The Argo Project: Global Observations for Understanding and Prediction of Climate Variability

Dean H. Roemmich[1], John E. Gilson[1], Stephen C. Riser[2], W. Brechner Owens[3], Steven R. Jayne[3], Paul E. Robbins[3], Silvia L. Garzoli[4], Claudia Schmid[4], and Gregory C. Johnson[5]
[1]Scripps Institution of Oceanography, La Jolla CA
[2]School of Oceanography, University of Washington, Seattle WA
3Woods Hole Oceanographic Institution, Woods Hole MA
[4N]OAA Atlantic Oceanographic and Meteorological Laboratory, Miami FL
[5]NOAA Pacific Marine Environmental Laboratory, Seattle WA

Project Summary

The U.S. Argo Float Consortium proposes to continue its integrated implementation of the U.S. Argo program for a broad range of operational and research applications. The Argo array is now global, with more than 3500 active floats (Figure 1) providing over 100,000 temperature/salinity profiles and reference velocities per month. Activities of the U.S. Argo Float Consortium begin with float technology development and with the production, assembly, or purchase of about 360 profiling floats per year (Figure 2). Deployment of floats, using a combination of opportunistic and dedicated platforms, follows priorities for global distribution set by the U.S. Argo Science and Implementation Panel, and is done in collaboration with international partners. Communications use ARGOS and Iridium systems, with all Argo data made publicly available via the GTS and Internet, subject to automated quality control checks and usually delivered within 24 hours of collection. Expert examination of profiles, plus detection and adjustment of slow drift in salinity sensors adds to the quality of data in delayed-mode. All activities are coordinated not only within the U.S. Float Consortium and U.S. Argo, but also internationally using the mechanisms of the Argo Steering Team, Argo Data Management Team, and Argo's scientific and technical workshops. The U.S. Float Consortium increases Argo's value through its implementation of the U.S. Argo program, through its international leadership, and through its broad participation in Argo applications including research and education.

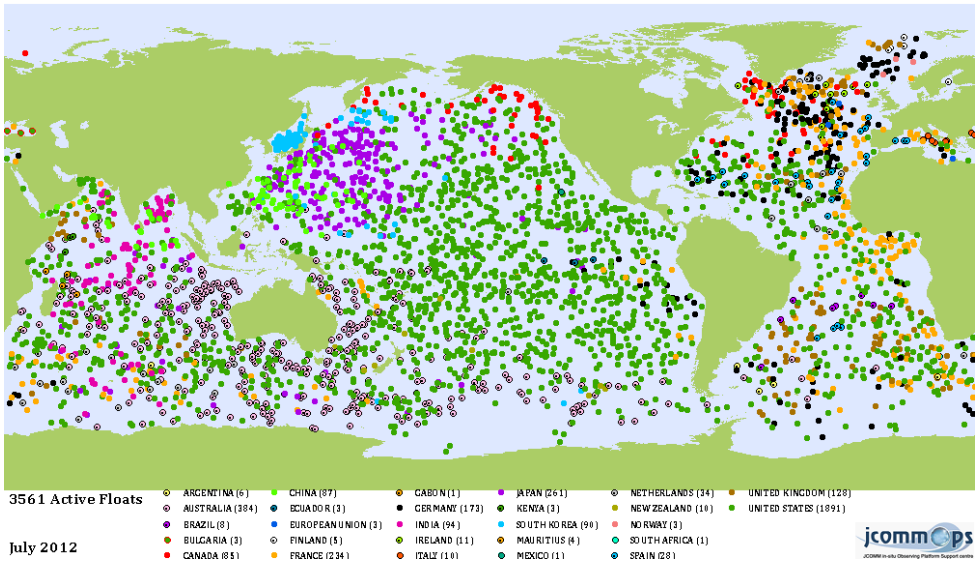

***Figure 1**: The Argo Array as of 30 July 2012. As of 9 October 2012 there were 1905 active US floats , including1789 floats funded under the U.S. Argo Program, and 116 other US (Argo-equivalent) floats whose data are released by the PIs via the U.S. Argo Data Assembly Center.*

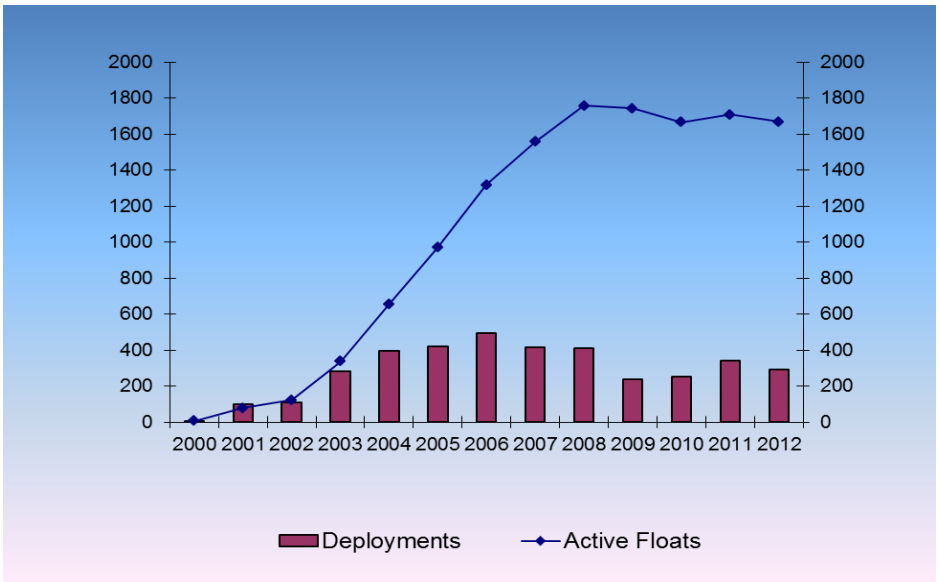

***Figure 2**: Yearly deployments by the United States Argo Program through 30 September 2012 and the number of active U.S. floats.*

The uses of Argo data fall into four broad categories: basic research, national and international assessments, operational applications, and education/outreach. The Argo Steering Team tracks basic research by maintaining a bibliography of published research papers using Argo data (http://www.argo.ucsd.edu/Bibliography.html). Over 1100 Argo papers have been published to date, with about 200 being added each year, on a broad range of topics including water-mass properties and formation, air-sea interaction, ocean circulation, mesoscale eddies, ocean dynamics, and seasonal-to-decadal variability. Soon Argo will have completed a decade of systematic global observations of the subsurface ocean, collecting over a million temperature/salinity profiles. As the first and only global subsurface ocean dataset, Argo has become a key contributor to national and international assessments of climate-scale ocean variability such as the annual "State of the Ocean" reports (Bull. Am. Met. Soc.). These assessments have value as public informational documents and for use by policy makers. Research in global ocean data assimilation modeling is gradually translating into operational uses of these models for ocean state estimation, short-term forecasting, seasonal-to-interannual prediction, and coupled climate modeling. Again, as the only global subsurface dataset, Argo is critical for these applications. The Argo Steering Team tracks operational users at http://www.argo.ucsd.edu/Use_by_Operational.html . Finally, educational applications of Argo have begun to increase and have enormous potential value for the future. These applications include curriculum-based teaching units using Argo data at high school level in several nations, student projects at the undergraduate level, and Argo data used in master's and PhD theses. The Argo Steering Team facilitates educational applications by providing gridded versions of the Argo dataset and data display tools for easier accessibility, and in the future it will track theses using Argo data.