

**Japanese National report**  
(Submitted by Kensuke Takeuchi)

## **1. Status of implementation**

### **1.1 Floats deployed and their performance**

Japan Marine Science and Technology Center(JAMSTEC) deployed 97 floats (APEX) in FY 2003 (from April 2003 to March 2004) . In the around the world cruise in the southern hemisphere by R/V Mirai (Beagle Cruise), not only Japanese floats but also 22 US floats and 15 UK floats are deployed in the Southern Pacific and the Southern Atlantic.

Japan Meteorological Agency (JMA) deployed 2 floats (APEX) south of Japan in FY 2003. National Polar Research Institute deployed 3 Argo Equivalent floats (all PROVOR) in the Southern Ocean in FY 2003.

Among the 246 floats (APEX 170, PROVOR 70, NINJA 6) JAMSTEC had deployed in the Pacific, Indian and Southern Oceans, from 1999 to the end of January 2004, 172 floats are operating at the end of January 2004 (APEX 149, PROVOR 23), 67 floats are already dead and 7 floats are recovered.

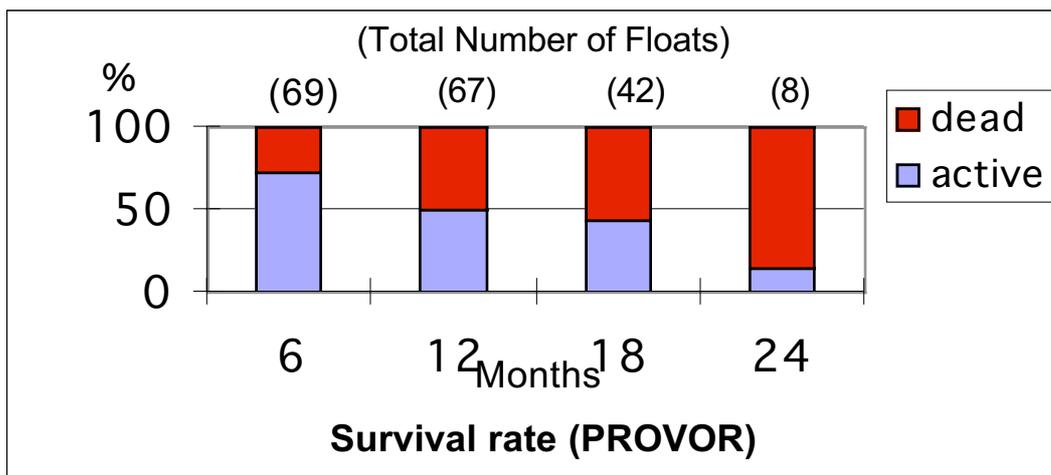
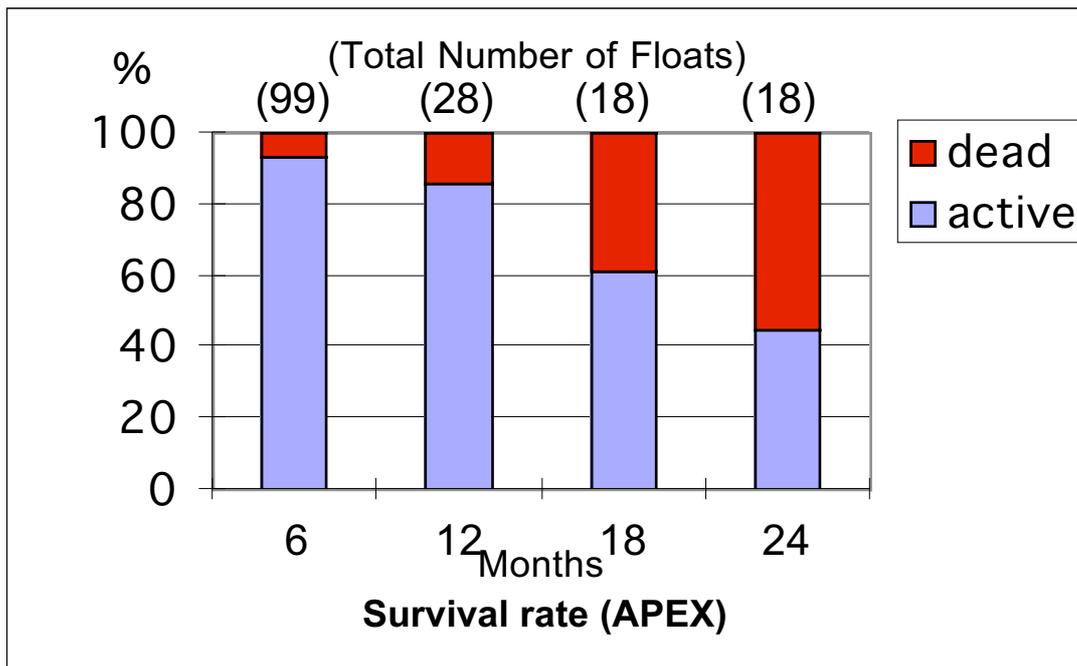
### **1.2 Technical problems encountered and solved**

About a half of the PROVOR floats deployed by JAMSTEC have experienced emergency pop-up. Once a float experiences the emergency pop-up, it tends to repeat the emergency pop-up, and many of them die earlier than their expected life time. Most of the PROVOR floats die between 70 and 90 profiles even without the experience of emergency pop-ups.

Among 20 APEX floats deployed in FY 2000 and 2001, 11 floats stopped operation due to drop of battery voltage after 40 to 50 profiles. These floats use APF6 or 7 boards, known to cause so-called energy flu. The manufacture changed the design of the floats, and the floats with an improved board (APF8) used for the deployment from FY 2003 and so far no similar problems are found for these floats.

Ten floats out of 50 APEX floats with Druk pressure sensor showed abnormal data, one of them died early, which is suspected due to malfunction of the pressure sensor. The manufacture claims they already spotted the problem and fixed it. No such problem is found for the floats with new sensors.

Among the 3 PROVOR floats deployed by NPRI in the Southern Ocean, 2 didn't dive at all and drifted at the sea surface and the other showed very unstable behaviors. It is suspected due to the high viscosity of bladder oil in the cold circumstance.



## 1.2 Status of contributions to Argo data management

### Real time data management

The Japan DAC, Japan Meteorological Agency (JMA), is presently acquiring ARGOS messages from 179 active floats deployed by six Japanese organizations, as of January 22, 2004. All profiles are issued to the GTS and GDACs in accordance with the Argo data management standard. More than 90% of the profiles are issued within 24 hours. Historical data from 279 floats including those from the active floats have been sent to GDACs.

### Data acquired from floats.

JAMSTEC has got 4977 profiles (more than 90% of Japanese floats) from about 150 active floats operated by JAMSTEC, NPRI and Tohoku Univ in 2003.

Among 8842 records, which we have received (one record for one cycle) in the past four years, 883(10%) records were found abnormal, such as, data with few observation layers (less than 10), no-position, constant profile, abnormal pressure and

data out of cycle schedule (emergency ascent). Remaining 90% records show 'usual' profile.

#### Data issued for delayed QC.

JAMSTEC has been doing WJO salinity adjustment on trial to the profiles obtained in the past four years to find how to use it as a automated tool. Close examination shows that about 64 (82)% of the 5938 QCed profiles are that their Delta-S is within Sigma-S x 1.0 (2.0), where Delat-S is S(adjusted)-S(observed) and Sigma-S is estimation error by WJO. Further investigation will be reported in 'Argo delayed mode data workshop'.

#### Delayed data sent to GDACs.

This has not yet done.

#### Products about Argo floats and data.

JAMSTEC's web pages show various tables and figures including float tracks, T/S profiles and TS diagrams, and ASCII data files which come from dQC processes for Japanese floats. It also shows network information and some scientific products including T/S/DynamicHeight/Accelalation potential on isobaric or isopycnal surface for the Pacific and Indian Ocean.

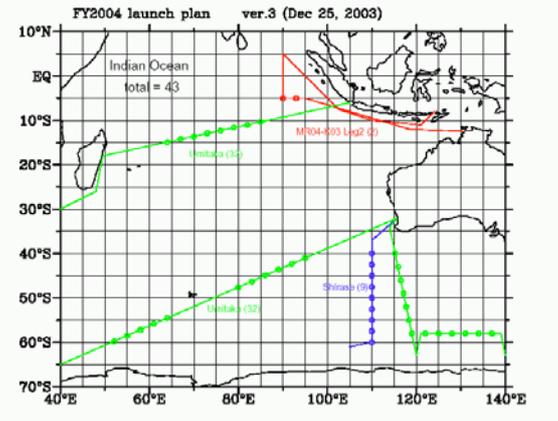
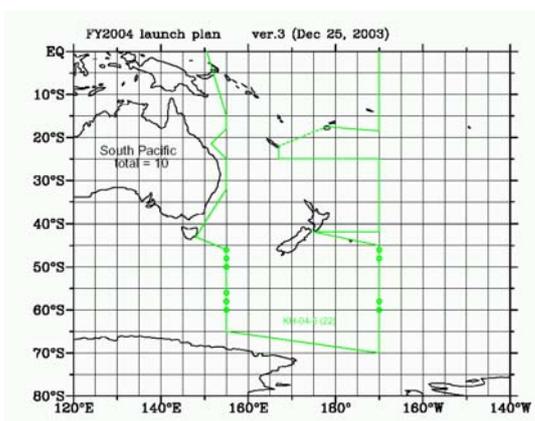
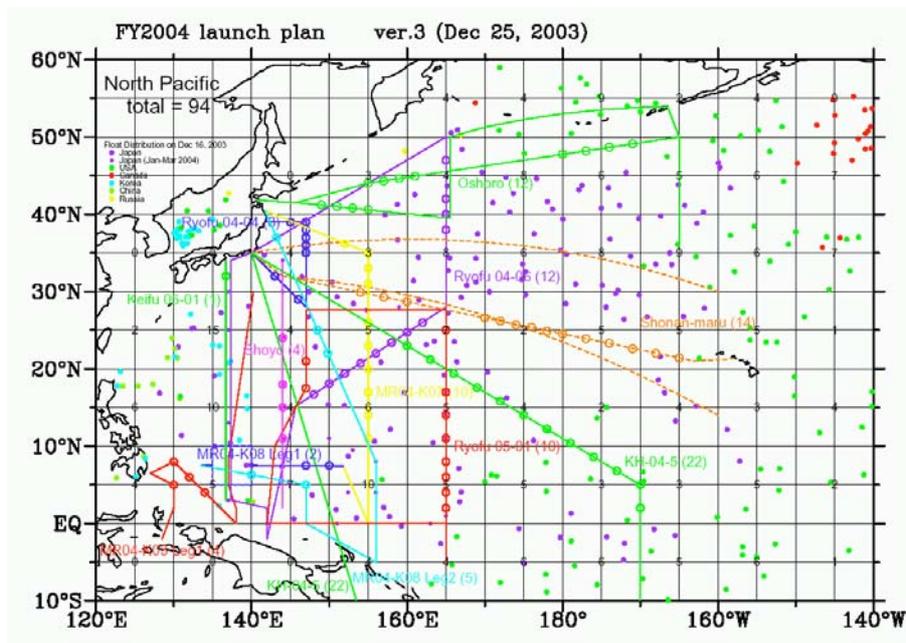
## **2. Present and future national funding for Argo.**

Japan Argo is a 5-year program from FY1999 to FY2004, as a part of so called Millennium Project, which is implemented under cooperation among the Ministry of Education, Culture, Sports, Science and Technology (operation: Japan Marine Science and Technology Center), the Ministry of Land, Infrastructure and Transport, the Japan Meteorological Agency and the Japan Coast Guard. JAMSTEC is responsible for the float operation and delayed mode data management, while JMA is mainly responsible for the real time data management and JCG is responsible for complementary observation to Argo. In total more than 20 people are involved in the Argo project. More than 10 people of them are working full timers.

The funding for FY 2003 was about 400 million Japanese Yen, and about the same level of funding is expected for FY 2004. Even after the end of the Millennium project, JAMSTEC will likely continue about the same level of operation until FY2008.

## **3. Summary of deployment plans.**

In FY 2004 JAMSTEC is planning to deploy in total 90 to 100 floats in the North and South Pacific, Indian and Southern Ocean. NPRI may deploy some floats in the Southern Ocean.



### 3. Summary of national research and operational uses of Argo data

The global TESAC messages from Argo data are used for operational ocean analyses by Japan Meteorological Agency. The global TESAC messages have been distributed through the NEAR-GOOS Real Time Data Base operated by JMA since the beginning of Argo. Several users of the database are retrieving the TESAC messages operationally.

JMA studies the mid-depth circulation in the North Pacific using trajectory data of Argo float.

In JAMSTEC, research on 4-dimensional assimilation of Argo data into an ocean global circulation model is on the way.

Many groups in JAMSTEC, JMA and Universities are using Argo data for researches in various field of oceanography. More than 30 papers are presented at the First Argo Science Symposium in Tokyo, in November 2003. The topics include use of Argo data for forecasts, assimilation, water mass formation mixed layer depth distribution and so on.

