Extension of Argo in shallow coastal areas and expansion of the regional communities (Euro-Argo RISE project)

Giulio Notarstefano, Dimitris Kassis, Atanas Palazov, Laura Tuomi, Waldemar Walczowski, Birgit Klein, Matthew Donnelly, Romain Cancouët

9th EuroGOOS Conference, 3-5 May 2021

The authors would like to thank the Euro-Argo RISE Work Package 2, 5 and 6 partners that provided a fundamental contribution in this work:

Massimo Pacciaroni
Lara Diaz
John Allen
Inmaculada Ruiz
Joaquín Tintoré
Vincent Taillandier
Fabrizio D'Ortenzio
Pedro Velez Belchi
Violeta Slabakova
Simo Siiriä
Malgorzata Merchel
Ingrid Angel Benavides
Edouard Leymarie
Kjell Arne Mork
Kamila Walicka
Brian King
Luca Arduini Plaisant
Estérine Evrard (Project Manager)

Euro-Argo RISE (WP 5, 6 + link with tasks 2.1, 7.3, 8.1, 8.2)

1. **Extension of the Argo array in shallow coastal areas of the European Marginal Seas** (Mediterranean, Black and Baltic Seas)

1. **Expansion of the Argo community at regional level and promotion of Argo data**

Extension of Argo in shallow/coastal regions

Main Challenges of Argo in Europe in the next decade

Euro-Argo RISE Project

Monitoring of European marginal seas

Argo international strategy

- Trajectory: grey line
- Yellow dot: last location (active)
- Grey dot: last location (inactive)

Type	WMO	Deployment Date/Time	Deployment location	Total Cycles	Date of Last Cycle	Status
Arvor I	6903271	01/10/2019	44.54 N 30.97 E	253	22/03/2021	Active
Provor III	6902899	11/12/2019	43.41 N 7.86 E	157	20/03/2021	Active
Apex 11	6903288	09/02/2020	40.42 N 25.42 E	120	05/10/2020	Inactive
Arvor I	6901278	12/03/2020	39.37 N 2.52 E	126	21/03/2021	Active
Arvor I	6902109	03/06/2020	54.48 N 18.85 E	396	19/04/2021	Active
Arvor I	6903703	10/06/2020	58.88 N 20.31 E	71	12/04/2021	Active
Arvor I	6903865	24/07/2020	42.98 N 28.23 E	94	15/11/2020	Inactive
Arvor I	6903783	31/07/2020	44.05 N 13.70 E	40	06/02/2021	Inactive

Extension of Argo in shallow coastal areas

TARGET   Operate Argo floats in shallow/coastal areas and achieve a good life expectancy

WHAT IS NEEDED:

1. **Improvement of technical aspects of Argo floats**
    A. **Optimization of the configuration:**
   - keep the float in the targeted area
        - achieve the target of the mission
        - avoid stranding events, getting stuck at the sea bottom, risky areas (coastline, islands, high-maritime traffic)

1. **monitoring tools tailored for marginal seas**
    A. **Available monitoring tools**
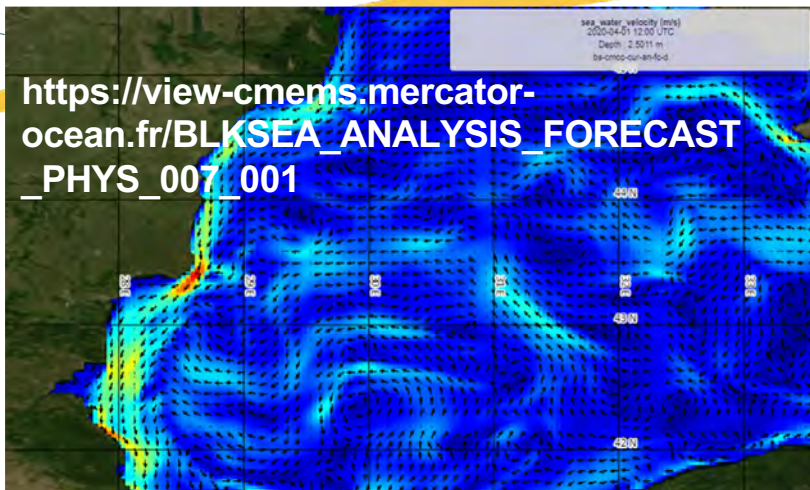   B. **Home-made monitoring tools**
        - anticipate the float decoding
        - Implementation of notification/warning/alert systems to take into consideration crucial parameters of the floats' missions
        - weather, forecasting systems, maritime traffic, detailed bathymetry tools

High level of human-platform interactivity

Intense monitoring activity
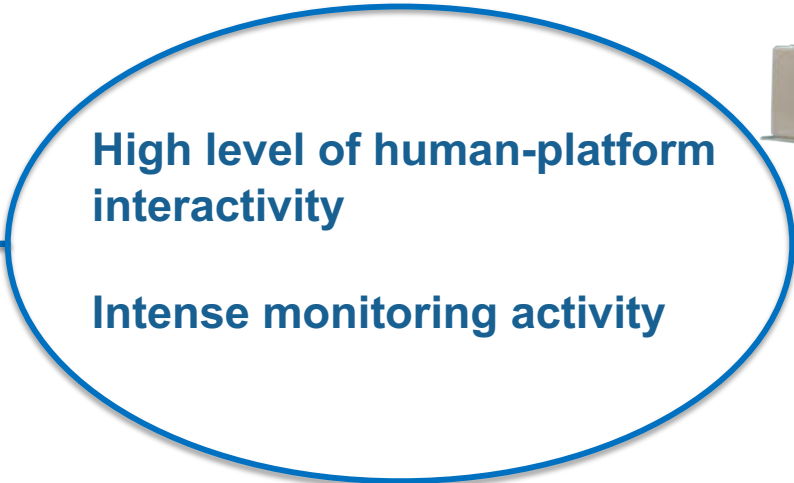
Extension of Argo in shallow coastal areas – Black Sea

https://view-cmems.mercator-ocean.fr/BLKSEA_ANALYSIS_FORECAST_PHYS_007_001
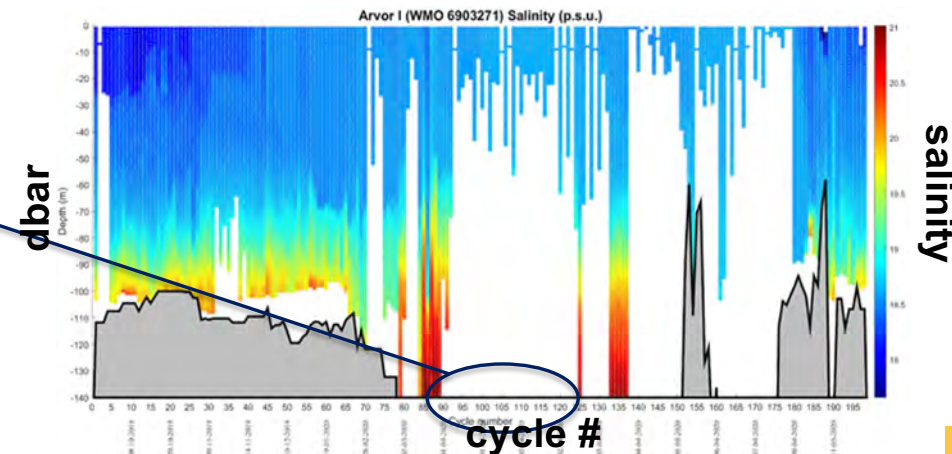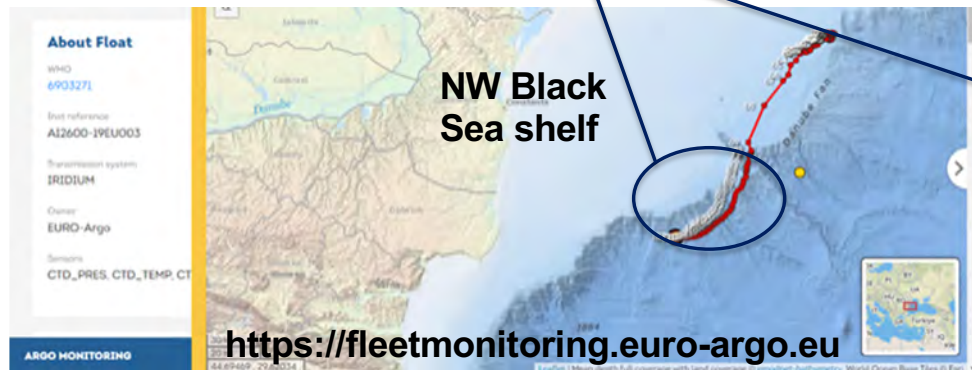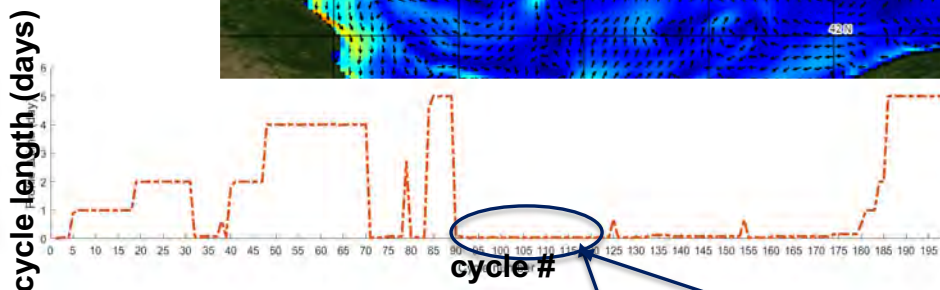
«Piloting» the Argo float in the North-West Black Sea:
- Home-made tools: fast SBD decoding, automatic email alert system (float location and depth almost in real time)
- Euro-Argo + OceanOPS monitoring tool (tech info, graphs, alerts)
- Support of other tools (CMEMS sea water velocity)
- Adjust the configuration when needed

RESULTS:
- We were able to limit, to speed up the float displacement and to slightly drive the float according to our needs
- Level of interactivity can be linked to cycle length
- Need of near-real time float information to adjust configuration

cycle length (days)

cycle #

About Float

WMO
6903271

Inst reference
AI2600-19EU003

Transmission system
IRIDIUM

Owner
EURO-Argo

Sensors
CTD_PRES, CTD_TEMP, CT

ARGO MONITORING

NW Black Sea shelf

https://fleetmonitoring.euro-argo.eu

Arvor I (WMO 6903271) Salinity (p.s.u.)

dbar

salinity

cycle #

Extension of Argo in shallow coastal areas – Baltic Sea

- Argo float as a virtual mooring
- 383 profiles in Gulf of Gdansk
- Parking depth at bottom   very slow motion;
- 30 km radius displacement;
- Excellent time series of temperature and salinity showing seasonal variability
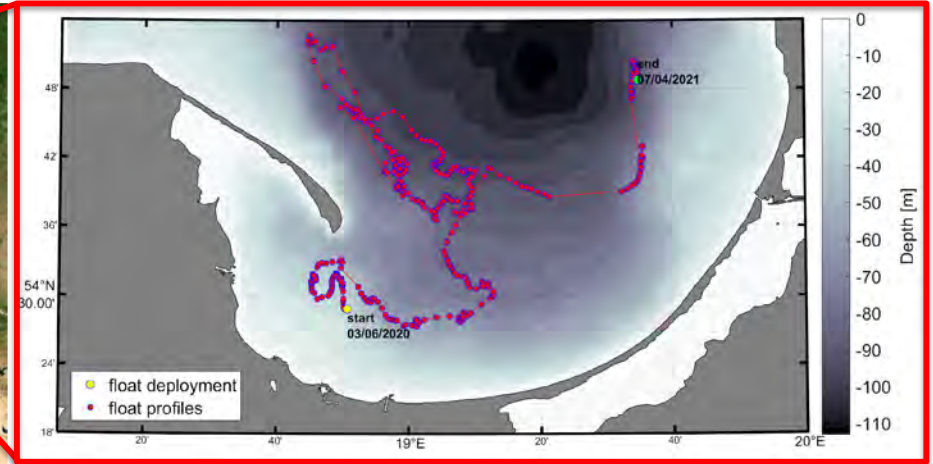
Argo float 3902109 between 03/06/2020 and 06/04/2021
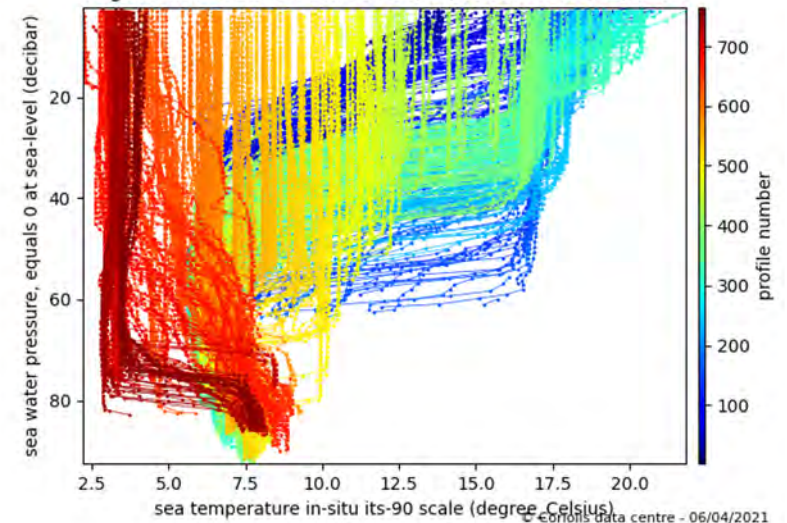
RESULTS:
- Practice shows that shallow shelf seas can also be explored using Argo floats
- Contact with the bottom, proximity to the shore, collisions with vessel are not as dangerous for the floats as it seemed before

Expansion of the Argo community at regional level

- **Strengthen collaboration with riparian countries**
  - cooperation to sustain Argo activities (deployment, recovery, float operations in territorial waters, EEZ).

- **Attract new participants**
  - 2 workshops (8-9 April 2021)
  - take part in Argo activities
  - training
  - float donations

- **Promotion of Argo**
  - political event – 8 June 2021, Virtual Event
    - decision-makers and stakeholders (show the role that Argo data have in the marine environment and services to society)

- **Improvement of the connections with other RIs and regional networks (link with WP 7.3, 8.1, 8.2)**
  - consolidate the network of scientists engaged in climate and ocean research at the regional level
  - collaboration at sea and in technical+scientific activities
  - sharing data, expertise and best practice

Countries approached in European Marginal Seas

Conclusions

1. **Extension of Argo in shallow coastal areas**
   a) First results are promising and provided the basis for the expansion of Argo in shallow coastal areas of European Marginal Seas
   b) Configurations used seems adequate to explore shallow and small-sized seas but more knowledge is needed
   c) Suggestions to improve the monitoring systems + home-made tools and systems in support of the monitoring activity were provided

2. **Expansion of the regional Argo community**
   a) New scientists and countries were approached and introduced to Argo
   b) New initiatives have been set up (Morocco, Algeria, Russia, Sweden)
   c) Successful collaborations routinely established mainly with Malta, Israel, Romania
   d) Mediterranean & Black Sea + Baltic & Arctic workshops: successful in terms of attendance and participation (starting point for building new collaborations).
      - 3 Marine Reseach Infrastructures (EMSO, ICOS, DANUBIUS) attended the events   Side Event at EuroGOOS: Cooperation Framework Between Marine RIs
   e) Participations of Euro-Argo RISE partners at meetings at regional level
   f) Increase the visibility of Argo through initiatives like the political event

9

EURO-ARGO RISE

THANKS!

#EARISE