

## **Argo Chinese National Report 2015**

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### **1. The status of implementation**

#### **- floats deployed and their performance**

From March 2015 to February 2016 China deployed 16 profiling floats in the western Pacific and Indian oceans. These floats come from 4 PIs of 3 institutions in China, which includes 5 Iridium APEX floats deployed by Dake Chen from CSIO, 6 HM-2000 floats deployed by DongLiang Yuan from IOCAS, 4 APEX floats deployed by Jianping Xu from CSIO, and 1 PROVOR float deployed by Navigation Guarantee Department. The number of deployment decreased dramatically compared with that of 2014 owing to the status of China Argo which is supported by research programs. As of January 2016, China has deployed about 353 profiling floats in the Pacific and Indian oceans including 183 Argo equivalent floats. Now there are 170 active floats working in the seas (Figure1). In September 2015, China deployed 6 HM-2000 floats in the WBC of western Pacific ocean. It was the first deployment of floats developed by China as Argo equivalent floats. HM-2000 float uses Beidou satellite System (BDS) for data transmission and GPS for positioning. However, it can be switched between GPS and BDS for positioning. After deployment, 1 float did not transmit any data, and another float transmitted bad salinity measurements owing to the problem of its CTD sensor. Two-way communication capacity has been tested successfully when some of the floats are likely to drifted outside of the BDS coverage. As of January 2016, 2 HM-2000 floats are still active. On average, the inactive floats repeated 72 cycles from their deployment.

#### **- contribution to international Argo**

Invited by PICES, Mr. Liu Zenghong attended the 24th North Pacific Marine Science Organization (PICES) annual meeting held in Qingdao, China during October 14-25, as international Argo observer authorized by international Argo project office. He gave invited lectures entitled "Progress of global Argo" and "Progress of global Argo and float technology"

at the three sessions (MONITOR、POC and IPCC AR5), and also exhibited the important achievements from the beginning of international Argo project through a poster.

On 27 January 2016, a review of "Fifteen years of ocean observations with the global Argo array" was online published by 《Nature Climate Change》, which was co-authored by 27 scientists from 18 different countries. The publication of this review was reported by several China medias through which the influence of global Argo was expanded in China. It will promote the applications of Argo data and attract more attention from government.

#### **- technical problems encountered and solved**

In 2015 there were 4 floats (2 PROVOR, 1 APEX and HM-2000) added into grey list due to obvious conductivity sensor drift. The reason is still under investigation.

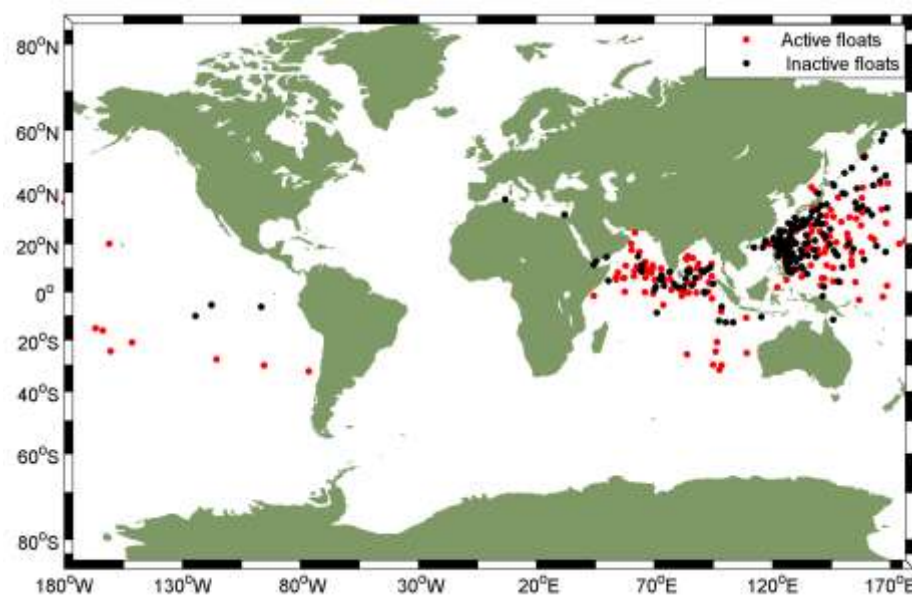


Fig.1 Launch positions of all floats (black) and latest positions of the active floats as of January 2016.

#### **-status of contributions to Argo data management (including status of pressure corrections, technical files, etc)**

From the AST-16 meeting, China Argo received data from 214 active floats and submitted 7057 TS and 1000 O2 profiles to GDAC. CLS still helps us to insert all Argo profiles into GTS. However, CSIO started to insert data into GTS via Chinese Meteorological Agency (Beijing) from October 2015. All Argo profiles were converted to BUFR format through a Perl script developed by JMA. At present, profiles from Chinese floats are inserted into GTS by both CLS and CSIO. We plan to stop distributing bulletins by CLS after the AST-17 meeting. We would like to thank CLS for their helps. CSIO changed all the decoders from C language to Matlab, as well as RTQC

and netcdf file generation. New decoders are very flexible due to usage of format table. We updated most of the meta files and technical files to V3.1 but not for trajectory files. We also created b-files from several bio-Argo floats except 17 PROVOR-DOI floats.

CSIO setup a BeiDou data receiving system (including a Beidou Antenna) through which the messages from HM-2000 floats can be operationally received and decoded. At present, the selected cycles from HM-2000 floats are submitted to GDAC because the PI only wants to share 10-day cycles.

**- status of delayed mode quality control process**

In the past year, CSIO didn't submit any D-files to GDAC due to a poor manpower. Now we are restoring submission of D-files and updating all of the old D-files to V3.1. It should be noted that the China Argo equivalent floats has been more than half of the total floats, which will lead to an increased difficulty of carrying out DMQC.

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

China Argo is a non-operational program, the number of deployment is heavily relied on Argo related research programs. Now China Argo is mainly supported by Ministry of Science and Technology (MOST).

Currently there are 5 staffs working for float deployment, data processing and data application at CSIO. A few floats will be deployed by some special programs from SOA.

**3. Summary of deployment plans (level of commitment, areas of float Deployment, low or high resolution profiles) and other commitments to Argo (data management) for the upcoming year and beyond where possible.**

We estimate that about 15 floats will be deployed in 2016 (including 4 HM-2000 floats). The number of China Argo equivalent float's deployment is difficult to count because it depends on whether or not PIs want to share their Argo data with others.

**4. Summary of national research and operational uses of Argo data as well as contributions to Argo Regional Centers. Please also include any links to national program Argo web pages to update links on the AST and AIC websites.**

Argo data has become an important data source in many studies about ocean variability from basin-scale to global-scale. Besides this, Argo data has also been used into operational assimilation system or reanalysis system. CSIO maintains a monthly global Argo gridded dataset (called BOA\_Argo) and updates once a year. In 2015, we added SST, SSS and MLD into this

dataset based on a mixed-layer model. The dataset was carefully verified using Levitus, TAO and other Argo gridded datasets (e.g. Scripps, IPRC, JAMSTEC). The dataset has been used by some scientists from China and their papers.

There are two websites maintained by China, one is maintained by NMDIS ([www.argo.gov.cn](http://www.argo.gov.cn)) at Tianjin (China Argo data center), and another is maintained by CSIO ([www.argo.org.cn](http://www.argo.org.cn)) at Hangzhou (China Argo Real-time data center). The implement status of China Argo, real-time data display including T/S/O2 profiles, float trajectory, profile data, the derived products and status of global Argo are presented. Meanwhile, GDACs, related international organizations and member's Argo websites can be accessed through these two websites. Besides this, an Argo data inquiry system has been developed by CSIO based on Hadoop technology (<http://101.71.255.4:8090/flexArgo/out/argo.html>).

#### **5. Problems encountered during the operation of international Argo and suggestions**

No.

**6. To continue improving the number of CTD cruise data being added to the reference database by Argo PIs, it is requested that you include the number and location of CTD cruise data uploaded by PIs within your country to the CCHDO website in the past year.**

No CTD data

#### **7. Keeping the Argo bibliography**

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