

Other scientists are finding new ways to use the data.

“We will be able to get information about short-lived events, such as hurricanes,” said Gould. “When a hurricane is building up and it goes across an area, if there is a float underneath it you can actually see how much energy the hurricane has sucked out of the upper ocean.”

The full Argo array of 3,000 floats is expected to be deployed by 2007. Argo floats are autonomous ocean-traveling robots programmed to sink more than a mile below the ocean surface (**see animation**) and drift for as long as four years. Every 10 days the instruments surface to record temperature, salinity and currents and to relay the information to satellites. Within hours the information is transmitted to the Global Telecommunications System and is freely available on the Internet. The floats then sink again to begin a new cycle.

The developments leading to Argo’s ability to operate globally were made in the

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early 1990s by Scripps scientist Russ Davis. Twenty-five percent of the floats in the Argo array are built at Scripps. Each float is designed for a four-year lifespan, or approximately 150 cycles. Some have lasted longer.

“If anyone is concerned about what the climate will be like over a five- or 10-year period, they will have to look to the oceans to find answers to their questions,” said Gould. “Argo is becoming one of the key tools for monitoring what is going on in the oceans. So if there are any surprises, then we will get prior warning about them from Argo.”

Eighteen countries contribute floats to the array and many others provide assistance with float deployment and access to their nation’s waters.

Scripps Institution, Woods Hole Oceanographic Institution, the University of Washington and the National Oceanic and Atmospheric Administration’s (NOAA) Pacific Marine Environmental Laboratory are United States float operating partners in Argo. NOAA’s Atlantic Oceanographic and Meteorological Laboratory (AOML) handles U.S. float data. The United States also operates one of Argo’s two global data centers. U.S. Argo is funded by NOAA.

Argo is sponsored by the World Climate Research Program’s Climate Variability and Predictability project (CLIVAR) and by the Global Ocean Data Assimilation Experiment (GODAE). It is a pilot project of the Global Ocean Observing System (GOOS).

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Argo information: <http://www.argo.net/>

Scripps/UCSD Argo information: <http://www.argo.ucsd.edu/>

Group on Earth Observations: <http://earthobservations.org/>

Partnership for Observation of the Global Oceans: <http://www.ocean-partners.org/>

Scripps Institution of Oceanography on the web: <http://scripps.ucsd.edu/>

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