



## ARGO National Report 2018: Bulgaria

### **Bulgarian Argo Activities Present status and further plans V.Slabakova, A. Palazov and N. Valcheva**

BulArgo gathers all Bulgarian activities related to Argo. BulArgo programme is part of national roadmap for scientific Infrastructure of Republic of Bulgaria: MASRI – Infrastructure for sustainable development of marine research including the participation of Bulgaria in the European Infrastructure Euro-Argo. (<http://masri.io-bas.bg/>). 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**

Bulgaria was first involved in the Argo activities in December 2009, when one French PROVOR float (#1901200) was deployed in the deep part of the Black Sea by the R/V Akademik operated by the Institute of Oceanology in Varna. Latter, in March 2011 and August 2013 four Bulgarian floats were deployed in the western open Black Sea. Apart from the standard CTD measurements, one of the floats (6900804) was equipped with an oxygen sensor. All floats use ARGOS telemetry system, and were programmed to a 5-days cycle, a parking-depth at 750 m and a profile depth at 1500 m. The following table shows relevant information of each BulArgo floats.

Model	Profiling depth dB	cycle days	Sensor Type	rep rate	park dept h	ptt freq	optional sensor	WMO Label	Deployed	Status
APEX	1500	5	SBE41	42	750	standard	-	6900803	18.03.2011	Inactive
APEX	1500	5	SBE41	44	750	standard	-	6900805	19.03.2011	Inactive
APEX	1500	5	SBE41	46	750	standard	Aanderaa Optode 3830	6900804	8.03.2011	Inactive
ARVP R-L	2000	5	SBE41	42	750	standard	-	7900590	29.08.2011	Inactive

Since June 2012 in a frame of a collaborative effort with Italy, Institute of oceanology, Bulgarian Academy of Sciences (IO-BAS) has deployed fourteen ARGO floats in the western Black Sea as contribution of the MedARGO programme as six of them are still active. In December 2013, two biogeochemical PROVOR CST4 floats (basbio001b and basbio002b) were deployed in the western Black Sea by IO-BAS in the frame of E-AIMS, EC 7FP project . In June, 2014 and July 2015 two PROVOR CT float (7900593 and 7900594) delivered under PERSEUS EC 7FP was launched in the western Black Se during R/V “Akademik” research cruise and one ARVOR-I float In the frame of MOCCA project one



At present the total number of active float in the Black Sea is 10.

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

The data management for the BulArgo float 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 are performed at the IO-BAS. The scientific staff from IO-BAS participated in the 1<sup>st</sup> European DMQC workshop and in collaboration with OGS the IO-BAS staff is training to run the DMQC software and implement the QC procedures for BulArgo data.

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

On April 5<sup>th</sup>, 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 costs and part-time personnel support.

**3. Summary of deployment plans**

The Bulgarian deployment plans for 2019 are detailed in Table 1. The area of float deployment is western Black Sea.

Year	Month	Programme/Project	Float type	Quantity
2019	Aug - Dec	BulArgo	Arvor L-I	1
2019	Aug - Dec	BulArgo	Arvor L-I	1
2019	Aug - Dec	EA-RISE	Arvor L-I	1

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

The key objectives to use the Argo data in the Black Sea involve:

- Study of the long-term temperature and salinity changes near the sea surface and in the deep layers
- Model validation and assimilation of the Argo data in a Black Sea circulation model
- Evaluation of biogeochemical properties
- Studying the dynamics of oxycline and anoxic layer.
- Quantification of the steric effects in the Black Sea
- Getting new insight about the deep circulation of the Black Sea



- Quantification of Bosphorus plume effects on the Black Sea

## **5. Issues we wish to be considered and resolved**

At the moment we have no suggestion

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

No

## **7. Bibliography**

1. Capet, A, Vandenbulcke, L., Grégoire, M., Marinova, V.. 2018. Decline of the Black Sea oxygen inventory. Chapter 3 Changes in the regional European seas. Copernicus Marine Monitoring Service Ocean State Report (CMEMS OSR, Issue 2). Journal of Operational Oceanography, Taylor & Francis. V. 11, Supplement1. 103--106.