USA Report to AST-10, Hangzhou China, March 2009
(Submitted by Dean Roemmich)

Organization:

U.S. Argo is supported through the multi-agency National Ocean Partnership Program (NOPP). The project is presently being carried out by a U.S. Float Consortium that includes principal investigators from six institutions (SIO, WHOI, UW, NOAA/AOML, NOAA/PMEL, FNMOC). Float production, deployment and data system functions are distributed among these institutions on a collaborative basis. Following two years of pilot activity supported by ONR and NOAA (FY99, FY00), and a 5-year (FY01-05) full implementation phase under NOPP, the Argo project is now in the third year of a five-year continuation, supported by NOAA and (for FNMOC participation) the Navy.

In addition to U.S. Argo floats, Argo-equivalent floats have been provided from a number of U.S. Sources, including University of Hawaii, PMEL, AOML, NAVOCEANO, and Florida State University.

The present 5-year cycle of U.S. Argo implementation will end in mid-2011.

Support level:

The support level for U.S. Argo is aimed at providing half of the global Argo array. The target level is 1500 active floats, based on a deployment rate of about 410 floats per year. There were 316 floats funded in FY02, 344 in FY03, 410 in FY04, 410, in FY05, 390 in FY06, 368 in FY07 and about 360 in FY08. With level funding, further incremental reductions in float numbers are likely.

The U.S. Argo effort includes float production and deployment, technology improvement, communications, data system development and implementation for real-time and delayed-mode data streams, and participation in international Argo coordination and outreach activities.

Status:

As of February 23, 2009, there are 1847 active U.S. Floats (Argo Information Centre, see Fig 1), including 1764 from U.S. Argo float providers (SIO, UW, WHOI, PMEL) plus 83 Argo-equivalent floats provided by partnering programs. During 2008 there were 368 floats deployed by U.S. Argo (Fig 2). The large number of active U.S. Argo floats (1847) relative to the target number of 1500 reflects the high deployment rate in 2005-2006, to clear a backlog of instruments funded but not deployed earlier. A concern for the international array is that the number of U.S. floats is likely to decrease toward the 1500 float target number.

The major focus of the U.S. effort in 2008 was to help achieve Argo's objective of a global array by increasing float density in sparsely sampled regions. The majority (257 out of 368) of U.S. float deployments during the year were in the Southern Hemisphere. This included a major cruise deploying 98 floats in the South Pacific, jointly staged with New Zealand Argo on R/V Kaharoa.

Out of 1773 Argo floats presently active in the Southern Hemisphere, 68% (1212 floats) have been provided by the U.S. Priorities for float deployments are established by the U.S. Argo Science Panel, comprised of members of the Float Consortium and representatives of Argo data user groups. The highest priority is deployment of a global Argo array. Specific plans for 2009 float deployments, as they evolve, are posted on the AST web site's deployment planning links. A major U.S./New Zealand deployment cruise in the South Indian Ocean is planned in late 2009 on R/V Kaharoa.

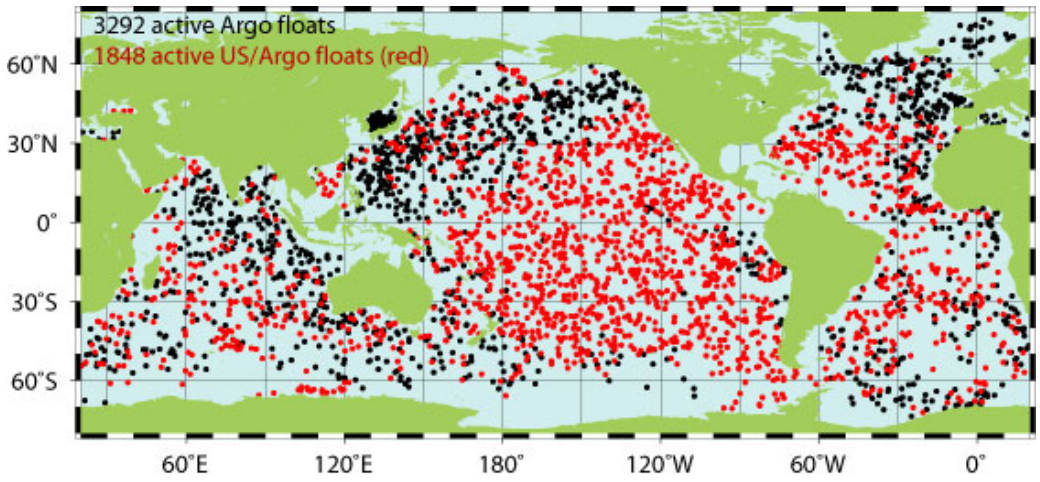

Fig 1. Positions of all active Argo floats in black, with positions of active U.S. Argo floats in red, 24 February 2009.

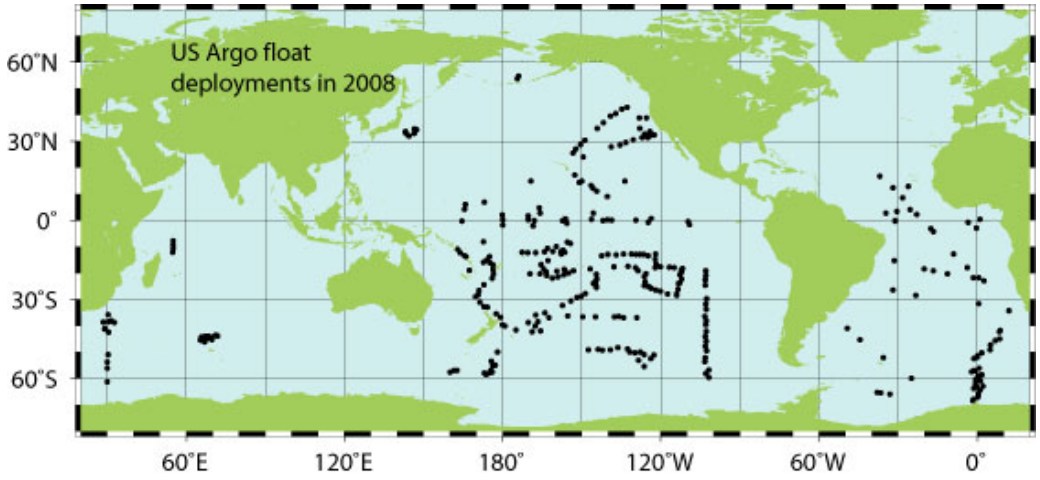

Fig 2. Positions of U.S. Argo deployments during 2008.

A continuing effort in U.S. Argo is aimed at technology improvement: for increased float lifetime and improved performance. Ongoing improvements in reliability have been demonstrated in recent years. Out of 396 U.S. Argo (PMEL, SIO, UW, WHOI) floats deployed in 2004, 226 remain active as of 23/02/2009. Floats deployed in 2004 have an average age of about 4.7 years. Floats deployed in 2005 and 2006 appear to be doing even better. A goal of U.S. Argo is to extend average float lifetimes beyond 4 years.

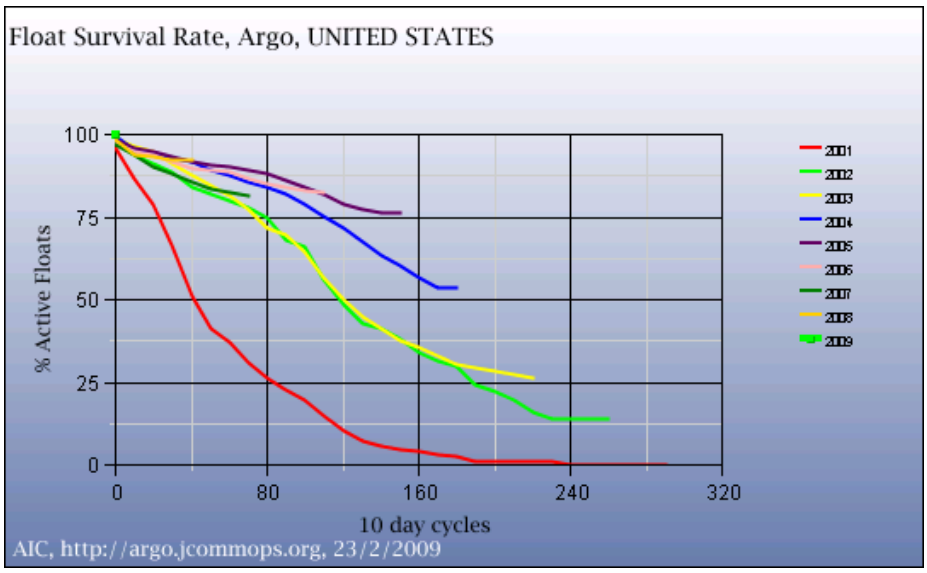

Fig 3. Survival rate for U.S. floats, including Argo-equivalent, by year of deployment (source: AIC).

The U.S. Argo Data Center is based at NOAA/AOML. Real-time data from all U.S. Argo floats are transmitted via the GTS. GTS transmission uses computers housed at Service ARGOS (U.S.) and operating round-the-clock, running software developed at AOML to implement internationally-agreed quality control tests. The AOML data center serves as the national focus for data management and is the conduit for delayed-mode data to pass between the Pis and the GDACs. During 2009, U.S. goals in data management include elimination of the backlog in delayed-mode quality control (Fig 4).

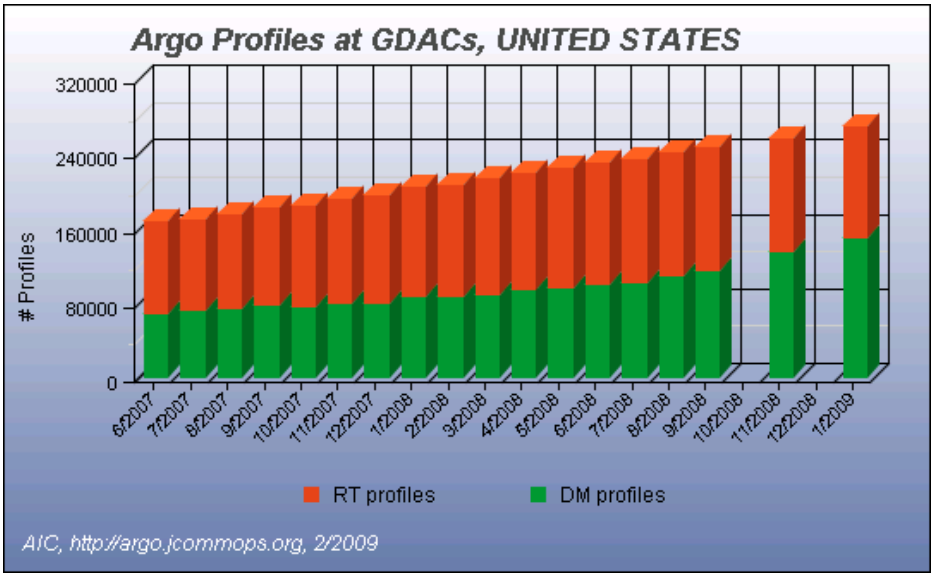

Fig 4. Number of profiles held at GDACs for U.S. floats (source: AIC), including those with delayed-mode and real-time levels of quality control. Roughly 58,000 of the RT profiles are less than one year old and not yet eligible for DM processing.

In addition to the national DAC, a Global Data Assembly Center (GDAC) is run as part of the GODAE server, located at FNMOC/Monterey. The two GDACs at FNMOC/Monterey and IFREMER/Brest are mirror images in their assemblies of Argo data from all international partners, and are responsible for

dissemination of the data.

Several U.S. institutions participate in Argo Regional Center activities, including AOML's role as focus for the South Atlantic ARC.

Uses of Argo data

The impressive breadth of Argo applications, both research and operational, in the U.S. is well illustrated by the publications list and operational centers referenced at www-argo.ucsd.edu. A significant structural issue in U.S. Argo continues to be the lack of funding targeted specifically at Argo research (or even more broadly at research based on the sustained ocean observing system).

Issues

The U.S. Argo Science and Implementation Panel held its annual meeting in Dec 2008. Some issues discussed there included:

- The need for dedicated ship-time for Argo deployments in remote regions.
- Eliminating the DMQC backlog.
- Consistency in decision-making in DMQC.
- “Mission creep”: Is Argo pursuing reasonable and feasible objectives?
- Development of a Reference Database.
- Number of data decoders maintained by DACs.
- Understanding float failure modes.
- Re-seeding of greylisted floats.