Bulgarian Argo Activities

Present status and further plans

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March 2020

BulArgo programme is a component of the project MASRI – Infrastructure for sustainable development of marine research including the participation of Bulgaria in the European Infrastructure Euro-Argo. (http://masri.io-bas.bg/), a part of the National roadmap for scientific Infrastructure of Republic of Bulgaria. The BulArgo comprises a consortium of three scientific organizations: Institute of Oceanology (IO-BAS) in Varna, Sofia University "St. Kliment Ohridski" and National Institute of Meteorology and Hydrology in Sofia.

1. The status of implementation

During 2019, three Argo floats were successfully deployed in the Black Sea under the framework of BulArgo activities and the Italian Argo programme. Two of the floats were ARVOR-I and ARVOR-DO type and were purchased by Institute of oceanology-BAS whilst, one standard Arvor-I float was deployed under the Italian Argo programme. The floats were tested and deployed by the Bulgarian Argo team in the western Black Sea form board of R/V Akademik. All floats integrate Iridium satellite telemetry system which provides a dual telecommunication capability allowing modification of the configuration in real-time.

The BulArgo (WMO 7900595 and 7900595) floats were deployed on August, 10th and December, 5th in Bulgarian EEZ at depths 1480m and 1100, respectively. Both floats were programmed to cycle between the surface and 2000 dbar every 10 days and to drift at the parking depth of 1000 dbar. The floats are still active. The status information for the Bulgarian floats deployed in the Black Sea during 2019 is presented on Table 1. Their surface positions are shown on Fig 1.

Model	WMO	Deployment date	Deployment time	Latitude	Longitude	Cycles	Status	Cycle
Arvor-I	7900595	10/08/2019	11:27	43.16	29.15	23	Active	10
Arvor-I-DO	7900596	05/12/2019	22:59	42.48	28.64	11	Active	23

Table 1. Status information for the Bulgarian floats deployed in the Black Sea during 2019

Additionally, Bulgarian Argo team deployed on 2nd December an Italian ARVOR-I float (WMO 6903766) in the western Black Sea from board of R/V Akademik. The float has a parking depth at 200 dbar and maximal profiling depth at 1500 dbar. In the frame of EA-RISE project, Institute of oceanology -BAS was purchased an ARVOR-I float. It will be deploy in late summer of 2020.
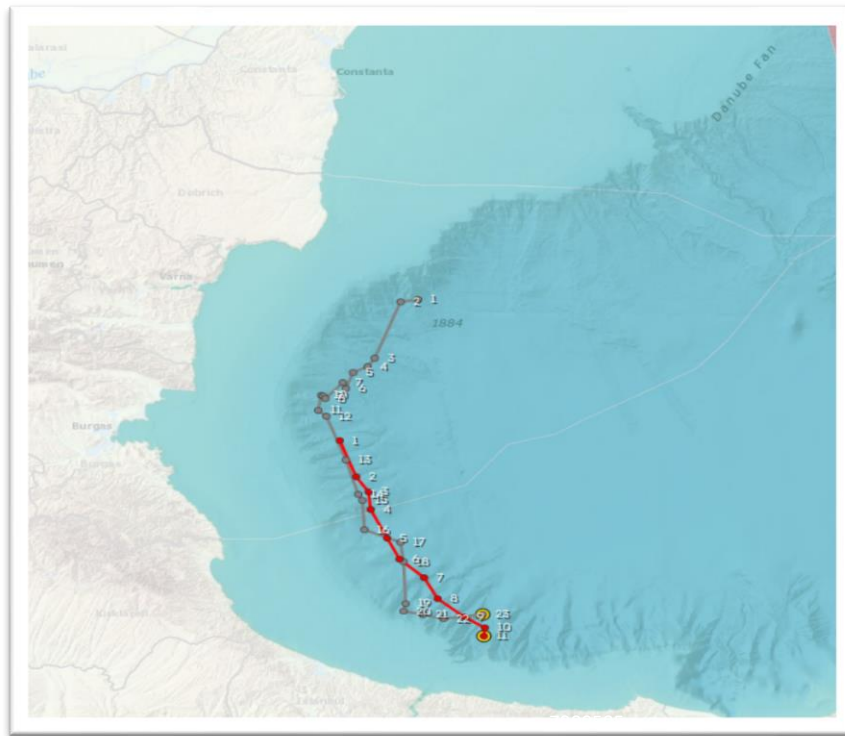
Figure 1. Surface positions of Argo floats deployed in the Black Sea

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

The data management for the BulArgo floats was done by the Coriolis GDAC. Metadata and data are available through the Coriolis web site in near real-time.

b) *status of delayed mode quality control process*

At present the standard procedures for delayed mode data processing and quality control of BulArgo data are performed at the IO-BAS.

2. **Present level of and future prospects for national funding for Argo**

On April 5th, 2018, Bulgaria has become a regular member of Euro-ARGO ERIC and as such has the obligation to ensure deployment of at minimum of 3 Argo floats per year. The funding covers float procurements in the period 2019-2023, deployment and communication coasts and part-time personnel support.

For 2020 the Bulgarian Ministry of Education and Science provided funding to buy 3 Argo floats, including 2 instruments with dissolved oxygen sensors. The Ministry is committed to provide funding in order to sustain the Bulgarian contribution to Argo beyond 2020 as a member of the Euro-Argo Research Infrastructure Consortium.

3. Summary of deployment plans

The Bulgarian Argo deployment plan for 2020 is detailed in Table 1. The area of floats deployment is western Black Sea.

Year	Month	Programme/Project	Float type	Quantity
2020	Aug - Dec	BulArgo	Arvor DO-I	2
2020	Aug - Dec	BulArgo	Arvor -I	1
2020	Jul - Dec	EA-RISE	Arvor -I	1

4. Summary of national research and operational uses of Argo data

BulArgo focuses on both research topics and marine climate monitoring of the Black Sea.

All Argo data are routinely assimilated into the BS-MFC operational Black Sea forecasting system of the Copernicus Marine Environment Monitoring Service (CMEMS).

Argo data are being used by researchers in Bulgaria to improve the understanding of Black Sea properties (e.g. deep red fluorescence signal, water mass disappearance, IOPs). A list of bibliography is available at the end of this report.

5. Issues that your country wishes to be considered and resolved by the Argo Steering Team regarding the international operation of Argo.

At the moment we have no suggestion.

6. Number of CTD cruise data added to the Argo reference database

The CTD casts were performed just before the floats deployment. No data uploaded to the Argo reference database.

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