Argo-KOREA Annual Report 2022

by National Inst. of Meteorological Sciences/KMA

24th Argo Steering Team Meeting (AST-24)
Halifax, Canada, 20-24 March 2023

1. Status of Implementation

The National Institute of Meteorological Sciences of Korea Meteorological Administration (NIMS/KMA) has contributed the Argo float deployment process around Korea and Northwestern Pacific area, however Argo float deployment was not carried out in 2022 due to the delayed purchasing process by COVID-19 and the rapid exchange rate between US dollar and Korean won. The purchasing process for 2022 budget was done March 2, 2023 and deployment will be carried out on July, 2023. And the Korea Institute of Ocean Science and Technology (KIOST) deployed 5 Argo floats: two floats were in the East Sea (ID 4903636, 4903637) on July 6, 2022 and three floats in the Northwestern Pacific (ID 3902470, 5906968, 7901012) on October 12 ~ 16, 2022. The East Sea float has 800 m parking depth and ten-day profiling cycle and the Northwestern pacific floats had 2000 m parking depth with same profile cycle.

a. Status of contributions to Argo data management

- To setup the regional range check procedure in the Yellow Sea data.
  - Temperature: -2.5 ~ 35 ℃; Salinity: 15 ~ 36 psu
- To evaluate the MEDD test for the Northwestern Pacific data
  - decreased bad data detection, still needed a spike-test for high quality
- To compare the upward casting and drift data set in the parking depth
  - confirmed that the quality control of drift data was done properly

b. Delayed Mode QC

- Total 3,492 profiles (1,905 from the East Sea, 1,587 from the Yellow Sea) were processed by the DMQC operation process, which had been observed from early September 2021 to early September 2022. The QCed profiles had been sent to the Ifremer GDAC on June 29 & October 21, 2022 with NetCDF format. The profiles will be DMQCed based on KMA DMQC process and OWC 3.0.0. The D-files will be sent to the Ifremer GDAC in the late June & October 2023 by NetCDF format.
- Constant salinity offsets were identified in the several shallow ARGO

floats right after deployments in the Yellow Sea by using shipboard CTD data. Since the floats in the Yellow Sea observed for relatively short period of time (due to shallow parking depths of less than 100m and short cycle times for about a day), they usually have initial salinity offsets rather than salinity drift.

- Additionally, Temporal and spatial scale of salinity variability were much smaller than those of the open ocean since the Yellow Sea is a wide continental shelf area. This indicates that the only shipboard CTD data collected at the similar time and location of deployment are needed as a reference. The identified offset for PSAL based on the shipboard CTD is adjusted by using LAUNCH_OFFSET in "MAIN_write_dmqc_files" (matlab code). We will be able to improve current DMQC prototype for the shallow Argo floats with collecting more accurate CTD data.

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

In 2022, NIMS/KMA received the funding for 7 Argo floats (about USD 150,000,000) and KIOST was also done the procurement process of 5 floats for 2023 deployment. NIM/KMA will procure 7 floats by October 2023, and deploy them around Korea. Following persons contribute to the Argo-Korea program.

- KiRyong KANG, Hyeong-Jun JO (KMA)
- Sung-Dae KIM, Hyuk-Min PARK (KIOST)
- Jong-Jin PARK, Yumi SONG (Kyungpook National University)

3. Summary of deployment plans

NIMS/KMA plans to launch 14 floats in 2023 around Korean Peninsula: four floats will be deployed on July and November at the Yellow Sea to keep the shallow sea observation network, 7 floats deployed on July and November at southwest area of Jeju Island to monitor the summer low salinity and typhoon-ocean interaction, and finally 3 floats deployed on November at the East Sea to keep current observation network (Figure 1). According to KIOST's contact point, they also try to deploy 5 floats in October, 2023: two floats at the same location in the East Sea (129.92°E, 37.01°N), three at the Northwestern Pacific area (133.63°E, 14.99°N; 132.0°E, 15.0°N; 132.0°E, 17.0°N).

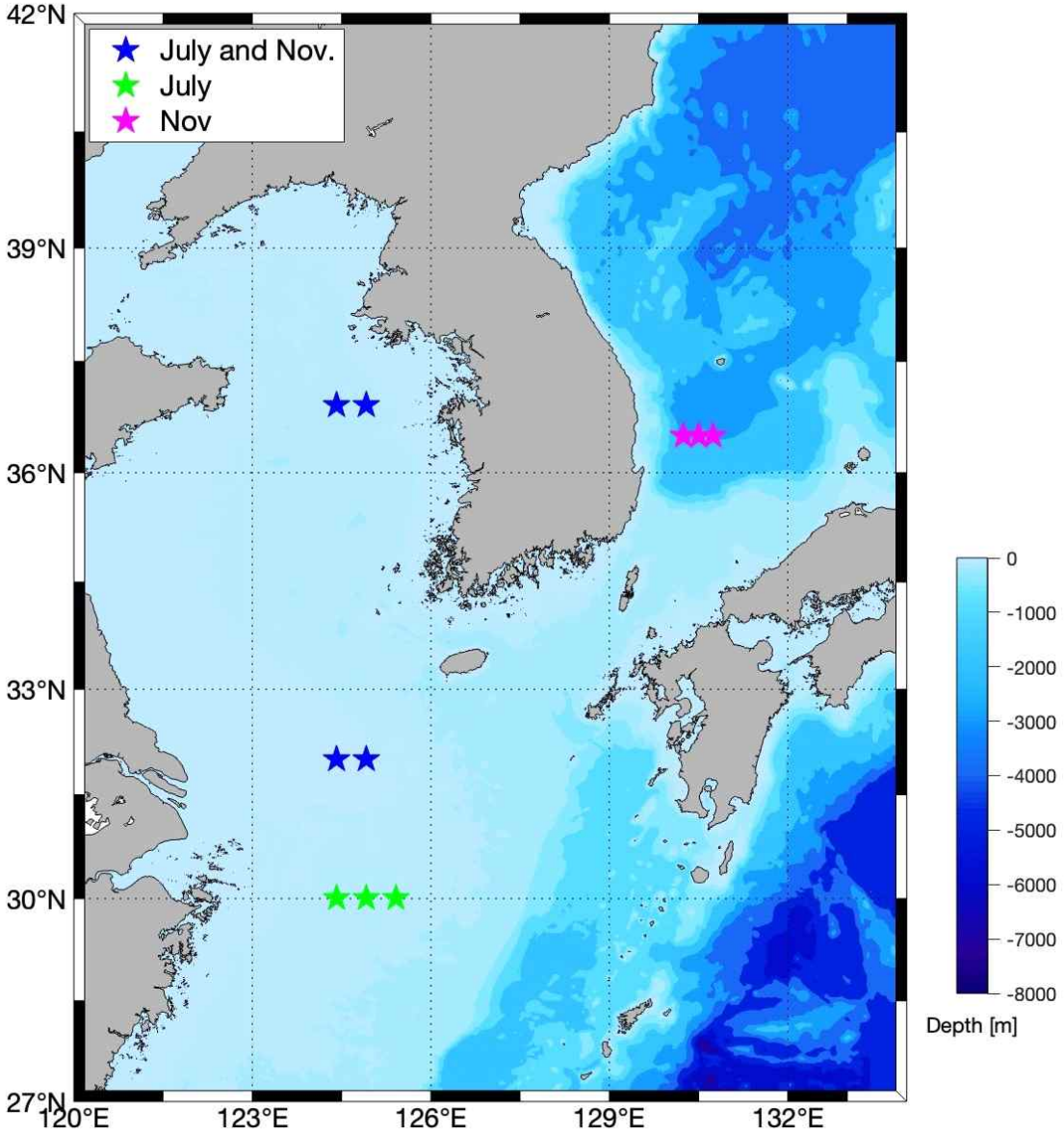

Fig.1 Position map of Argo float deployment in 2023 by NIMS/KMA

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

In 2022, even thought there was no new float deployment, all Argo float-based temperature and salinity profile data have been used to the KMA's global ocean data assimilation and prediction system by near-real time mode. It was helpful to make more accurate initial field for the numerical ocean model and to increase the predictability.

At the East Sea Argo float data are used to monitor the long-term change of

ocean condition around Ulleng-do and Dok-do such as water temperature and ocean heat content. And the Yellow Sea Argo data were also used to verify the ocean model and research about annual variation of temperature structure. Below shows the visitor number of the NIMS/KMA's Argo homepage for 5 years.

Table 1. Annual number of the NIMS/KMA Argo homepage visitor

	2018	2019	2020	2021	2022
argo.nims.go.kr	336,851	471,062	323,455	909,058	1,980,305

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

- None

7. Bibliography

- None

8. Effects of COVID-19

Deployment was impacted by a combination of COVID-19 and rapid exchange rate between US dollar and Korean won. Because of high exchange rate, we performed the procurement process two times, which made it delay at least three months. And total period from contract to arrival at our institute took about 5 months, which was 2-month longer than normal state. Due to these impacts we made delay the float deployment from November 2022 to July 2023.

9. RBR CTD piloting and deployment plans

- N/A

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