Argo-KOREA Annual Report 2023

by National Inst. of Meteorological Sciences/KMA

25th Argo Steering Team Meeting (AST-25)
Southampton, UK, 18-22 March 2024

1. Status of Implementation

The National Institute of Meteorological Sciences of the Korea Meteorological Administration (NIMS/KMA) has deployed **264** Argo floats around the Korean Peninsula and the North Pacific Ocean since 2001, including eight active floats as of March 2024. In 2023, NIMS/KMA deployed six Argo floats in the East China Sea (ECS) and Yellow Sea (YS) (Fig. 1). Five floats were deployed in the ECS from July 13 to 16, 2023, with a parking depth of 60m and a one-day or two-day profiling scheme, and one float was in the YS on November 26, 2023, with parking depth of 60m and a two-day profiling scheme for shallow sea observation. All floats deployed using the GISANG 1, the KMA's research vessel, could obtain the profile from the starting day.
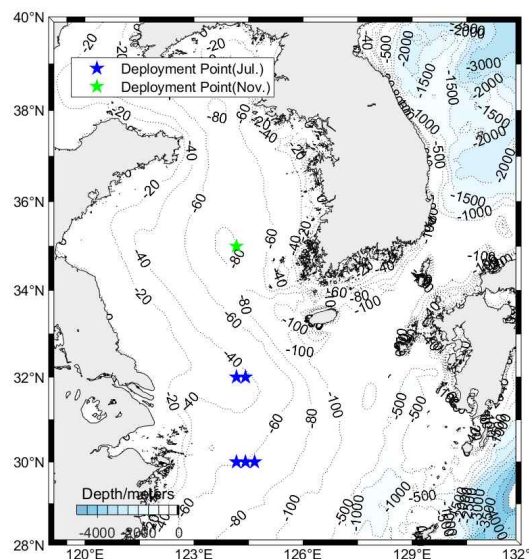

Fig. 1. Deployment points of Argo floats in the East China Sea and Yellow Sea in 2023.

- *Status of contributions to Argo data management*

· A total of 828 profiles were collected from January through December 2023 and sent to the Global Data Assembly Center (GDAC) after undergoing Real-Time Quality Control (RTQC) procedure.
· Data re-submission to GDAC was conducted by applying the Warning Objective Analysis Report.
· The RTQC procedure for shallow sea profiles and grey-listed ones has been updated.
· The RTQC procedure has also been updated for the global range test for the North Pacific Ocean and the East Sea.
· Some missing files, such as "Tech.nc" and "Meta.nc", were found on the KMA Data Center server. This issue may be related to an unexpected failure of FTP data transmission to GDAC. A fix is currently in progress and will be implemented soon.

- *Delayed Mode QC*

· A total of 652 profiles (446 profiles from the East Sea, and 206 from the Yellow Sea) were processed by the Delayed Mode QC (DMQC) procedure. These profiles were observed from early September 2022 to early September 2023. The D-files were successfully sent to the Ifremer GDAC on June 29, October 19, and November 9, 2023, in NetCDF format. The Delayed Mode T/S Audit Report was answered on November 9 with 664 profiles included: 238 profiles from the East Sea, 420 profiles from the North Pacific Ocean, and 6 from the Yellow Sea.
The profiles of this year will be DMQCed based on KMA DMQC procedure and OWC 3.0.0. The D-files will be sent to the Ifremer GDAC in June and October 2024 in NetCDF format.
We are in the process of effectively addressing the CTD duplicated S/N issue and the file reject warning issue regarding metadata format.
· Constant salinity offsets were identified in several shallow ARGO floats right after their deployments in the Yellow Sea by using shipboard CTD data. Since the floats in the Yellow Sea observed for a relatively short period of time (due to shallow parking depths of less than 100m and short cycle times of about a day), they usually have initial salinity offsets rather than salinity drift. Additionally, given that the Yellow Sea is a wide continental shelf area, its temporal and spatial scale of salinity variability is much smaller than those in the open ocean. Therefore, the only available shipboard CTD data collected at similar time and location to the Argo floats were utilized as a reference for OW.
· The identified offset for PSAL evaluated based on the shipboard CTD data is

adjusted by using LAUNCH_OFFSET in "MAIN_write_dmqc_files" (matlab code). We plan to make further enhance DMQC progress for the shallow Argo floats by collecting more precise CTD data in the future.

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

We successfully deployed six floats in the sea around the Korea Peninsular in 2023. In 2024, we plan to deploy seven Argo floats, with a different deployment strategy from last year, targeting the Northwestern Pacific (NWP) Ocean and the ECS. The following people contribute to the Argo-Korea program.

- Baek-Jo Kim, Hyeong-Jun JO (NIMS/KMA)
- Kyung-Hee Oh, Hyuk-Min PARK (KIOST)
- Jong-Jin PARK, Yumi SONG (KNU)

3. Summary of deployment plans

NIMS/KMA has a deployment plan for seven floats in 2024: three floats will be deployed at the NWP to keep the observation network and four floats at the ECS to continue the shallow sea observation scheme in the marginal ocean. The KOREA-Argo observation program will be preformed to examine the variation of the ocean environment (Fig. 2).
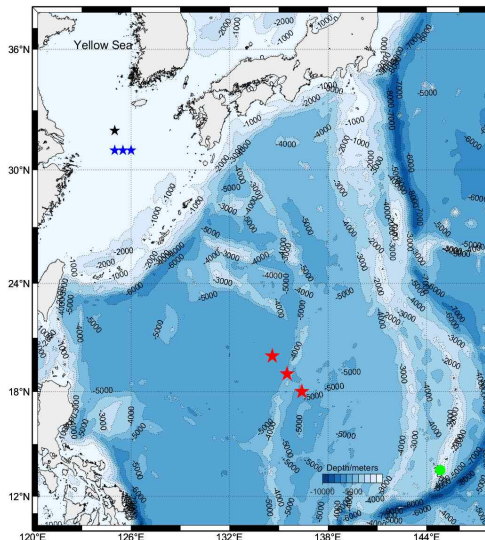

Fig. 2. NIMS/KMA's deployment point for 2024

4. Summary of National Research and Operational Uses of Argo data as well as contributions to Argo Regional Centers.

In 2023, Argo float observations were conducted in the shallow sea, such as the deployment of six floats in the ECS and YS. Through Argo float observations, the decrease of sea temperature and salinity during typhoon passage, as well as the descent of thermocline layer due to coastal upwelling have been revealed. NIMS/KMA will maintain a continuous Argo float observation network along the typhoon northward-moving path.

5. Issues that your country wishes to be considered (and resolved) by AST regarding the international operation of Argo.

- None.

6. CTD data uploaded to CCHDO

- No CTD data has been uploaded to the CCHDO website.

7. Bibliography

- Baek-Jo Kim, Hyeong-Jun Jo, KiRyong Kang and Chul-Kyu Lee, 2023; Current status and future direction of the NIMS/KMA Argo program. Atmosphere. Vol. 33, No 5, pp.1-10, doi:10.14191/Atmos.2023.33.5.1

8. Effects of COVID-19

- The deployment was impacted by the rapidly changing exchange rate between the US dollar and the Korean won. Because of the unfavorable exchange rate, we performed the procurement process twice, creating a delay of at least three months. The total period from contract to arrival at our institute took about five months, which was two-months longer than normal. Due to these impacts, we delayed the float deployment from November 2022 to July 2023.

9. RBR CTD piloting and deployment plans

- Not planned yet

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