



Progress made on engagement with countries surrounding the Arctic Ocean

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**Euro-Argo Research Infrastructure Sustainability and
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Lead authors	Waldemar Walczowski, Laura Tuomi
Contributors	Birgit Klein, Kjell-Arne Mork, Estérine Evrard
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EXECUTIVE SUMMARY

The engagement with countries surrounding the Arctic Ocean and other countries involved in Arctic research in the direct use of Argo floats and the use of data obtained from the Argo network is an important task of the Euro-Argo RISE project. Despite the limitations associated with sea ice, argo floats are an excellent tool for exploring the vast regions of the shelves and deep basins of the Arctic Ocean and subarctic seas. Therefore, WP5.2 has taken steps to strengthen contacts with Arctic research coordinating organizations, institutes and even individual researchers. These activities were significantly limited by the COVID-19 pandemic, which started in 2020. Despite this, meaningful progress has been made. Contacts were activated, joint plans and arrangements were made. Denmark has already applied to join the Euro-Argo ERIC and Sweden is considering. An important element of the action was the Arctic workshop, which was held in a virtual form.



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1. Introduction

The Argo system has proved its utility in oceanographic observations by providing already more than 2 400 000 casts collected by profiling floats. The spatial coverage in the open ocean is satisfactory and the marginal seas slowly get covered by the network of floats. The largest gaps in the Argo system are still found in the Arctic regions, where the network of floats is poorly developed. Scientific institutions are usually reluctant to deploy floats in the Arctic Ocean and even the Nordic Seas are weakly covered. This can be explained by the fact that the float life time in usual conditions can reach up to 4 years while in the northern regions even two years is considered a very optimistic estimate. For a standard Argo float, the close approach to the ice edge is usually mortal.

However, even limited information from the Argo floats can provide an extremely valuable contribution to the ocean observation system in the Arctic and sub-Arctic regions. The Argo system has great potential to complement other observing methods and fill the gaps due to their limitations. Fast paced development of the Argo float technology, including the implementation of new biogeochemical sensors and progressing efforts on ice-sensing and ice-avoidance methods, increases robustness of Argo floats in the harsh Arctic environment and make them a promising source of the most demanded biogeochemical and biological data.

The closer collaboration between the Argo and Euro-Argo programs and other Arctic-oriented research and infrastructure projects is of the highest importance, particularly in the context of shrinking sea ice cover and growing areas of open water where Argo floats can be fully operational. For these reasons, the Euro-Argo RISE project also addresses the problem of the spread and expansion of the use of Argo floats in the Arctic. These works are grouped mainly in WP5 of the program: 'Extension of the European Argo Program to High latitude regions'. The following report concerns Task 5.2 - cooperation with high latitude countries.

2. Contacts with organisations and potential partners

There are missing links between science and decision makers, as representatives of the scientific program are not able to directly contact the governments of countries'. Therefore, in the implementation of Task 5.2, it was decided to contact, first of all, the existing scientific organizations within which the oceanographic research of the Arctic is located, as well as with scientists dealing with these problems. Therefore the task focused on strengthening contacts with existing structures such as EuroGOOS and its regional node Arctic ROOS, as well scientific projects as INTAROS and other initiatives.

Few countries have a direct border with the Arctic Ocean or maritime subarctic regions. These are: Canada, Denmark, Iceland, Norway, the USA and Russia. Sweden and Finland are also classified as Arctic countries, but have no direct access to the Arctic Ocean or sub-Arctic seas. Half of the Arctic countries (USA, Canada, Finland, Norway) use Argo floats in oceanographic research. The rest of the Arctic countries do not use their own Argo floats.

In addition to the countries whose territory is partly in the Arctic, many other countries are involved in Arctic investigations. The greatest number of active floats in the Arctic is used by: Norway (35

floats), France (15 floats), Germany (9), Poland (6), USA (3), Ireland (2), UK (1), Finland (1). 5 floats are deployed by Euro-Argo.

Europe's most important oceanographic organization is **EuroGOOS**. It is an international non-profit association of national governmental agencies and research organisations, committed to European-scale operational oceanography within the context of the intergovernmental Global Ocean Observing System (GOOS). EuroGOOS operates in five regional sea areas where operational systems have been set up. **Arctic ROOS** is a regional node of EuroGOOS for the Arctic regions. 20 leading institutes from all over Europe are represented in this body.

Contacts with EuroGOOS and Arctic ROOS were maintained by oceanographers affiliated with these institutions and associated with the Euro-Argo RISE project. On the Polish side, it was Agnieszka Beszczynska-Möller, who is the Polish representative in EuroGOOS and member of Arctic ROOS steering group, Waldemar Walczowski, who was the Polish representative in Arctic ROOS (both from Institute of Oceanology Polish Academy of Sciences - IOPAN). Jari Hapala from Finnish Meteorological Institute (FMI) is the Finnish representative in EuroGOOS and chair of the Arctic-ROOS. During the annual Arctic ROOS meetings, the progress of Argo use in the Arctic and the problems related to this issue were presented by the representatives from Norway, Poland and Finland. It made it possible to get to know the subject of Argo to a wider group of Arctic oceanographers.

Contacts with major Arctic research programs were also maintained. The biggest one is **INTAROS** - Integrated Arctic Observation System. The overall objective of this project is to build an efficient integrated Arctic Observation System (iAOS) by extending, improving and unifying existing systems in the different regions of the Arctic. INTAROS have a strong multidisciplinary focus, with tools for integration of data from atmosphere, ocean, cryosphere and terrestrial sciences, provided by institutions in Europe, North America and Asia. The main INTAROS contribution to the development of Argo floats in the Arctic was under WP3 'Enhancing in situ observing systems in the Arctic' led by IOPAN. The INTAROS partner **CNRS-TAKUVIK** contributed to Task 3.4 through the monitoring of the biogeochemical properties of the Baffin Bay with the deployment of a fleet of bio-Argo floats dedicated to navigate in ice-infested waters. Experience gained with BGC Argo floats deployments in the seasonally ice-covered waters in the Baffin Bay was reported in detail in three WP3 deliverables (D3.4 on technical development and system design, D3.14 on the first implementation of the system, and D3.13 on the final implementation of the observing system). The role of Argo floats in a future sustained Arctic observing system and technical recommendations was addressed in the final WP3 deliverable D3.16 'Synthesis and technical recommendations'. The conclusions included in the synthesis report will also contribute to the INTAROS Roadmap for a sustained Arctic observing system.

Under INTAROS, IOPAN collaborated with the US-Norwegian project **CAATEX** (Coordinated Arctic Acoustic Thermometry Experiment) aiming to use acoustic thermometry to estimate mean ocean temperature and heat content in the central Arctic Ocean. In the CAATEX experiment, acoustic moorings, carrying tomographic sources and arrays of receivers were distributed across the entire Arctic Ocean. Acoustic transmissions that were recorded year-round during CAATEX experiment (and also acoustic data from earlier experiments in Fram Strait and in the Nansen Basin) for obtaining state estimates of the Arctic Ocean can be also used in future as a basis to evaluate feasibility and environmental requirements for building an underwater acoustic positioning and navigation system (UW-GPS) for ice-covered areas of the Arctic Ocean. Positioning of Argo floats under the sea ice would be one of the major future applications of such multidisciplinary acoustic system. Adaptation of ARGO for geo-positioning under ice using UW-GPS is considered to be further exploited in the

planned proposal for the Horizon Europe call 'Next generation of scientific instrumentation, tools and methods (2022).

Not only contacts with international organisations and projects, but also cooperation with leading scientific institutes and even individual scientists in a given country may be important to progress on engagement.

2.1 Contacts with Russian partners

The largest part of the Arctic Ocean coast and its Exclusive Economic Zone (EEZ) is occupied by Russia (Fig. 1). Looking at the map of active Argo floats in the Arctic, it is noticeable that the Arctic is very poorly covered by Argo measurements. However, while Argo floats work in the ice-free zones of Canada, USA, Norway, Iceland and Denmark, in the Russian zone they are almost missing. Therefore, it is understandable that contact with Russian institutes and oceanographers is necessary, and encouraging them to work together within the framework of Euro-Argo ERIC and helping to use floats in the Arctic is in the interest of the Argo community, or the scientific community in general.

Despite the negligible presence of Argo in the Russian Arctic, there is some experience in this matter. In 2008, during the International Polar Year, three Argo floats were deployed by Russian oceanographers in the Russian Arctic. Experience gave negative results, two floats disappeared, one appeared at the surface and disappeared again. Also in 2008, the American WHOI launched float [4901041](#), which performed two cycles. Two floats launched by the Japanese JAMSTEC were more lucky. Float [2900941](#) worked from October 2008 to January 2009 and made 114 profiles, float [2900942](#) worked for over half a year making 184 profiles up to 1000 m deep. German float [6900563](#) launched in 2008 in the Greenland Sea, in 2016 reached the coast of Novaya Zemlya island. Float [7900549](#) launched in October 2020, entered Laptev Sea after one year. Both floats were owned by BSH. Also floats launched in the Barents Sea by NorArgo, ArgoUK and other organizations reach the western end of the Russian EEZ. In such cases, there are problems with contacting the Russian side for notification of floats entering EEZ as the e-mail addresses of the Russian representatives do not function (similar case for the Baltic Sea).

Argo data from the Arctic regions can play an extremely important role. This is mainly due to the rapid loss of sea ice. This worrying from the climate change point of view process, is conducive to the processes of opening up the Arctic to economic and scientific activities. It can be expected that the Northern Sea Route will be in a few years open to commercial shipping for most of the year. Russia is preparing for this intensively by building a fleet of new nuclear icebreakers, floating power plants and large scientific platforms.

The loss of ice in the Arctic also favors the work of Argo floats, which can be launched in the regions of the Siberian shelf. This can give a large amount of operational and for scientific application data. Therefore, the Euro-Argo RISE project attempted to contact Russian oceanographers. The Institute of Oceanology Polish Academy of Sciences, as an institution that has been involved in Arctic research for years on the one hand, and maintaining contacts with Russian oceanographers on the other, was chosen as a representative of the program, carrying out these tasks.

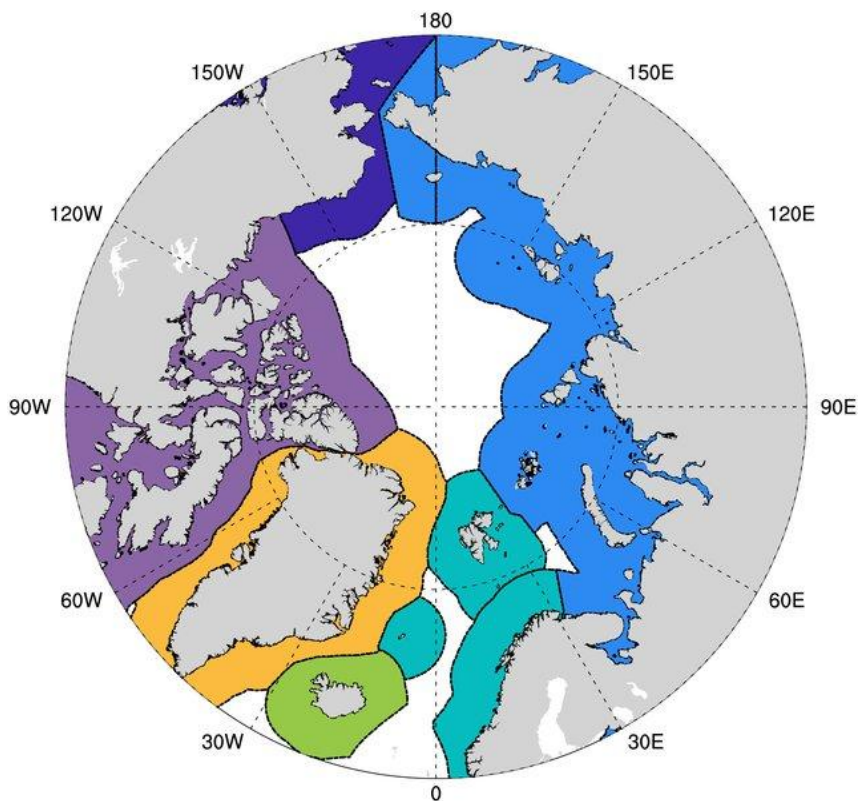


Fig. 1 Map of the exclusive economic zones (EEZs) of the Arctic based on the definition from the United Nations Convention on the Law of the Sea (Nordquist, 2011): Canada (purple), the United States (dark blue), Russia (light blue), Norway (turquoise), Iceland (green), and Greenland (orange) (after DeRepentigny, 2020).

In the initial phase, the implementation of tasks was very successful. In April 2019, three representatives of the Shirshov Institute of Oceanology in Moscow were invited to IOPAN. There were talks about cooperation in the Arctic and the Baltic Sea, a joint cruise in the Baltic Sea related to the launching of the Argo floats. In May 2019, Prof. Waldemar Walczowski took part in the biennial Arctic Science Summit Week 2019 conference. It took place in Arkhangelsk, located in the north of Russia. The poster 'An increasing role of Argo floats in Arctic oceanographic observations' was presented, which met with great interest. Many conversations were held with oceanographers and representatives of the administration of the Republic of Russia. This resulted in prof. Walczowski's invitation to the conference 'IX International Forum Arctic: Today and the Future'. This conference, covering a wide range of political, economic and social issues, took place in December 2019 in St. Petersburg. Under the logo of the Euro-Argo RISE project, Prof. Walczowski gave a lecture entitled 'An increasing role of Argo floats in Arctic oceanographic observations' in the 'Arctic as a unique testing ground for fundamental and applied research' panel (Fig.2). The lecture was popular, especially since it was delivered in Russian. A poster previously shown in Arkhangelsk was also presented. A visit to St. Petersburg gave the opportunity to establish new contacts and renew older ones. The prestigious Arctic Antarctic Research Institute in St. Petersburg was visited.



Fig 2. The Arctic Forum. The AARI Deputy for Scientific Affairs, prof. Igor Ashik (left) and prof. Waldemar Walczowski.

During both conferences, Russian scientists and stakeholders were encouraged to participate in the Arctic workshop planned by Euro-Argo RISE in autumn 2020 at the IOPAN headquarters in Sopot (Fig.3). Unfortunately, due to COVID 19 reasons, the conference did not take place and was replaced by a virtual meeting.



IX INTERNATIONAL FORUM
December 5-7, 2019 St. Petersburg

ARCTIC: TODAY AND THE FUTURE

- Euro-Argo RISE project organises a workshop focused on international collaboration on Argo activities in the Arctic
- Time 20-23 September 2020
- Place - Sopot, Poland

WELCOME

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INSTITUTE OF OCEANOLOGY
POLISH ACADEMY OF SCIENCES

Fig.3. The last slide of the presentation at the Arctic Forum, inviting you to a workshop in Sopot.

Thanks to contacts with Russian oceanographers, the online workshop in April 2021 (see paragraph 3.2) was attended by scientists from three centers: Arctic Antarctic Research Institution St. Petersburg, P.P.Shirshov Institute of Oceanology Moscow, and P. P. Shirshov Institute of Oceanology, Kaliningrad. They showed great interest in Argo technology and potential collaboration. They express their willingness to take part in the planned meeting, which may still take place in Sopot as part of the Euro-Argo RISE project. The main obstacle to its organization is the ongoing COVID-19 pandemic and related travel restrictions. At the moment, crossing the Russia-European Union border is associated with the need to undergo a 14-day quarantine.

2.2 Contacts with Scandinavian partners

Sweden, Denmark and Iceland are Scandinavian countries that do not yet have their own Argo program. They all are related to the Arctic, so WP 5.2 was also tasked with keeping in touch with them. This took place during EuroGOOS, Arctic ROOS and BOOS meetings and other conferences. Scientists from Denmark participated in the Arctic User workshop arranged in April and contacted FMI and EuroArgo ERIC Office to receive some instruction on how to deploy and operate Argo floats in high latitude regions. Denmark presented its application as a candidate Member to the Euro-Argo ERIC in Council meeting in December 2021 and is now a candidate member.

Contacts have also been made with Freshwater Research Institute in Iceland, who helped IMR to deploy a BGC float in the Iceland Sea in 2020. The head of Oceanographic Research Group at SMHI, Sweden is also part of the Advisory group in the Norwegian Argo Infrastructure project (NorArgo2) that IMR leads. In addition, FMI has also made contacts with SMHI in WP6, and BSH has also discussed with a scientist from University of Gothenburg, who are interested in Argo floats.

3. Arctic workshop

3.1 Workshop preparation

The Arctic Workshop was an important part of the Argo integration. Several goals of the conference were set. The most important of them were:

- Gather together oceanographers from the countries surrounding the Arctic;
- Familiarize them with the Argo technology;
- Present the problems related to the operation of floats in the specific Arctic conditions;
- Present the results obtained from floats working in the Nordic Seas and Arctic Ocean;
- Show possibility of using the results in scientific work and monitoring;
- Highlight legal problems and the need for international cooperation.

Sopot (Poland), which is the seat of the Institute of Oceanology of the Polish Academy of Sciences, was chosen as the venue for this workshop. In order to maximize the impact of the conference and gather more participants, it was decided to combine the Baltic Workshop with the Arctic Workshop, also organized in Sopot as part of Euro-Argo RISE WP6. For this reason, a 3-day meeting has been

planned: the 'Baltic' day, the general day on the Argo technique and the 'Arctic' day. September 2020 was selected as the date of the workshop organization. An extensive information campaign was carried out, the conference advertisements were posted on many internet platforms of the ocean observing community, and many participants and speakers were acquired.

The Scientific Programme Committee included the following experts:

- Waldemar Walczowski (IOPAN, Poland)
- Laura Tuomi, (FMI, Finland)
- Siiriä Simo-Matti (FMI, Finland)
- Ingrid Angel-Benavides (BSH, Germany)
- Birgit Klein (BSH, Germany)
- Kjell Arne Mork (IMR, Norway)
- Edouard Leymarie (SU, France)
- Claire Gourcuff (Euro-Argo ERIC office, France)
- Sylvie Pouliquen (Euro-Argo ERIC office, France)

The practical organisations were conducted by Estérine Evrard and Francine Loubrieu (Euro-Argo ERIC office, France).

Unfortunately, the COVID-19 pandemic, which has been developing since the beginning of 2020, has thwarted these plans. Initially, it was decided to postpone the meeting in spring 2021. Unfortunately, the further development of the situation forced the organizers to change their plans again. Eventually, it was decided to conduct the meeting remotely, together with the Mediterranean and Black Sea workshop. The length and complexity of the workshop was revisited to get the highest outcomes possible considering the pandemic situation. Virtual formats with shorter sessions were chosen to keep things to the point and discussions interactive.

3.2 Online workshop

The Arctic and Baltic User Workshop was held on 8 - 9th April 2021 (Fig 4).



Figure 4. The first page of the workshop announcement.

Information about the planned workshop has been placed on the Euro-Argo ERIC website:

<https://www.euro-argo.eu/News-Meetings/Meetings/Others/Arctic-and-Baltic-users-workshop>

The first day began with a general session on Argo in the European Marginal Seas. It was the first ever organized session on this subject. The session dedicated to the Baltic Sea was held in the afternoon of April 8th. The Arctic session was held in the afternoon of April 9th. Chair of the session was Agnieszka Beszczynska-Möller, arctic oceanographer from IOPAN. Welcome and introduction to Euro-Argo RISE WP5 activities was presented by Laura Tuomi. Agenda included four talks:

- Operating in Arctic Ocean presented by Ingrid Angel, BSH
- Arctic Ocean Argo Activities presented by Kjell Arne Mork, IMR
- Use cases of Argo data in Arctic Ocean presented by Laura Tuomi, FMI
- Enhancing cooperation in Arctic presented by Waldemar Walczowski, IOPAN.

The formula was a 15 minutes PowerPoint presentation and 5 minutes for questions. To take advantage of the online format of the workshop, presentations were targeted to a 15-minute time slot to keep messages focused.

The presentation of Ingrid Angel explained how Argo floats are operated in the ice covered areas and how the ice sensing algorithms (ISA) work. Also the reference datasets, TS-profiles and ice concentration, collected in WP5 were presented and how they are used to tune the ISA settings.

Kjell Arne Mork presented the current Argo activities in the Nordic Seas and Arctic Ocean. The number of floats in different regions as well as the number of profiles obtained were presented including examples of the data and data usage.

Laura Tuomi presented examples how the Argo data from these regions are currently used and which application could benefit from the use of this data. Use cases covered for example studies of hydrography and heat content, improving satellite products by validation and using the Argo data for validation and assimilation of the forecast systems.

The presentation by Waldemar Walczowski discussed how to enhance cooperation in the Arctic; highlighting several possibilities for cooperation. In addition to joining the Euro-Argo, there are

possibilities to help for example in deploying and recovering of the floats and of course participating in the development of technologies needed to be able to measure in the ice-covered areas.

These speeches were followed by the panel/general discussion moderated by Laura Tuomi. Three panelists, Jari Haapala representing ArcticROOS, Laurent Bertino from Arctic MFC, Achim Randelhoff from Takuvik were invited to participate in it. The panel discussion focused on the sufficiency of the current Argo coverage in the Nordic Seas and Arctic Ocean and the possible use cases. Also, the future needs and possible challenges were discussed. As an overview of the discussions the sufficiency of the current Argo float coverage in these areas was dependent on the application. In the Nordic Seas, the coverage of TS-profiles is sufficient to be used in model application especially when complementing the satellite data. However, there is a need for more BGC profile data and also, if solving of synoptic scales are needed, then both the temporal and areal coverage is too sparse even for the TS floats. In the Arctic Ocean, more measurements are needed. However, Argo floats might not be the most appropriate devices and a multi-platform concept for observation needs to be considered to get optimal coverage. The ice conditions and ridging ice are a challenge for all types of measurements in the Arctic. Considering Argo floats, the location of under-ice profiles is difficult to determine. Acoustic techniques have been tested during some projects, but there are challenges related to them both considering the technology and expenses. The possibilities to operate in the shallow regions of the Arctic Ocean, for example in the Russian Arctic were discussed. The experiences gained from the marginal seas can be utilised in these areas.

3.3 Workshop participants

The general session of the Arctic and Baltic Users workshop was participated by 118 people of which 57 took part in the Arctic session. They represented 15 countries (Fig. 5).

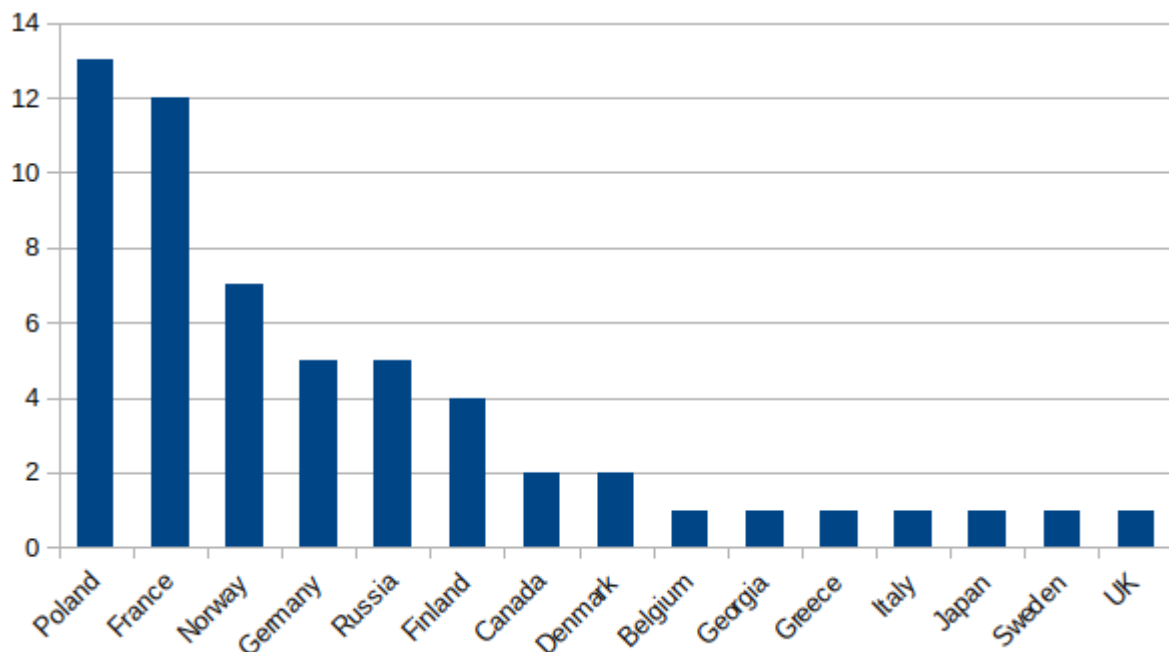


Figure 5. Distribution of participants by country for the Arctic session.

Table 1: List of scientific institutions and organisations for the Arctic session

Institutes	Countries
EuroGOOS	Belgium
Rockland Scientific	Canada
Takuvik/CNRS	Canada
Joint GeoMETOC Support Center	Denmark
NIVA	Denmark
Finnish Meteorological Institute	Finland
CNRS	France
CNRS-LOV	France
Euro-Argo ERIC	France
IFREMER	France
nke instrumentation	France
Black Sea Commission ICZM Advisory Group Member and NFP	Georgia
Bundesamt für Seeschifffahrt und Hydrographie	Germany
Institute for Chemistry and Biology of the Marine Environment, University of Oldenburg	Germany
Leibniz Institute for Baltic Sea Research Warnemünde (IOW)	Germany
Institute of Oceanography, Hellenic Centre for Marine Research	Greece
OGS	Italy

JAMSTEC	Japan
Akvaplan-niva	Norway
Institute for Marine Research	Norway
The Nansen Center (NERSC)	Norway
IMGW-PIB	Poland
Institute of Geophysics PAS	Poland
Institute of Meteorology and Water Management	Poland
Institute of Oceanology Polish Academy of Sciences	Poland
Ministry of Education and Science	Poland
Ministry of infrastructure	Poland
Arctic and Antarctic Research Institute (AARI)	Russia
Shirshov Institute of Oceanology, Russian Academy of Sciences, Atlantic Branch	Russia
SMHI, Swedish Meteorological and Hydrological Institute	Sweden
University of East Anglia	UK

3.4 Questionnaire

To obtain knowledge about the existing and potential use of Argo data within the Arctic and Baltic Argo Users workshop participants we made a questionnaire, which was available for the participants before and during the workshop. The results of this questionnaire have already been presented in [D6.6 “Baltic Sea workshop report”](#) delivered in July 2021. As a short summary, the questionnaire was answered by 37 people that represented mostly Public sector organisations or Universities from 11 different countries. The use of Argo data was not familiar to 66% of those who answered. Different fields of oceanography were more or less evenly represented as targets of the present and possible future use of Argo data.

4. Outcome

The results of the activities carried out in Task 5.2 are spread over time. The COVID-19 pandemic has significantly limited the activity of most scientific institutes, both in the organization of cruises and in international links. Particularly conferences and personal contacts have been drastically restricted. This is especially true for countries outside the Schengen area. Many actions taken before the outbreak of the pandemic had to be stopped. Nevertheless, contacts with scientists and institutions are maintained.

Positive effects of WP5.2 activity have undoubtedly been obtained. Collaboration within the community of Arctic researchers using Argo floats has improved. Thanks to numerous contacts and the online Arctic conference, the advantages of the Argo system were presented to a wider group of scientists. The results of this are tangible: Denmark and Sweden have expressed their wish to join Euro-Argo ERIC. Denmark presented its application in the Euro-Argo ERIC Council meeting in December 2021 and is now a candidate member. Russian oceanographers have stressed their interest in using Argo in the Arctic and the Baltic Sea.

Arctic research programs planned for the future are making Argo measurements an important aspect of their activities.

5. Next steps

Euro-Argo ERIC scientists will continue to progress on engaging with countries surrounding the Arctic Ocean, relying on the actions started with Euro-Argo RISE project or even beyond.

Once the borders are opened and complete freedom of travel is restored, it is planned to return to the original concepts that were already discussed with potential partners. IOPAN has a long-term cooperation agreement with the Shirshov Institute. It is planned that representatives of IOPAN will visit Moscow to discuss issues related to cooperation in the Arctic. IOPAN conducted preliminary talks on signing a Memorandum of Understanding with AARI. They were to be continued during the meeting in Sopot, which did not take place. Therefore, we believe that organizing such a meeting is important. AARI has its own Arctic-going vessels and is considering the possibility of joint launching floats in the Arctic. We believe that further contacts are needed and that they will pave the way for wide use of Argo across the whole Arctic in the future.

BSH has been in contact with the Alfred Wegener Institute (AW) in Bremerhaven during 2021 and has participated in their meetings about forthcoming research cruises in the Arctic in the context of the ArcWatch cruises. This provided the opportunity to inform the international consortium present at the meeting about successful pilot deployments in the Arctic and was met by great interest by the participants. Links have been established already in task WP5.1 with the NABOS consortium (Nansen and Amundsen Basins Observational System, <https://uaf-iarc.org/nabos/>) to get access to their CTD data and could be explored further for deployment opportunities. Scientists from Sweden also expressed their interest in the float technology and got experience with recent deployments of Argo in the Weddell Sea. Even if not in the Arctic, this data, once ingested in the GDAC, will be a step further for the integration of Sweden in the ERIC.

The beginning Ocean Decade (Decade for Ocean Science of Sustainable Development 2021-2030) should help strengthen contacts and increase Argo activity in the Arctic. A similar boost occurred in



2008 during the Polar Year. Over the coming ten years the decade is anticipated to mobilise new opportunities for collaborations and partnerships among coastal, marine and maritime rights holders and stakeholders, based on a shared understanding of the need for joint global efforts to achieve the Sustainable Development Goals for all regions of the world (Ocean Decade - Arctic Action Plan). This may provide opportunities for better contact not only with scientists, but also with politicians and decision-makers. A good start to such activity was the Marginal Seas Political Event, organized within the framework of Euro-Argo RISE, WP6.

The Arctic region is currently experiencing dramatic changes as a consequence of climate change. Ocean is the most important component of the Earth's climate. Especially in the Arctic the climate change is pronounced and fast due to the Arctic Amplification phenomenon. That is why Argo data from this region is especially needed - for understanding the process of sea ice vanishing, ocean heat content calculations, potential changes of the oceanic circulation. Argo data will also be extremely useful in operational activities - for better weather and oceanographic forecasts.

It is therefore possible and necessary to extend the scope of Argo research in the Arctic. However, this should be associated with technological advances, including the development of new, cheaper shelf floats with a life cycle of 1-2 seasons. These problems were partially addressed in the E-AIMS project reports. New funding opportunities and further discussions with manufacturers are needed to enhance the technological development needed to extend the Argo program in the Arctic.

References:

Ocean Decade - Arctic Action Plan [Ocean Decade Arctic Action Plan](#)

Marginal Seas political event report [Deliverables - Euro-Argo ERIC](#)

E-AIMS [D2.5.2 Arctic float final evaluation](#)

INTAROS - list of deliverables : <https://intaros.nersc.no/list-of-open-deliverables>

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