Completing the global mission: European goals for the seasonal ice zone

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A “Roadmap for the Evolution of ARGO in Europe” has been developed during the preparatory phase of the ERIC. The document will be reviewed and updated when the ERIC has started work. The document specifies how to:

- **Strengthen** Europe’s role in and contribution to the global ARGO Programme,
- **support** the implementation of the EU Marine Policy through the development and subsequent incorporation of biogeochemical sensors into the programme,
- **extend** the observations spatially into the European and Polar Seas, as well as into the abyssal parts of the oceans,
- **further develop** the existing data management system, and
- **maximize** the relevant knowledge of the Seas and Oceans, e.g. their role in a changing climate.
Priority 1: contribute to the global core mission + regional enhancements

Priority 2: start implementing new phase of Argo (bio, deep, polar).

The ERIC will be starting with pilot experiments but will also start working on long term implementation plans proposed by the SIDERI activities.

This will be done through a coordination of efforts from nations participating to Euro-Argo.

When the targets for the next 10 years are defined by the ERIC the national partners will have to work with their funding agencies (ministries).

The ERIC will also work at EU level (as we are doing today with DG MARE).
Aims:

- analysis of the mid-depth circulation, mean flow, seasonal variability and dynamics
- analysis of the heat- and freshwater budgets in the Greenland Sea
- uncertainties and error estimates
Nordic Seas: What exists, examples of valuable science conducted, targets and added value of the new mission

Detection of climate change signal in the Nordic Seas:

combined timeseries of historical CTD and Argo profiles

Updated from Latarius and Quadfasel, 2010
Nordic Seas: What exists, examples of valuable science conducted, targets and added value of the new mission

Analysis of circulation scheme

Seasonal variability in the rim-currents.

From Voet et al., 2010
Requirements for a sampling strategy

Based on the observed variability the number of floats per basin has been selected to be able to detect climatic changes in the Nordic Seas.

From Latarius and Quadfasel, 2010
Need to be realised from national plans and EU contributions

39 active floats in the Nordic Seas: 10 in the boundary currents (x) and 29 in the 4 deep basins,

- red – Greenland Sea (11 floats)
- blue – Icelandic Plateau (6 floats)
- yellow – Lofoten Basin (4 floats)
- green – Norwegian Basin (8 floats)

Boundary currents floats: parking depth of 500 m, profiling depth of 2000 m, working cycle of 3 days, lifetime 2 years.

Deep basin floats, parking depth of 1000 m, profiling depth of 2000 m, working cycle of 10 days, lifetime 3 years.

Two floats with biogeochemical sensors (oxygen+bio) per basin except for the Lofoten Basin (3-4) floats.
No EuroArgo targets for deployment have been defined, because mature technology is still missing. But national activities exist and are carried out as pilot projects.

iAOOS project (integrated Arctic Ocean Observing System, led by the Arctic Ocean Sciences Board (AOSB)) will have 15 autonomous platforms operating at any given time in the Arctic Ocean for a period of 7 years. Project started in October 2011 and will end in December 2019.

Sampling in the Arctic has started for the Baffin Bay. France as part of NAOS Project (http://www.naos-equipeX.fr/) has a pilot experiment for biogeochemical floats in the Arctic (Bay of Bafin) (cooperation with Canada - UMI Takuvik) (20 floats in 2015-2016) (PI : M. Babin).
Float deployments should be coordinated with other observing systems.

A scheme of the ACOBAR integrated observing system in Fram Strait with acoustic tomography (blue and green) and oceanographic (moored array and gliders, yellow) components.
Southern Ocean: What exists, examples of valuable science conducted, targets and added value of the new mission

**WOCE: CTD-stations**

Ca. 800 CTD casts

Strong seasonal bias existed

5633 float profiles without seasonal bias
Deployments in the southern ocean have to consider ice protection and underwater tracking. Shown are surface positions Dec 2012 – June 2013 with circles indicating RAFOS sound source moorings maintained at Awi.
Southern Ocean: What exists, examples of valuable science conducted, targets and added value of the new mission

EuroArgo goals for deployment:

Extension of Argo beyond 60°S into the seasonal ice zone at the nominal core Argo design density: 320 active floats in the Southern Ocean

Strong European research interest in the Weddell Gyre, RAFOS array already installed -> focus on Weddell Gyre

Requires 81 floats to be active in the Weddell Gyre at any given time

Accounting for an increased failure rate of floats of 20% -> 25 deployments per year

Maintainance of rafos sound sources needs to be funded