

## Argo Chinese National Report 2022

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### 1. The status of implementation of the new global, full-depth, multidisciplinary Argo array (major achievements and problems in 2022)

#### a. floats deployed and their performance

In 2022, China deployed 5 floats in the western Pacific and Bay of Bengal, which includes 2 PROVOR (one float with FLBBCD sensor and the other with six parameters), 2 HM2000 (one float with DO sensor) and 1 deep XUANWU. These floats were contributed by CSIO, Ocean University of China (OUC) and Laoshan Laboratory (formerly Qingdao Pilot National Laboratory for Marine Science and Technology), respectively.

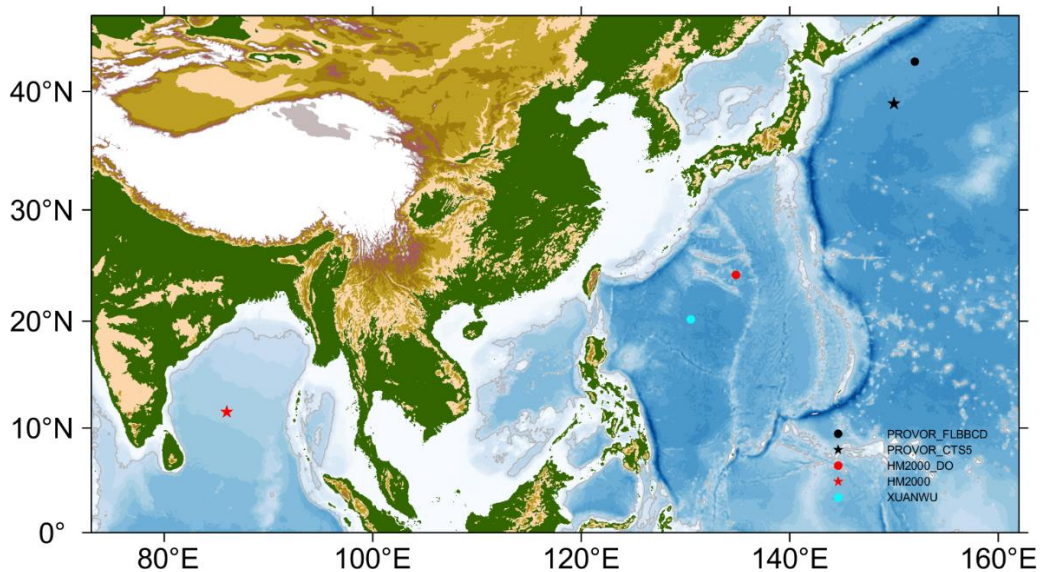


Fig.1 Launch positions of the Chinese floats in 2022

In July 2022, the first deep XUANWU float (6000-m) manufactured by Laoshan Laboratory was deployed in the northwestern Pacific, which was sponsored by the project “The construction of China deep Argo regional array”. Additionally, the first PROVOR\_CTS5 float with six parameters was deployed by OUC in July. The PI agreed to share the observations within Argo 6 months after the deployment.

In a special program about the construction of the observing network in Indian Ocean, 30 COPEX floats (manufactured by NOTC) had been deployed by CSIO in the northern Indian Ocean. These floats are all equipped with SBE41 CTD and transmit data by Iridium satellite. In order to add these floats into Argo, CSIO is validating their observations and float performance.

**b. technical problems encountered and solved**

One deep XUANWU float didn't transmit data after its deployment in July. The failure may be caused by the communication failure between the float and its SBE61 CTD sensor. Unfortunately, the trial for recovering was unsuccessful.

**c. status of contributions to Argo data management (including status of high salinity drift floats, decoding difficulties, ramping up to include BGC or Deep floats, etc)**

During 2022 CSIO received 5,834 core profiles plus 904 DOXY, 607 CHLA, 668 BBP, 546 CDOM, 849 IRRADIANCE, 322 NITRATE and 61 pH profiles from 81 active floats (Fig.2). All the profiles were submitted into GDACs and core & DOXY profiles have been inserted into GTS via CMA after being converted into BUFR bulletin.

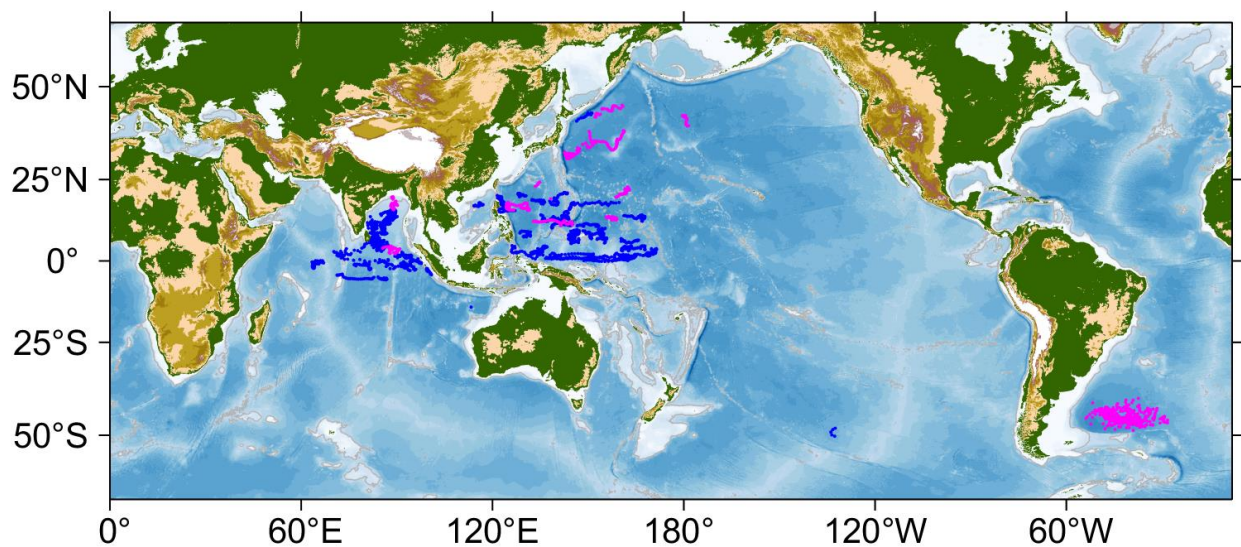


Fig.2 Positions of core (blue) and BGC (red) profiles.

**d. status of delayed mode quality control process**

Last year of 2022, with the help of Jenny Lovell (CSIRO), Dirk Slawinski (CSIRO), Annie Wong (UW), Cecile Cabanes (Ifremer) etc., CSIO had sent about 12, 045 D-files of Core Argo to GDACs. In total above 77% R-files has been DMQC'd. Here we express to them our sincere gratitude. Next, with the help of CSIRO, we are planning to update the DMQC system in order to process the data that collected by RBR CTD.

## **2. Present level of and future prospects for national funding for Argo including a summary of the level of human resources devoted to Argo, and funding for sustaining the core mission and the enhancements: BGC, Deep, Spatial (Polar, equator, WBCs)**

The national funding for China Argo has not been secured. The deployment of float relies on various research and special programs from institutions and universities. A project that implements the development and pilot deployment of deep XUANWU float had been granted by Laoshan Laboratory (PI: Dr. Zhaohui Chen from OUC), from which about 60 XUANWU floats are going to be deployed in the northwestern Pacific by the end of 2025.

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

Another 30 COPEX floats in the special program of the construction of the observing system in Indian Ocean will be deployed in 2023, the data will be delivered to GDACs when COPEX float gets qualification. About 10 BGC-Argo floats will be deployed in the northwest Pacific this year, including 5 from CSIO (4 Navis-BGC floats with SeaTrec rechargeable batteries will be delivered to CSIO soon), 2 PROVOR\_CTS5 floats with six parameters from OUC, 2 from Hainan Tropical Ocean University (HTOU), and one from South China Sea Institute of Oceanology (SCSIO). Laoshan Laboratory plans to deploy 4 XUANWU floats through a survey cruise in the northwestern Pacific (2 in the Kuroshio Extension region and 2 in the Philippine basin) during this May. Another 4 XUANWU floats will be deployed by Institute of Oceanology, Chinese Academy of Sciences (IOCAS) via a joint cruise in the western Pacific (all floats will be deployed in the Philippine basin) in November.

## **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.**

The value of Argo data has been fully recognized, and Argo dataset and data products have been widely used in scientific research and operational forecasts. For instance, Argo T/S profiles have become the most important data in the global data assimilation system in NMEFC (National Marine Environmental Forecasting Center); the

post-QC'd Argo T/S profiles have been applied in the IAP (Institute of Atmospheric Physics, Chinese Academy of Sciences) reanalysis (<http://www.ocean.iap.ac.cn/?navAnchor=home>).

CSIO maintains the website of the China Argo Real-time Data Center (<https://www.argo.org.cn>) where the implementation status of China Argo, real-time data display including observed profiles, float trajectory, profile data, the derived products and status of global Argo are accessible.

**5. Issues that your country wishes to be considered and resolved by the Argo Steering Team regarding the international operation of Argo. These might include tasks performed by the AIC, the coordination of activities at an international level and the performance of the Argo data system. If you have specific comments, please include them in your national report. Also, during the AST-23 plenary, each national program will be asked to mention a single highlight or issue via a very brief oral report.**

None.

**6. To continue improving the quality and quantity of CTD cruise data being added to the reference database by Argo PIs, it is requested that you include any CTD station data that was taken at the time of float deployments this year. Additionally, please list CTD data (calibrated with bottle data) taken by your country in the past year that may be added to the reference database. These cruises could be ones designated for Argo calibration purposes only or could be cruises that are open to the public. To help CCHDO track down this data, please list the dates of the cruise and the PI to contact about the data.**

Two full-depth CTD casts obtained from the deployments of deep XUANWU float were submitted to Coriolis data center.

**7. Keeping the Argo bibliography ( [Bibliography | Argo \(ucsd.edu\)](#)) up to date and accurate is an important part of the Argo website. This document helps demonstrate the value of Argo and can possibly help countries when applying for continued Argo funding. To help me with this effort, please include a list of all papers published by scientists within your country in the past year using Argo data, including non-English publications.**

**There is also the thesis citation list ([Thesis Citations | Argo \(ucsd.edu\)](#)). If you know of any doctorate theses published in your country that are missing from the list, please let me know.**

**Finally, if you haven't already sent me a list of Argo PIs in your country, please do so to help improve the statistics on how many papers are published including an Argo PI vs no Argo PIs.**

### **The list of publications not listed in the Argo bibliography**

Gao, Z.K., Y.T. Jiang, J.Y. He, J.P WU and G. Christakos (2021), Bayesian maximum entropy interpolation of sea surface temperature data: A comparative assessment. *International Journal of Remote Sensing*, 43, <https://doi.org/10.1080/01431161.2021.2003905>