

Japan National Report (Submitted by Nobie Shikama)

1. The Status of implementation (major achievements and problems in 2007)

1.1 Floats deployed and their performance

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) deployed 80 floats (all APEXs) with the aid of R/Vs of 11 domestic organizations in 2007. Two APEXs among these 80 floats have a Sea-Bird oxygen sensor and a Wetlab chlorophyll sensor. The R/V Mirai of JAMSTEC deployed 5 APEXs belonging to IOS/Canada in the Bering Sea in October 2007, which became the commemorative 3000th float in the international Argo network. Five Iridium-APEXs deployed by JAMSTEC in the MISMO experiment in the Indian Ocean in October 2006 finished their initial mission (1day cycle, 500db profiling) and were modified to observe in the normal Argo mission (10day cycle, 1525db profiling) via the two-way communication in April 2007. Among these 5 Iridium-APEXs, 4 are still working.

After the success of the first POPS deployed near the North Pole in the Arctic Sea in April 2006 (see Argonautics No.7 and the Japan national report to AST-8), the Arctic research group of JAMSTEC tried to deploy the second POPS in the same area in September 2007, however, postponed deployment because some electric leakage was found with the 1,000m cable on the spot. Two or three POPS are being prepared to deploy in the Arctic Sea in summer 2008. POPS (Polar Ocean Profiling System) is an ice-based drifting buoy with a PROVOR float moving up and down along a 1000m cable. The observed data (temperature-salinity profiles of every 3 days, 3-hourly GPS position, atmospheric temperature and pressure) is transmitted to Iridium Satellites and distributed to GTS via JMA.

Among JAMSTEC's 613 floats (530 APEXs, 72 PROVORs, 11 NINJAs) deployed in the Pacific, Indian and Southern Oceans, from 1999 to the end of January 2008, 320 (318 APEXs, 2 NINJA) floats are now in normal operation, 249 floats (171 APEXs, 70 PROVORs, 8 NINJAs) terminated their mission, 4 floats (all APEXs) are transmitting on the beaches after stranding and 8 floats (5 APEXs, 2 PROVORs, 1 NINJA) were recovered.

The Japan Meteorological Agency (JMA) deployed 15 APEXs as Argo equivalent floats in the seas around Japan from January 2007 to December 2007, whose data have been used for operational ocean analysis and forecast. Among 38 floats (14 PROVORs, 24 APEXs) which JMA deployed from 2005 to 2007, 31 floats (9 PROVORs, 22 APEXs) are operating at the end of December 2007, while 3 floats (1 PROVOR, 2 APEXs) terminated the transmission in 2007.

The Fisheries Research Agency introduced a Slocum Glider manufactured by Webb Research and used it in the Kuroshio-Oyashio region in September 2007. This is the first experience of the Slocum Glider in the Japanese Argo community.

There reported three cases of recovered floats, two from a Japanese island, Amami-oshima (28.3N, 129.5E) and another from Negros Island, the Philippines.

- 1) JMA was informed by a local resident who recovered a float on the beach of Amami-oshima in November 2007, which was confirmed to be a PROVOR (WMO No. 2900581) deployed by JMA in February 2006. This float was sent back to JMA.
- 2) Japan Coast Guard recovered a float in the harbor of Amami-oshima in November 2007, which was confirmed by JAMSTEC to be an APEX of NAVOCEANO (WMO No. 2900382). JAMSTEC communicated with AIC and NAVOCEANO and then this float was redeployed by JCG in the Kuroshio a week after its recovery. Unfortunately, there has been no transmission from the redeployed float.
- 3) JAMSTEC was informed by AIC in February 2008 that the Philippine Coast Guard in Dumaguete City, Negros Island safely kept an Argo float which had been caught in a local fisherman's nets in 2006. This float was deployed by JAMSTEC in March 2003 and still transmitting. JAMSTEC plans to send a technician to Philippine to take off the batteries and send it back to Japan safely.

1.2 Technical problems encountered and solved

Among 40 APEXs delivered to JAMSTEC in October 2007, 9 ARGOS transmitters manufactured by Seimac showed a lower output power and less stable frequency than usual. These 9 transmitters were sent back to the maker and replaced by normal ones.

JMA's three floats terminated the transmission in 2007, of which two ceased their operation in shallow waters. JMA postponed the deployment of 3 APEXs due to the failure in the bladder function test as informed in the previous report. These floats were repaired and deployed by August 2007, which are working without problems.

An APEX (WMO No. 2900667) showed a series of profiles with lower salinity by 0.09psu compared with that of CTD measurement at deployment location and showing a gradual approach to a normal profile in the 9th cycle (Fig. 1). We were thinking that this sort of problem had been solved several years ago.

Abnormal observation with pressure was reported from an APEX (WMO No. 2900666). There was no observation in shallow layers from 16th to 30th profile (Fig. 2). After the 17th profile any observed pressure values differed from those of the designated depth table. Similar case was ever reported by H. Freeland with IOS's APEX (WMO No. 4900633).

1.3 Status of contributions to Argo data management

The Japan DAC, JMA has operationally processed data from all the Japanese Argo and Argo-equivalent floats including 380 active floats as of January 24, 2008. Nine Japanese PIs agree to provide data to the international Argo. All profiles from those floats are transmitted to GDACs in netCDF format and issued to GTS using TESAC and BUFR code after real-time QC on an operational basis. Argo BUFR messages have been put on GTS since May 2007.

JAMSTEC released the OW version of SeHyD, which is the baseline data to be used in the delayed-mode QC in the Pacific Ocean. JAMSTEC is also working with INCOIS to integrate the Indian Ocean historical data to IOHB, which should be the baseline data in the delayed-mode QC in the Indian Ocean.

1.4 Status of delayed mode quality control process

JAMSTEC has submitted the delayed-mode QCed data of 27,171 profiles to

GDACs as of January 2008. Among these data, the ones of about 16,000 profiles were provided within a year. JAMSTEC has also started the operation of delayed-mode QC for the floats of Japanese PIs other than JAMSTEC. The remaining backlog of about 12,000 profiles will be cleared by this operation.

2. Present level of and future prospects for national funding for Argo including a summary of the level of human resources devoted to Argo.

Japan Argo had been conducted in a 5-year program from FY1999 to FY2004, as a part of Millennium Project implemented under cooperation among the Ministry of Education, Culture, Sports, Science and Technology (operation: by JAMSTEC), the Ministry of Land, Infrastructure and Transport, JMA and Japan Coast Guard.

After the Millennium Project terminates in March 2005, JAMSTEC is to continue the operation until FY2008 nearly in the same scale (about 80 floats to be deployed every year) and JMA will continue to deploy 15 floats around Japan every year for operational ocean analysis and forecast.

3. Summary of deployment plans (level of commitment, areas of float deployment) and other commitments to Argo (data management) for the upcoming year and beyond where possible.

In FY2008, JAMSTEC will deploy about 80 floats in total in the Pacific, Indian, and Southern Oceans. JMA will continue to deploy 15 floats around Japan every year for operational ocean analysis and forecast.

JMA continues serving as the Japan DAC for the upcoming year. JAMSTEC continues running the Pacific Argo Regional Center for the upcoming year.

4. Summary of national research and operational uses of Argo data as well as contributions to Argo Regional Centers.

Many groups in JAMSTEC, JMA and Japanese universities are using Argo data for oceanographic researches on water mass production and transport in the North Pacific, the mid-depth circulation, the mixed layer variation, the barrier layer variation and so on.

The global Argo TESAC messages are used for operational ocean analyses and forecasts by JMA. Various oceanographic charts in the sea adjacent to Japan based on the output of the Ocean Comprehensive Analysis System are operationally distributed through the JMA web site (in Japanese) for national use. Numerical outputs of the system are available from the NEAR-GOOS Regional Real Time Data Base (<http://goos.kishou.go.jp/>) and the Japan GODAE server (<http://godae.kishou.go.jp/>) operated by JMA. Monthly Diagnosis and Outlook of El Niño-Southern Oscillation based on the outputs of the Ocean Data Assimilation System and the El Niño Prediction System (an ocean-atmosphere coupled model) are also operationally distributed through the JMA web site (in Japanese) and the Tokyo Climate Center web site (http://ds.data.jma.go.jp/tcc/tcc/products/el_nino/). JMA is planning to expand the ocean monitoring and prediction area for climate to the tropical Indian Ocean.

JAMSTEC is providing a variety of products and some information about consistency check of float data related to delayed-mode QC for the Pacific Argo Regional Center (PARC) web site as a main contributor. JAMSTEC will support the activities of the Southern Ocean ARC (SOARC) in the Pacific sector of the SOARC.

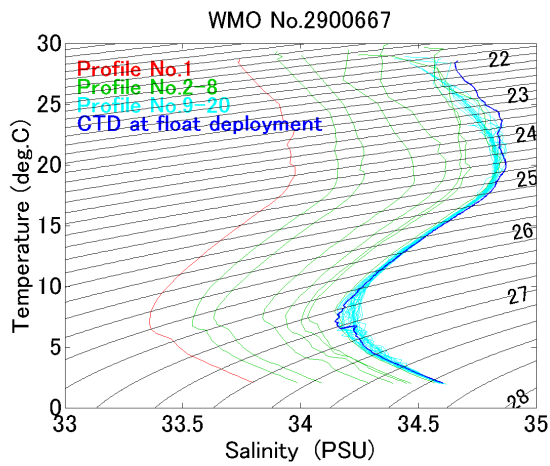


Fig. 1 Gradual approach of WMO No. 2900667 observations to the CTD cast at deployment location.

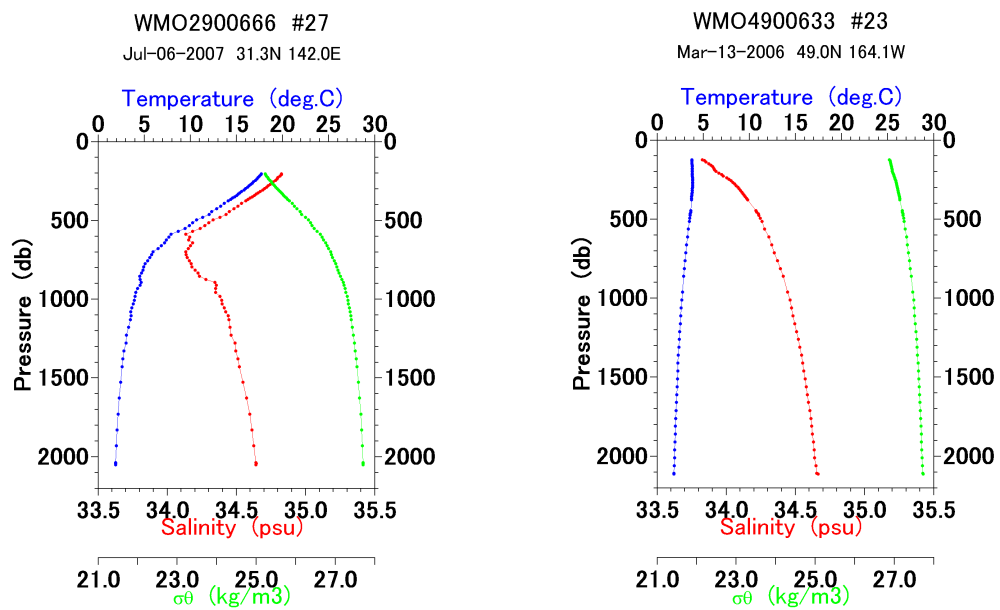


Fig. 2 Lack of observations in shallow layers; (left) WMO No. 2900666, (right) WMO No. 4900633.