Introduction to EA-RISE project and it’s benefits for the BOOS community

Laura Tuomi, FMI, BOOS AM 12.6.2019

Euro Argo RISE project

- Funded by H2020, 2019-2022
- 19 participants, lead by Euro-Argo ERIC
- The objective of EA-RISE is to enhance and extend the capabilities of the Argo network to provide essential ocean observations to answer new societal and scientific challenges and support

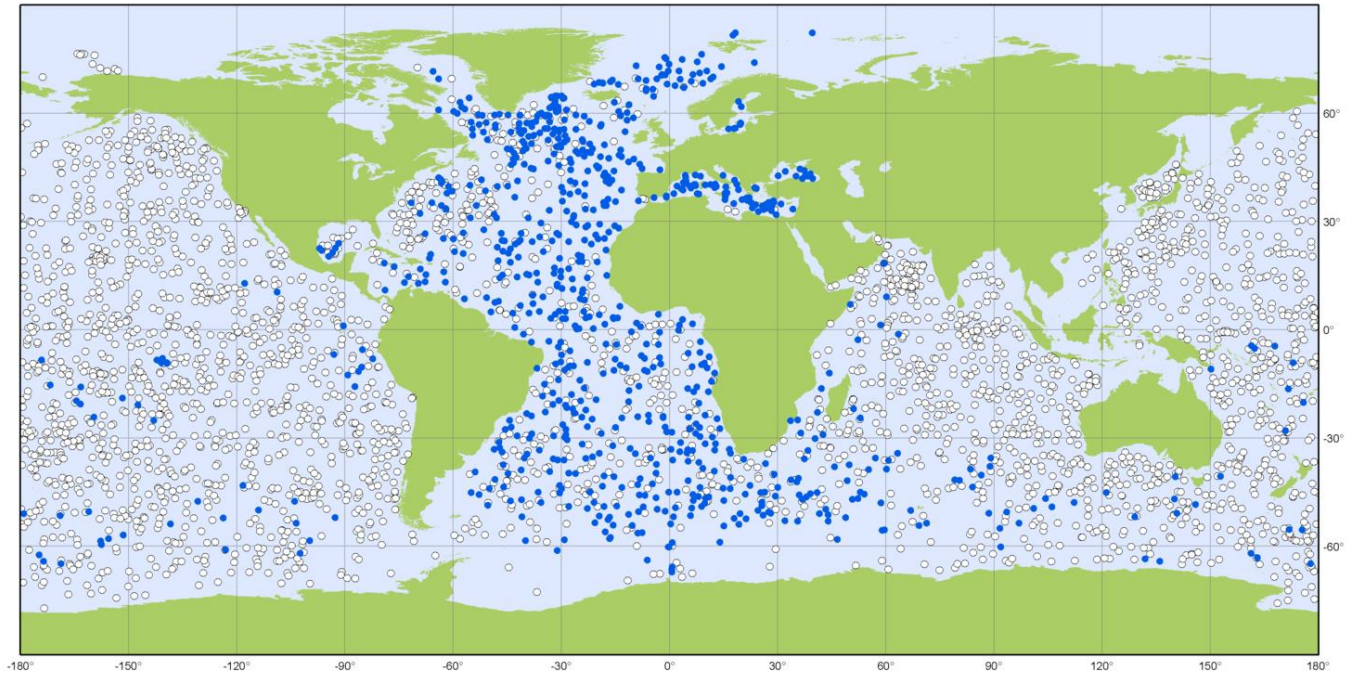
  1) ocean and climate change research

  2) climate change monitoring (characterizing climate change impact on the ocean physics and chemistry

  3) seasonal and climate change forecasting by improving the 4D description of the ocean state

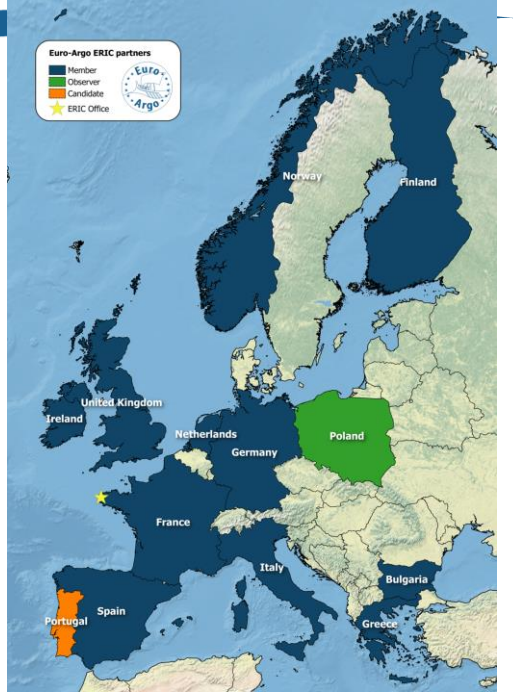
  4) ocean analysis and forecasting and associated ocean services including Copernicus Services.

EuroArgo RI



Argo **EuroArgo** **January 2019**

European contribution to the Argo program via EuroArgo Research Infrastructure
Latest locations of operational profiling floats (data distributed within the last 30 days)



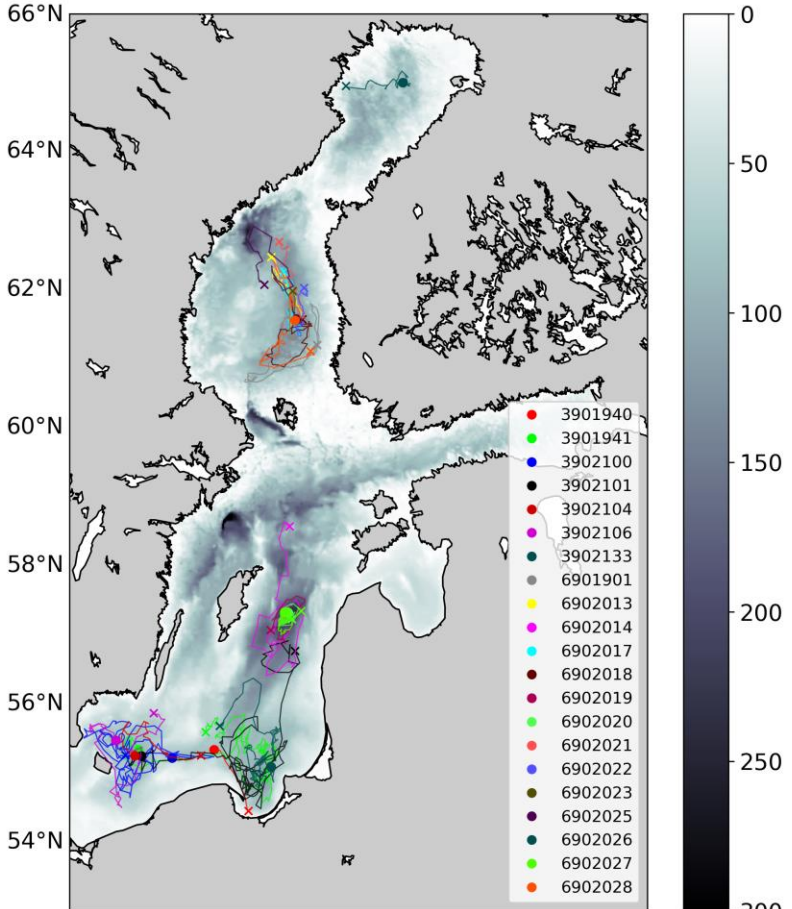
Data is freely available at ww.coriolis.eu

Baltic Sea Argo floats – specific features

- Strong density gradients → float needs to be balanced to match the expected densities of the target area.
- Heavy marine traffic → risk of collision
- Seasonal ice cover → ice avoidance algorithms needed
- Shallow depths → Possibility of bottom contact → constant monitoring of the float location needed.
- Proximity to coast: Floats can be recovered and redeployed after maintenance

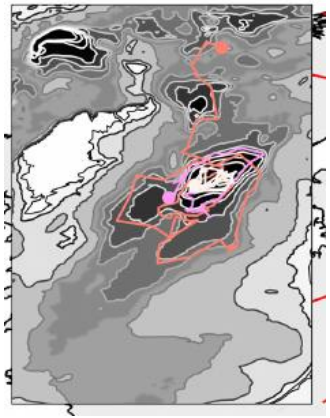
Baltic Sea Argo floats – areas covered

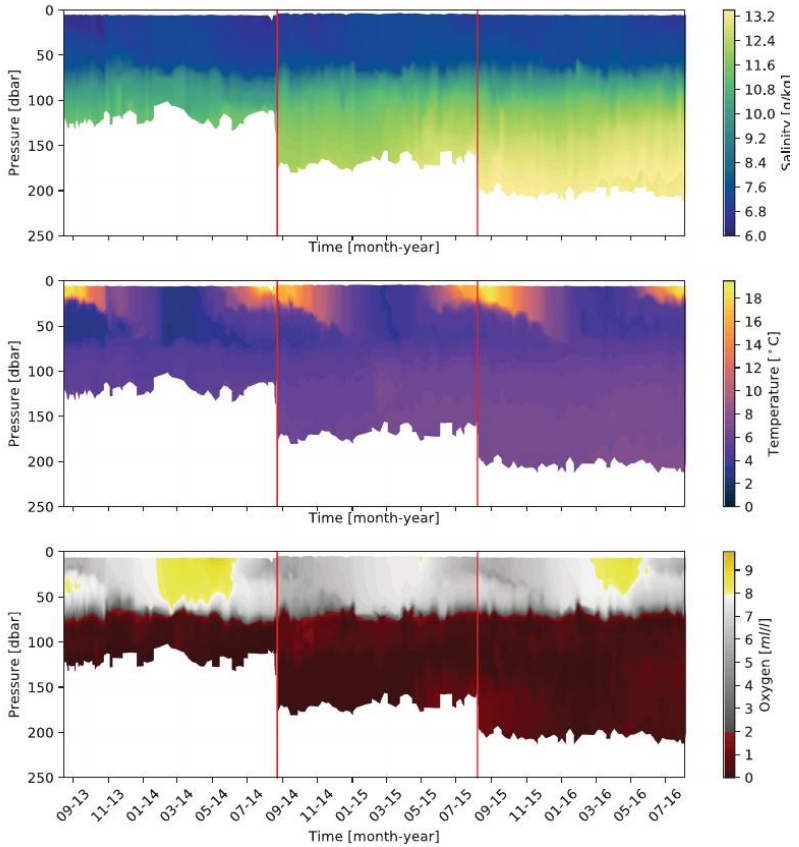
- FMI:
- Bothnian Sea, 2012 →
- Gotland Deep, 2013 →
- Bothnian Bay, 2017 →
- IOPAN:
- Bornholm basin/southern Baltic Sea 2017 →
- MOCCA project:
- Bothnian Sea, Gotland Deep, Bornholm basin, 2018 -



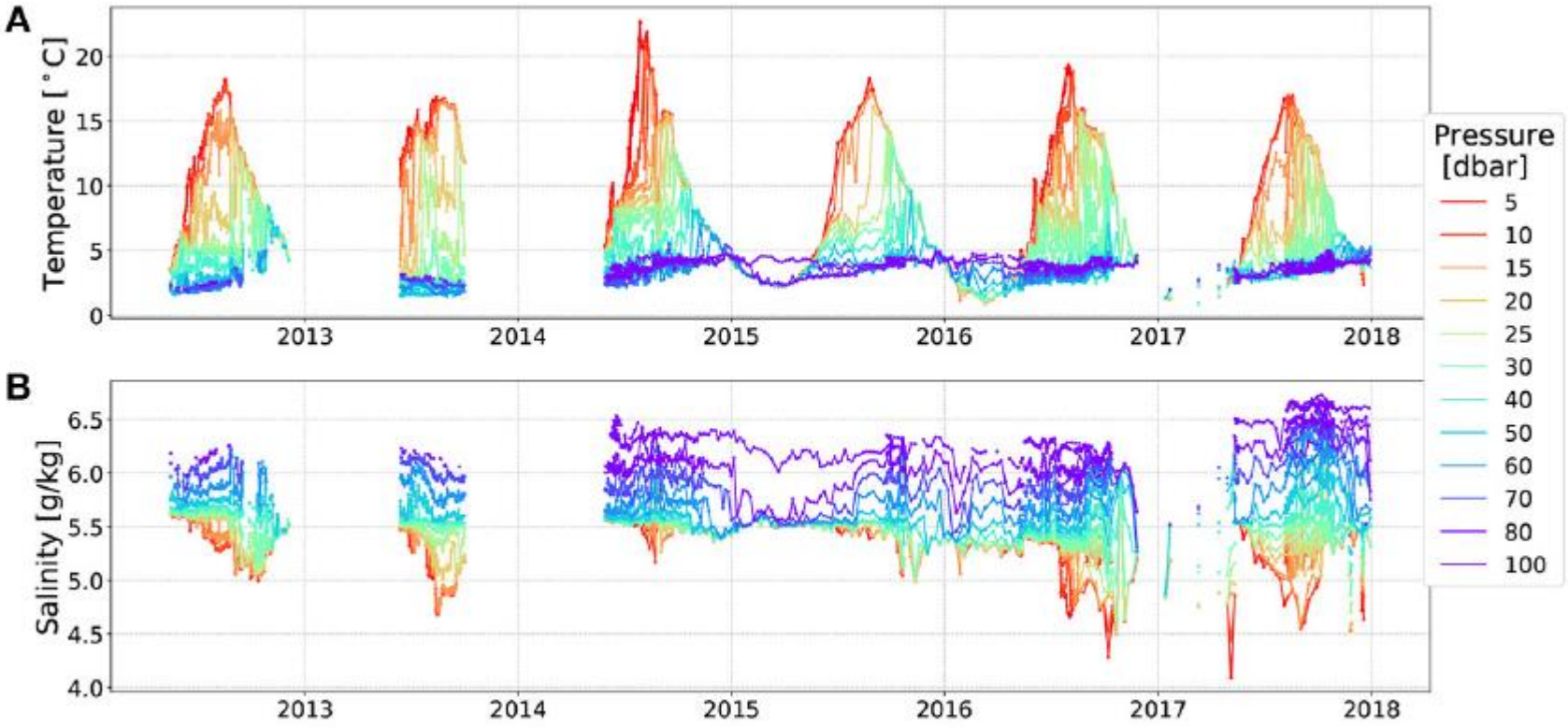
Baltic Sea Argo floats – measuring deep basins

- Argo floats provide profile data c. 4 m – close to bottom
- Typical measurement interval once a week. Can be shortened to one day o even half a day.



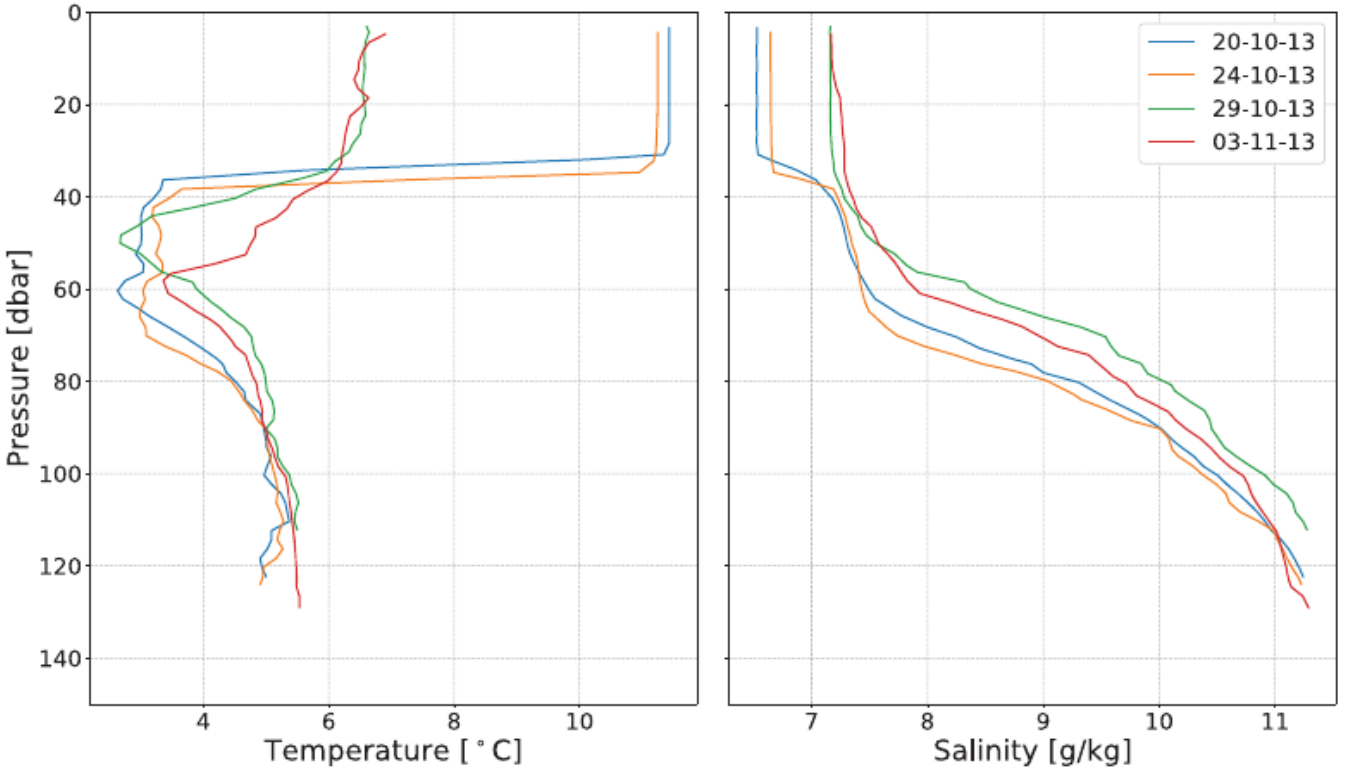


Baltic Sea Argo floats – measuring seasonal cycles



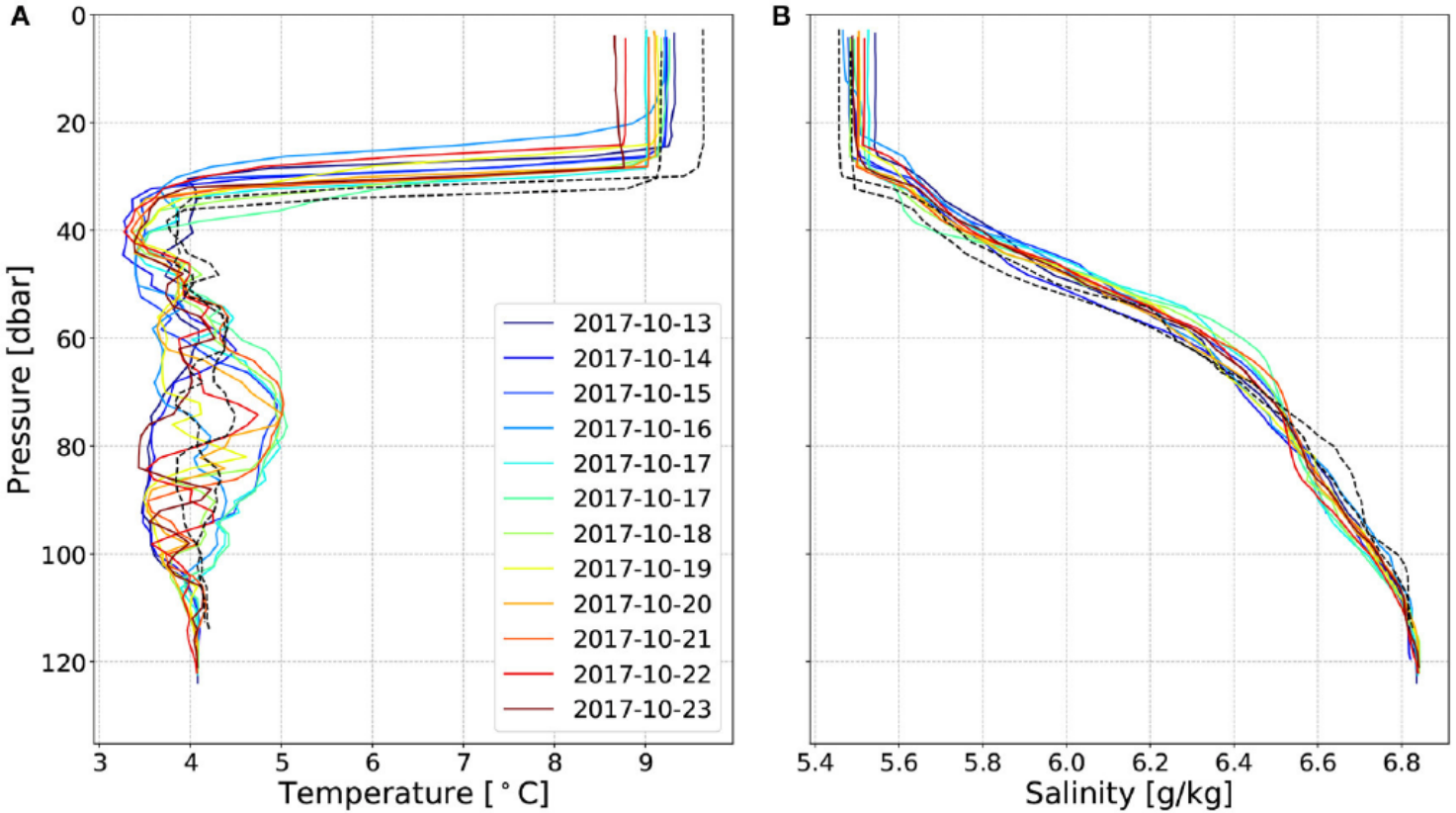
Haavisto et al. 2018

Baltic Sea Argo floats – measuring storm events



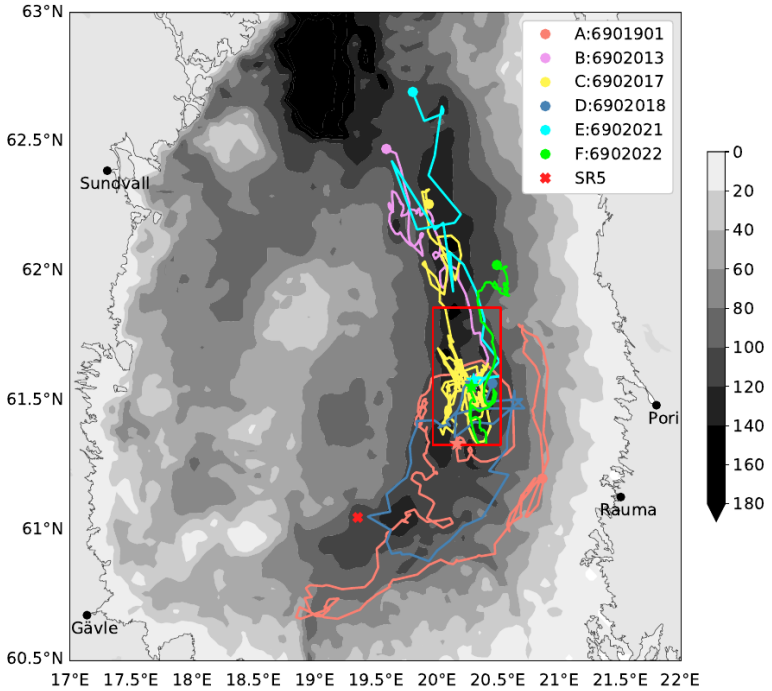
Siiriä et al. 2018

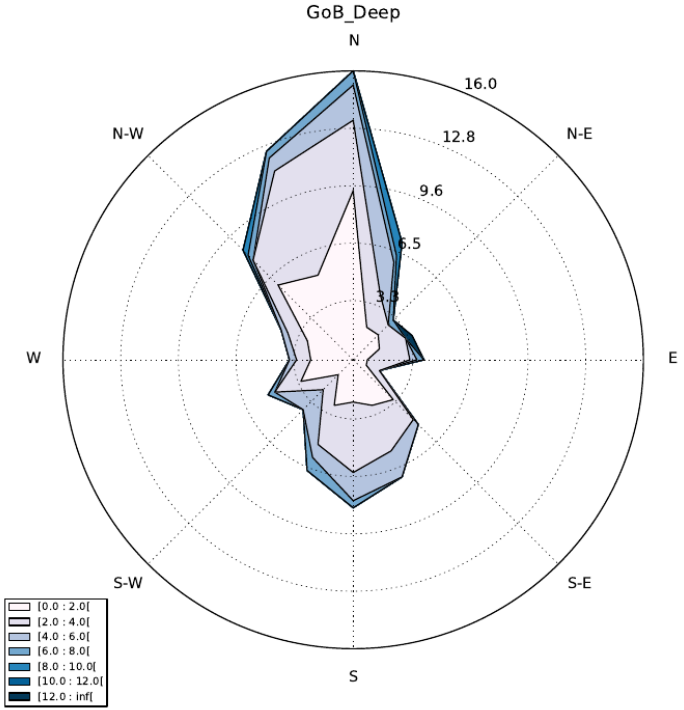
Baltic Sea Argo floats – measuring short term events



Haavisto et al. 2018

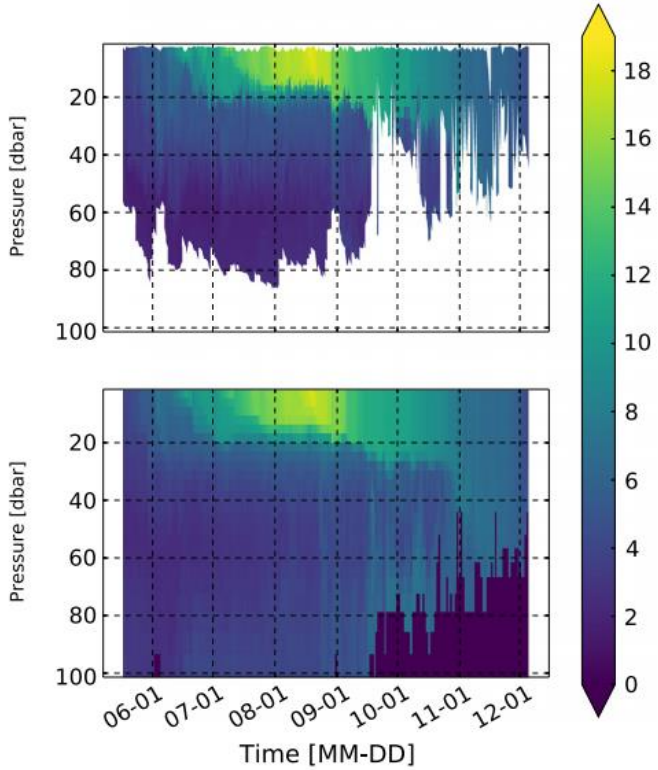
Baltic Sea Argo floats – estimating currents

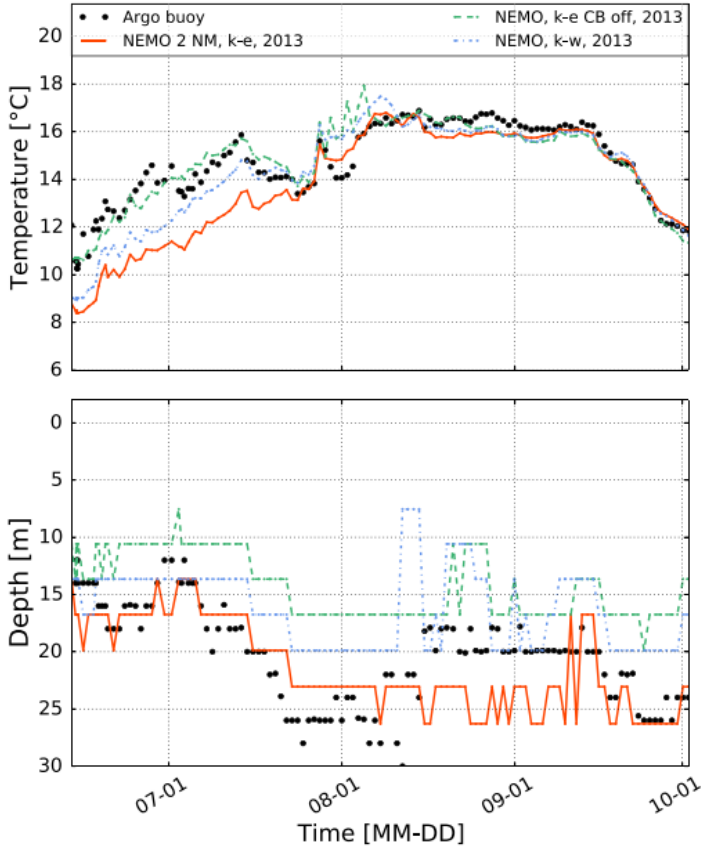




Roiha et al. 2018

Baltic Sea Argo floats – improving models





Westerlund and Tuomi 2016

Present and future

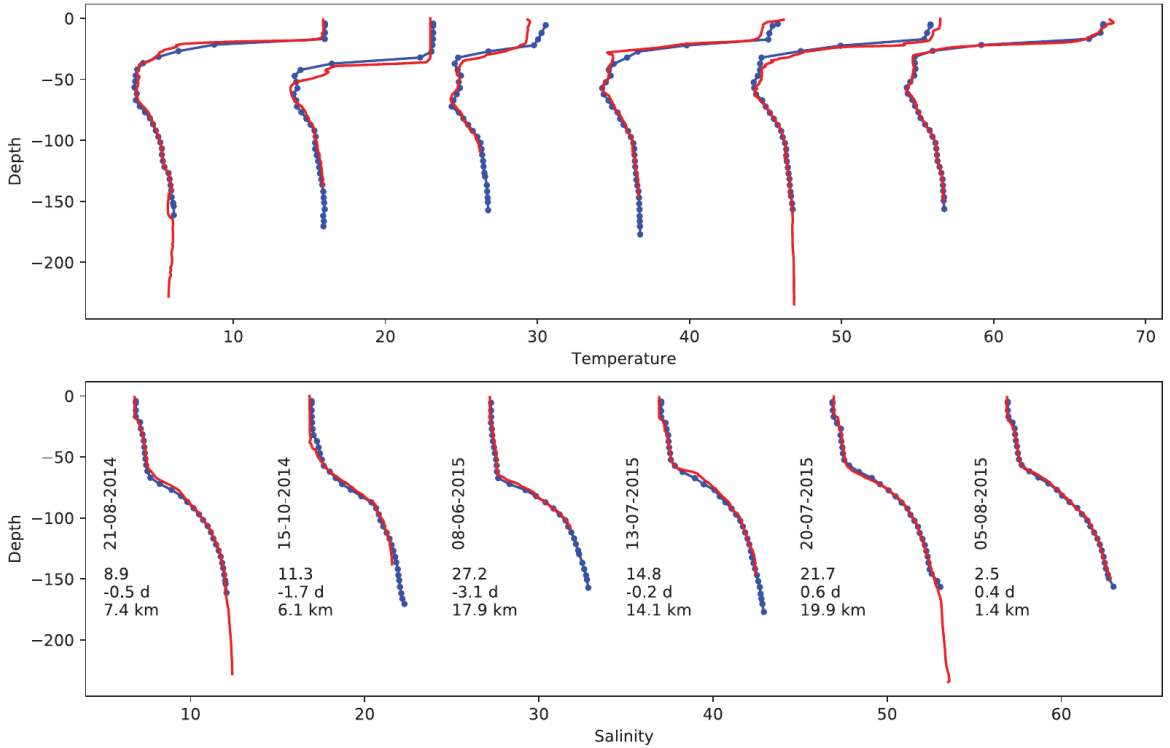
- Finland is committed to regular Argo activities as part of the EuroArgo RI
- FINMARI - AF FIRI funding to purchase Argo floats for the Baltic
  - 2017: 1 bottom parking float
  - 2018: 1 T/S float
  - 2018: 4 T/S+O2
  - 2019: 2-4 floats to be purchased, 1 bottom parking float, floats to the northern part of Baltic Proper
- Euro-Argo RISE project (H2020) , 2019 – 2022
  - Impoving ice sensing algorithms → enhancing year-round operations in the Baltic
  - Enhanced methods for shallow water missions
  - Testing new sensors: RBR CTD → measurements closer to the surface (presently up to 4 m depth)
  - Testing new sensors: New BGC sensors to be tested in the Baltic

Enhanced methods for ice avoidance

- Ice Sensing Algorithms (ISA) are software based methods of predicting ice conditions fromhydrographic information measured by the floats and aborting float ascent, before encountering ice.
  - Currently in use in the Arctic and Northern Baltic Sea Argo floats
- EA-RISE focuses on improving ISA, test areas northern Baltic Sea areas and Barents Sea
- Also new techniques for under ice navigation are evaluated; e.g. float with passive acoustic receiver for under ice navigation.

Better data quality control

- DMQC methods developed for the Baltic Sea
- Inter-calibration cruise planned for 2020 – CTD, Argo floats, gliders, other instrumentation



New BGC instrumentation

- EA-RISE will test and evaluate some existing BGC sensors on Argo floats
  - Nitrate concentration (NO3) and irradiance
- New BGC Argo floats will be tested in the Baltic Sea

Enlarging the regional Argo community

- Extension of Argo activities in shallow areas
- involving new scientists, countries, organizations in the Argo world
- workshops, political events, participation in activities
- join the Argo community, with the intention of developing collaborations, as a transverse activity
- A user-workshop will be organised in Sopot, Poland, target audience: all the scientists and technicians of the Baltic Sea.

EuroArgo Science meeting

- brings together users of Argo data and to provide an opportunity for high-level science interactions in link with Argo
- stimulates research activities using Argo data, especially in combination with other data types and in model studies
- highlights the new fields of research activities and applications allowed by the extensions of the core Argo programme to biogeochemistry, greater depths, and specific regions of interest (marginal seas, boundary currents, high latitudes)
- strengthens links with industry and foster Research and Development activities related to Argo
- allows users to widen their experience of the Euro-Argo community, welcome young scientists into that community, encourage their use of Argo data and provide an opportunity to participate in discussions of how Argo should evolve within Europe and globally.
- **The deadline for abstract submission: 17 June 2019**

Baltic Sea Argo floats – more information

- EA-RISE (https://www.euro-argo.eu/EU-Projects/Euro-Argo-RISE-2019-2022)
- EuroArgo RI (www.euro-argo.eu)
- Coriolis (for data access; www.coriolis.eu)
- FINMARI (www.finmari-infrastructure.fi)
- Publications about Baltic Sea Argo floats:

- Haavisto N, Tuomi L, Roiha P, Siiriä S, Alenius P, Purokoski T, 2018: Argo Floats as a Novel Part of the Monitoring the Hydrography of the Bothnian Sea Frontiers in Marine Science Vol. 5. https://www.frontiersin.org/article/10.3389/fmars.2018.00324 doi: 10.3389/fmars.2018.00324
- Roiha P, Siiriä S, Haavisto N, Alenius P, Westerlund A, Purokoski T, 2018: Estimating Currents From Argo Trajectories in the Bothnian Sea, Baltic Sea. Frontiers in Marine Science Vol. 5. https://www.frontiersin.org/article/10.3389/fmars.2018.00308 doi: 10.3389/fmars.2018.00308
- Siiriä S., Roiha, P., Tuomi, L., Purokoski, T., Haavisto, N., and Alenius P., 2018. Applying area-locked, shallow Argo floats in the Baltic Sea monitoring. Journal of Operational Oceanography. https://doi.org/10.1080/1755876X.2018.1544783
- Westerlund, A. and Tuomi, L.. 2016. Vertical temperature dynamics in the Northern Baltic Sea based on 3D modelling and data from shallow-water Argo floats, Journal of Marine Systems, 158, 34-44.

THANKS!

https://www.euro-argo.eu/EU-Projects/Euro-Argo-RISE-2019-2022

#EARISE

EURO-ARGO RISE

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