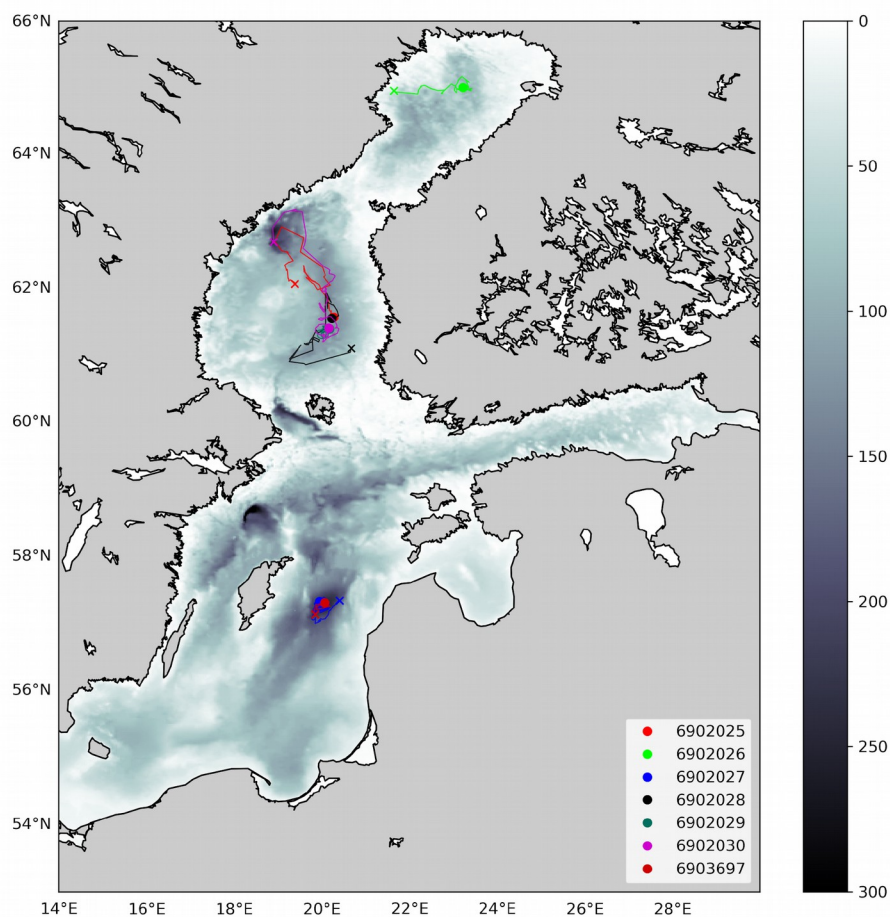


# Argo National Report 2018 – Finland

## 1. Status of implementation

The Finnish Argo program is run by the Finnish Meteorological Institute (FMI). Since 2010 FMI has deployed altogether eleven floats in the Nordic Seas. In addition of oceanic operations, 18 floats (starting 2012) have also been deployed into the shallow and low salinity Baltic Sea. Four of the Baltic floats have bio-optical sensor suite.



**Figure 1, Routes of Argo floats which operated in the Baltic Sea in 2017-2018. The dot indicates the deployment point, and cross the recovery point for each Argo float.**

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

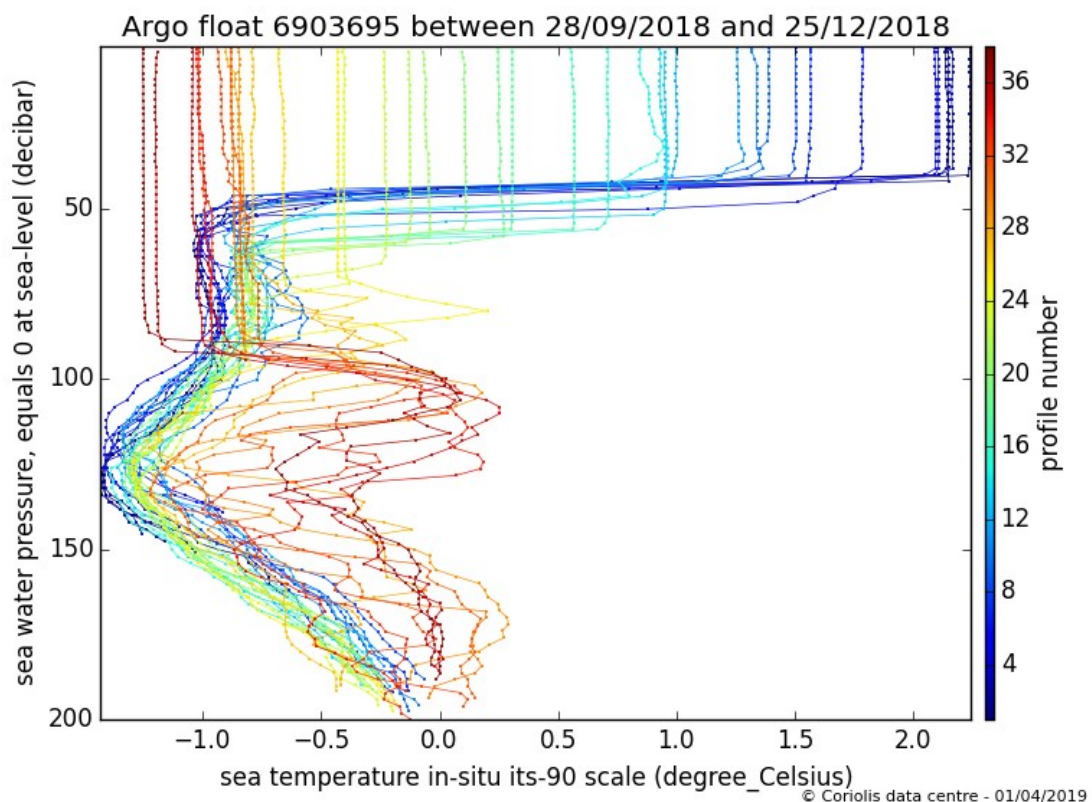
FMI has committed to purchase and deploy three floats in a year, at minimum. Our main geographical areas to operate are the Greenland Sea and the Baltic Sea. Currently we are looking for possibilities to further develop the

Argo floats to be used in shallow ice-covered seas. First experiments with ice-avoidance on the Baltic Sea has been performed during winter 2015-1016. And continued on the next years. 2018 one float (6902026) has been under ice on Bay of Bothnia.

### 3. Summary of deployment plans

This year two floats were deployed in the Baltic Sea and one on the Barents Sea. The Barents Sea is a challenging sea area for the Argo measurements. It's a shallow marginal sea where main currents are transporting Argo floats fast from the western side to the eastern Russian territorial water, expect in the North-East sector where dominant direction of flow is westward. However, that region is seasonally ice covered. In order to test feasibility of the Argo-floats in the Barents Sea monitoring, Norw

egian Polar Institute deployed one FMI's float to the Northern Barents Sea on September 2018. The float is equipped with the ice avoiding algorithm. The float was deployed in a local depression where maximum depth is ~ 300 meters. During the autumn, the float was circulated within the deep region and was practically same location in December where it as deployed in September. Temperature profiles depicted in the figure 2 show clearly cooling and deepening of the surface mixed layer. At the end of December, ice avoiding algorithm was activated and since the area is still ice covered, we haven't received any winter data yet.



**Figure 2. Vertical temperature profiles of the Argo float deployed in the Northern Barents Sea.**

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

Argo data sets gathered from Baltic Sea are used for validating the operational and research circulation models. Operating Argo floats in the Baltic Sea has been a research on the limits of usability of Argos in shallow seas. On this work three papers has been published on 2018. (Haavisto et al. 2018, Roiha et al. 2018 and Siiriä et al. 2018) Ongoing research is done on assimilating Argo data in the operational Baltic Sea circulation models for enhancing their forecasting skills.

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

Finland considers that more resources should be allocated for the environmental monitoring of the Arctic Ocean. The Euro-Argo could coordinate developments and deployments of ice-tethered Argos.

#### **6. CTD data uploaded to CCHDO**

No data uploaded.

#### **7. Bibliography**

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- Roiha P, Siiria SM, Haavisto N, Alenius P, Westerlund A, Purokoski T. 2018. Estimating currents from Argo trajectories in the Bothnian Sea, Baltic Sea. *Frontiers in Marine Science*. 5:308. Available from: <https://www.frontiersin.org/article/10.3389/fmars.2018.00308>.
- Siiria S, Roiha P, Tuomi L, Purokoski T, Haavisto N, Alenius P. 2018. "Applying area-locked, shallow water argo floats in baltic sea monitoring. *Journal of Operational Oceanography*. 0(0):1-15. Available from: <https://doi.org/10.1080/1755876X.2018.1544783>.