Integrated Arctic Observation System

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Data Management Plan V1

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8	AU		**31**	ARMINE	
9	GEUS		**32**	IGPAN	
10	FMI		**33**	U SLASKI	
11	UNIS		**34**	BSC	
12	NORDECO	***X***	**35**	DNV GL	
13	SMHI		**36**	RIHMI-WDC	
14	USFD		**37**	NIERSC	
15	NUIM		**38**	WHOI	
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18	EUROGOOS		**41**	U Laval	
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20	UPM		**43**	NMEFC	
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DISSEMINATION LEVEL		
PU	Public, fully open	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

EXECUTIVE SUMMARY

This document is the updated version of the Data Management Plan (DMP) for the INTAROS project – issued after 24 months of the project. The DMP describes how new datasets collected or generated by partners in the project, will be managed according to guidelines for FAIR data management in Horizon 2020.

The focus areas of INTAROS include Coastal Greenland, North of Svalbard, Fram Strait, the Eurasian Basin, and (5) selected sites in Siberia, Finland, Canada and Alaska. Within these areas, INTAROS partners are collecting new observations and generating high-level data products from different spheres (themes): (1) Atmosphere, (2) Ocean, (3) Sea ice, (4) Marine ecosystems, (5) Terrestrial, (6) Glaciology, (7) Natural hazards, (8) Community-based monitoring. Areas of interest include:

Datasets collected or generated within these spheres by the time of writing are summarised in this document, based on the deliverables completed by month 24 in WP 2 ("Exploitation of existing observing systems"). Datasets prepared for distribution in WP 2 have also been registered in the INTAROS Data Catalogue, available at https://catalog-intaros.nersc.no/. This data catalogue will be updated with new datasets collected or generated during the remainder of the INTAROS project. This includes new datasets collected in WP 3 ("Enhancement of multidisciplinary in situ observing systems") and WP 4 ("Enhance community-based observing programs for participatory research and capacity-building").

This DMP recommends standards for metadata and data standards that INTAROS partners should prepare their datasets in, to make it easier for other scientists and stakeholders to reuse the data. Open source tools can help scientists generate metadata and data in standard formats, such as Rosetta, GDAL (Geospatial Data Abstraction Library), NetCDF utilities, and widely used programming languages, such as Python, MATLAB and R, offer libraries that can be used to write customised format converter tools. A dataset prepared in NetCDF format can be made publicly available using data publishing tools like the Thredds Data Server (TDS). In November 2018, a webinar was held to exchange experience and build competence in publishing scientific data using Thredds. This activity will be followed up by a Data Management Training Workshop at the upcoming INTAROS General Assembly in January 2019 and complemented with training material prepared as part of the Useful Arctic Knowledge (UAK) Winter School held in Longyearbyen, Svalbard, 3-7 December 2018. Training material prepared for these events will be used to build competence in data management within the INTAROS consortium, to facilitate preparation of INAROS datasets in standard data formats with ample metadata compliant with established standards.

The DMP remains a living document; it will be updated regularly during the project and used actively to ensure that INTAROS datasets are made publicly available. Formal public versions of the DMP will be released in November 2019 and May 2021.

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1. Introduction

The Data Management Plan (DMP) for INTAROS describes how new datasets collected or generated by partners in the course of the project, will be managed according to guidelines for FAIR data management in Horizon 2020 (European Commission, 2016). This includes a plan for preparation of datasets collected or generated in the project in standard formats documented according to best practices, ingestion of the new data in an established data repository, as well as the long-term storage and curation of data.

This document is an updated version of the DMP, issued after 24 months of the project. It provides a summary of datasets produced in the two first years of the INTAROS project, recommendations for data and metadata standards that partners should use to make it easier for other scientists and stakeholders to reuse their datasets, and an overview of capacity building material for data management that is prepared in the INTAROS and Useful Arctic Knowledge (UAK) projects. Scientific datasets collected or machine-generated during project are registered in the INTAROS Data Catalogue, which holds key metadata elements for each dataset (Appendix A). For community-based data special conditions may apply; Appendix B contains the information and consent form for all participants in the community-based activities within INTAROS.

The DMP is a living document; it will be updated regularly during the project and used actively to ensure that INTAROS datasets are made publicly available. Later versions of the DMP will provide further details on new actual datasets as they are collected or generated, as well as the general framework for sustainable data management in INTAROS. Updated public versions of the DMP will be available in November 2019 and May 2021, respectively.

INTAROS project objectives and concepts

INTAROS (Integrated Arctic observation system) is a research and innovation project under the BG-09-2016 call and will run from December 1, 2016 to November 30, 2021. INTAROS is developing an integrated Arctic Observation System (iAOS) by extending, improving and unifying existing systems in the different regions of the Arctic. The iAOS will integrate distributed repositories holding ocean, atmosphere, cryosphere, terrestrial, and community-based data, and provide a common entry point to data originating from a wide range of observation networks, scientific campaigns and satellite missions, as well as new data generated within the project.

Existing observing systems, data repositories and infrastructure available from partners and collaborators will be the building blocks of iAOS. These observing systems and data repositories are assessed in WP 2 (“Exploitation of existing observing systems”). New data and generated products from INTAROS will be stored in an established data repository based on the outcome of this assessment. Thus, INTAROS will not build up a new e-infrastructure for data storage and preservation, but instead capitalize on the many existing research data infrastructures in Europe, US, Canada and Asia, that hold environmental data for the Arctic.

Themes addressed by INTAROS

INTAROS has 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. In addition to data collected and generated by scientists, the iAOS

will also integrate data from local communities. Thus, the themes addressed by INTAROS include:

1. Atmosphere
2. Ocean
3. Sea ice
4. Marine ecosystems
5. Terrestrial
6. Glaciology
7. Natural hazards
8. Community-based monitoring

2. General data management principles

Data management in INTAROS will be carried out in accordance with guidelines for FAIR data management in Horizon 2020 (European Commission, 2016). This means data collected or generated in the project must be:

- F (Findable) – "making data findable, including provisions for metadata"
- A (Accessible) – "making data openly accessible"
- I (Interoperable) – "making data interoperable"
- R (Reusable) – "increase data re-use (through clarifying licenses)"

A key element of making data findable is ensuring that all datasets are accompanied with rich metadata describing the contents and how data has been processed and quality controlled, as well providing a persistent identifier that uniquely identifies every dataset and supports versioning of datasets.

All data generated by the project will be made available according to an Open Data policy in line with the recommendations from Horizon 2020. This will enable external parties the right to access and use the digital datasets created by INTAROS, while respecting general terms and conditions as defined in the Grant Agreement and acknowledging that the originating partner retains the ownership of their datasets. The INTAROS consortium will define an open data policy, as part of its data governance framework. The data governance framework will define a set of guidelines for governance of the datasets generated by INTAROS, taking into account, among others, the needs for documenting data quality, procedures for secure long-term storage and curation, as well as a mechanism for data search, retrieval, and use.

INTAROS will make the datasets collected or generated in the project available in standard data formats, with discovery metadata encoded using standard vocabularies. This enables INTAROS datasets to be easily integrated in the iAOS and contributes to making them interoperable with in other Arctic data portals and services.

Data collected or generated by INTAROS during the planned field campaigns and extensions to ongoing observations will be publicly available without undue delay. Data from community-based monitoring programmes and collaboration with local communities in the project, will be made available as agreed with the respective communities. Access restrictions may apply to community data. This is done to protect the rights and interests of the local communities and the individuals living there. Both scientific and community-based datasets will be accompanied by a data license clearly stating how the data can be used the scientific and wider user community.

Metadata and data standards

To facilitate uniform discovery of multi-source heterogeneous data, iAOS will build on established standards for metadata search and retrieval. iAOS will integrate data from a number of spatial data infrastructures and use best practices for search services using OpenSearch with Geo, Time and EO extensions that allow standardized and harmonized access to metadata and data of data providers. This solution will facilitate the aggregation of results between disparate data providers via OpenSearch common standards, allow search engine discovery (using OpenSearch Description Documents) and, mostly importantly, facilitates smooth integration between related server's OpenSearch implementations

For the INTAROS datasets, partners will use standards such as GCMD DIF and ISO 19115 to hold general descriptive metadata, i.e. discovery metadata, to support flexible search in iAOS. Standard vocabularies such as GCMD Science Keywords and SeaDataNet-2 vocabularies (e.g. for parameter and sensor names, units, keywords) will be used to mark up the metadata in a manner that facilitates machine readable search and retrieval.

To facilitate reuse of a dataset, a more detailed description of its content, including among others, parameters and units used, is needed. Such usage metadata is well defined for some types of data, e.g. physical oceanography data from CTDs and EO data. However, for other types of data, there is a lack of standards. For instance, while GCMD and ISO19115 can represent general descriptive metadata for acoustic data from scientific experiments, there is currently no standard that can fully represent the usage metadata. Thus, standardization of usage metadata is needed to integrate passive acoustic data from distributed ocean acoustics observation networks.

In the NorDataNet project, NERSC has developed a new data format for the acoustically sensed ocean temperatures from the Fram Strait Multipurpose Acoustic system (Yamakawa et al., 2018). This format is based on the NetCDF Climate and Forecast (CF) Metadata Conventions and the metadata structure developed by the OceanSITES program (OCEANSites, 2010). NERSC has developed a second format, also based on NetCDF/CF and OceanSITES, for the ambient noise data from the Fram Strait Multipurpose Acoustic system. The datasets from EC projects DAMOCLES and ACOBAR have been converted to this format and stored at NERSC. During INTAROS, these datasets will be made available in iAOS as well as NMDC.

For the datasets themselves, the following standard data formats are recommended:

- NetCDF/CF (NetCDF/Climate and Forecast metadata convention)
- GeoTIFF
- HDF-EOS (Hierarchical Data Format - Earth Observing System)
- Shapefile
- CSV
- JSON
- GeoJSON

Several of these formats allow for metadata to be encoded as part of the data file(s), which is highly recommended. For the other formats, metadata should be placed in an accompanying file, according to the agreed structure in GCMD or ISO 19115.

Data repositories

INTAROS will not build up new data repositories, but instead rely on some of the many existing data repositories holding Arctic data in Europe, US, Canada and Asia. A major activity in WP2 is to assess the functionality and maturity of a series of potentially relevant data repositories. When this assessment has been completed, the DMP will be updated to reflect the results and make recommendations for where to store the different types of data to be collected or generated during the project. Currently, only general requirements for the data repositories to be recommended for INTAROS datasets can be formulated. Such data repositories must, among others

- Support standard metadata structures such as GCMD and ISO 19115
- Prescribe (or at least strongly recommend) use of standard vocabularies for metadata
- Prescribe (or at least strongly recommend) use of standard data formats (such as listed above)
- Provide an open data policy and a data license for all datasets
- Have an established data governance framework
- Offer secure storage and access mechanisms for scientific and sensitive data
- Have sustained funding for regular operation and updated for the next 10+ years

Long-term plans for data management in a Sustainable Arctic Observing System

In 2014, the Sustained Arctic Observing Networks (SAON) established the Arctic Data Committee (ADC) to map Arctic data management projects and services with their locations and relationships, to identify and promote common metadata elements, to provide a guide on data publication and citation, and to conduct interoperability experiments for selected regions and SBAs (Social Benefit Areas). They also established the Committee on Observations and Networks (CON), to advise the SAON Board on funding, coordinating and extending existing observation systems, and planning for their sustainability. Several Spatial Data Infrastructures (SDIs) and data repositories hold data for either the whole, or part of, the Arctic. These SDIs are operated by different organisations and communities world-wide, making it a challenge to reach agreement on common metadata and data standards, data policies and governance frameworks.

INTAROS has established contact with both SAON committees, ADC and CON, as well as with other initiatives, such as YOPP and GEOCRI, that address data management and interoperability between spatial data infrastructures for Arctic regions. INTAROS continues to work closely with SAON and other initiatives to establish a pan-Arctic Forum that will draw up a roadmap for a Sustainable Arctic Observing System (SAOS). Defining a data governance framework that will address different aspects of data interoperability will be a key element of this roadmap.

3. In situ datasets collected by INTAROS

INTAROS collects data using platforms such as aircraft, stations on land, ice-tethered platform (ITPs), gliders and fixed moorings in WP3 (Enhancement of multidisciplinary in situ observing systems). The data collection in INTAROS is designed to fill selected gaps in the following regions: (1) Coastal Greenland, (2) North of Svalbard, (3) Fram Strait, (4) Eurasian Basin, and (5) sites in Siberia, Finland, Canada and Alaska for terrestrial and atmospheric measurements. Focus is on integration of seismometers and biogeochemical sensors into the existing monitoring programs adding an Arctic component to EPOS and ICOS infrastructures.

In situ observing systems in the Arctic are limited due to logistical constraints and the high cost of deploying and maintaining equipment in this region. The sparseness of in situ data is therefore the largest gap in the overall observing system. Therefore, the in situ data collection activities in INTAROS aim at filling some of these gaps, especially in the ocean which is severely undersampled compared to the other spheres (terrestrial, atmosphere, cryosphere).

During the 2017 and 2018 field season, INTAROS partners have organised or participated in campaigns in Alaska, Eastern Canadian Arctic, Greenland, Fram Strait, North of Svalbard, central Arctic, northern Finland and Siberia. The in situ datasets collected during the above field campaigns will be registered in the INTAROS Data Catalogue once they have undergone quality control and are made available for use by other scientists and stakeholders.

4. Community-based datasets collected by INTAROS

INTAROS partners work with community-based observing systems in two Arctic local communities, Longyearbyen, Svalbard, and Disko Bay, Greenland. The two selected communities are high-risk regions in terms of climate change impacts as well as loss of biological diversity and can potentially benefit significantly from community-based observing programs. Furthermore, the two communities are characterized by economies which will benefit from efficient and low-cost observing programs at local levels.

During workshops and meetings in the two communities INTAROS partners in WP 4 (Enhance community-based observing programs for participatory research and capacity building) have discussed with the local authorities (Governor of Svalbard; Qaasuitsup Municipality) to define a set of topics to be addressed in the project. Based on these topics, relevant existing datasets will be identified, and agreements made to collect new data that can augment the existing records, within the framework of INTAROS and/or existing community-based observation networks. New community-based datasets will also be included in future versions of the DMP and be registered in the INTAROS Data Catalogue.

For community-based observations, it is foreseen that there will be some access and usage restrictions on the collected datasets. This will be clarified when members of the local communities agreeing to participate in the project. INTAROS will take the gender dimension into account when approaching the targeted stakeholder groups, including local communities (Lygre and Sagen, 2017). An important element in involving local community members in data gathering in INTAROS, regardless of gender, is informing of the project objectives and benefits of participation for their community. The first template for information and consent form for involving local communities in data gathering for INTAROS (see Appendix B), is focused on hunting and fishing which is dominated by males. Later in the project, we will define another template to address topics of relevance for females in these local communities. This will be done in collaboration and dialogue with local communities to engage the women.

5. Higher level products based on satellite, in situ and model data

In WP2 (“Exploitation of existing observing systems”), new products derived from existing satellite, in situ and model data are developed and made openly available through existing repositories. Categories of such products include:

- Regionally and seasonally downscaled products based on existing datasets of carbonate system chemistry; nutrients and phytoplankton

- Unified collection of temperature and salinity data from the Arctic Ocean, compiled from a wide range of data sources and thoroughly quality-checked.
- Ecosystem specific model products targeting management and harvesting of living marine resources while protecting the Arctic environment.
- Improved satellite-based ice concentration, ice thickness and ice drift products using new Sentinel data, passive microwave and optical data.
- Integrated ESA Sentinel/Copernicus data with in situ observations and climate modelling to deduce sub-annual mass loss estimates from the Greenland ice sheet at sub-basin scale.
- The Alaskan transect of 5 eddy covariance towers measuring CO2, H2O, CH4 and energy fluxes will be enhanced to provide continuous, year-round data on GHG concentrations and fluxes, as well as active layer depth, water table depth and snow depth.

Higher lever data products currently prepared as part of Task 2.3 is registered in the INTAROS Data Catalogue. More higher-level products will be added to this catalogue as partners develop new algorithms to integrate and synthesize information from time series or multi-source data. In addition, new integrated products will be developed for selected stakeholders in WP 6 (Applications of iAOS towards Stakeholders) using iAOS (WP 5) and model products. These products will also be registered in the INTAROS Data Catalogue.

6. Resources for data preparation and distribution

The costs of making datasets and products obtained within the INTAROS project available in standard formats with ample metadata, and deposit these in an approved data repository, are eligible costs under the Horizon 2020 Grant Agreement. The respective data owners in the INTAROS consortium are responsible for ensuring that their datasets and products are uploaded to one of the existing data repositories recommended by the assessment in WP2. In general, all data and products obtained within INTAROS should go into a secured and long-term storage. In cases where the cost and potential value for long-term storage is questioned (e.g. erratic data), the data provider, in dialogue with the INTAROS Executive Board, can decide not to save the data.

Open source tools can help scientists generate metadata and data in standard formats, such as Rosetta, GDAL (Geospatial Data Abstraction Library) and NetCDF utilities. Widely used programming languages, such as Python, MATLAB and R, offer libraries that can be used to write customised format converter tools. Some web sites with training material for metadata and data preparation include:

- DataONE Data Management Planning: https://www.dataone.org/data-management-planning
- DMPTool: https://dmptool.org/
- NMDC and NorDataNet use of Rosetta: http://tomcat.nersc.no/rosetta/
- GDAL documentation and tutorials: https://www.gdal.org/
- NetCDF utilities: ncgen and ncdump
- NetCDF/CF validation: http://puma.nerc.ac.uk/cgi-bin/cf-checker.pl
- Global Change Master Directory (GCMD) Keywords
- Links to Training and reference materials compiled by DCC: http://www.dcc.ac.uk/training/training-and-reference-materials

A dataset prepared in NetCDF format can be made publicly available using data publishing tools like the Thredds Data Server (TDS). In November 2018, a webinar was held to exchange experience and build competence in publishing scientific data using TDS. This activity will be followed up by a Data Management Training Workshop at the upcoming INTAROS General Assembly in January 2019 and complemented with training material prepared as part of the Useful Arctic Knowledge (UAK) Winter School held in Longyearbyen, Svalbard, 3-7 December 2018. Training material prepared for these events will be used to build competence in data management within the INTAROS consortium, to facilitate preparation of INAROS datasets in standard data formats with ample metadata compliant with established standards.

An essential part of a Sustainable Arctic Observation System (SAOS) is long-term and secure preservation of observations and derived products. Monitoring of resources used for preservation of data and products within INTAROS will provide input to the estimation of resources needed for SAOS. This is an important part of the roadmap for SAOS to be developed in WP 1 (Requirements and strategy for Pan-Arctic Observing Systems).

7. Data security

Datasets collected, and data products generated during the INTAROS project will be stored in established data repositories with secured funding for long term preservation and curation. The initial list of recommended data repositories includes (in alphabetical order):

- CERSAT – a data repository of satellite-based products, e.g. Arctic sea ice drift.
- Coriolis GDAC (Global Data Assembly Centre) – for glider data (e.g. ocean temperature, biogeochemistry, and acoustic data).
- European Plate Observing System (EPOS) RI – a distributed network of seismic stations across Europe, and a data infrastructure for long term storage of these data.
- Global Runoff Data Centre (GRDC) – provides access to data from the Arctic-HYCOS observing system (daily and monthly gauged river discharge data from a selection of stations operated by the national hydrological services (NHS) in the Arctic Council member states).
- Integrated Carbon Observation System (ICOS) RI - a distributed network of collection of carbon data across Europe, and a data infrastructure for long term storage of these data.
- Norwegian Marine Data Centre (NMDC) – a national data infrastructure with a distributed network of providers holding data for ocean areas of Norwegian interest, with a long-term mandate to preserve marine data for these ocean areas.
- PANGAEA (Data Publisher for Earth & Environmental Science) is a data centre holding a wide range of environmental datasets; global coverage.
- Sea-Ice Portal of University Bremen (UB) holds long time series of sea ice parameters derived from satellite data (e.g. ice concentration and ice thickness) for polar regions.

Further repositories will be added to this list when the assessment of existing data repositories carried out in WP 2 of INTAROS has been completed. Most of the data and products will be open, but INTAROS will respect the need to restrict access to sensitive data, such as data collected through community-based observations. The ethical aspects of data management in INTAROS are further described in the next section.

8. Ethical aspects

All activities in the proposal meet the national legal and ethical requirements of the 8 Arctic countries. Specifically, the ethics requirements will address: (1) research related to humans, (2) protection of personal data, and (3) third countries.

1. Humans. The procedures and criteria that will be used to identify and recruit research participants for the community observing systems of INTAROS are described below.

a) Procedures: The recruitment will be undertaken by the project in cooperation with representatives of the local communities. Participation will be entirely voluntary. The community members that the project will invite to participate in project workshops, discussions, sharing of knowledge, observations and experience are seen as 'co-creators' (and not as 'objects' of research).

b) Criteria: The project together with representatives of the local communities will identify who among the local communities may be interested in participating. The criteria will be the knowledge and experiences of the community members and their interest in participating. The aim is to obtain the participation of both men and women and different age classes, as they tend to use different natural resources and have knowledge about different topics.

2. Protection of personal data. Below we describe the justification for collection and processing of personal data, the procedures involved, and the information sheet.

a) Justification for collection and processing of personal data: Information on gender, age classes, and the experiences and interest of community members in community-based observing will be used to contact and recruit participants in relation to the community-based observing systems. Aside from this, personal information is not used in the project. No further personal data are collected.

b) Procedures: The project together with representatives of the local communities will identify who among the local communities may be interested in participating. The criteria will be the knowledge and experiences of the community members and their interest in participating. The aim is to obtain the participation of both men and women and different age classes (as they tend to use different natural resources and have knowledge about different topics). Information on gender, age, and their experiences and interest in community-based observing is not stored. **The project will comply with the EU directive on data protection** and with any updates it might receive during the life time of the project.

c) Templates of the information sheet/informed consent: The information sheet/ informed consent form that will be communicated to the participants is provided in Annex 2 in the Description of Action.

d) The participants will be compensated for the time they use on community-based observing. In each area, *every participant will be treated equally favourable and they will obtain the same daily compensation, irrespective of personal characteristics,* e.g. religion, gender or age. The project has set aside funding for compensating community members for lost work-time for the time they spend on community monitoring activities in the two focal communities of community-based observing in INTAROS: Longyearbyen in Svalbard and Disko Bay in Greenland.

3. Third countries. The ethical standards and guidelines of Horizon2020 will be rigorously applied, regardless of the country in which the research is carried out. For the activities in Svalbard, the project will need a research permission from the local authorities. The project will obtain the research permission from the local authorities in Svalbard before the start of the research. The project will keep these permissions available at any time if needed for the European Commission representatives or for ethics reviewers.

9. References

European Commission, 2016. H2020 Programme Guidelines on FAIR Data Management in Horizon 2010. Version 3.0. 26 July 2016.

Lygre, K. and H. Sagen, 2017. INTAROS Deliverable 8.2 Gender and diversity action plan.

OceanSITES (2010) OceanSITES User's Manual NetCDF Conventions and Reference Tables. Version 1.2. June 29, 2010.

Yamakawa, A., Dushaw, B., Sagen, H. and T. Hamre (2018). Data standardization for long-term underwater acoustic observation - Ocean temperature and ambient noise data in Fram Strait, NERSC Technical Report No. 391, Version 1.0, 31 May 2018.

Appendix A. Template for dataset descriptions.

Table 1. Template for describing datasets in the INTAROS Data Catalogue.

Description	Value
Title:	Short text naming the dataset and outlining its content.
Abstract:	Short description of contents of dataset, how data was collected or generated, what processing steps data have undergone, quality control procedures applied, estimated uncertainty.
Parameter name(s):	List of parameters contained in the dataset.
Project/Program name(s):	Name of project(s)/program(s) that supported data acquisition.
Observing system:	Name of observing system that collected the data.
Tags:	Keywords associated with the dataset. Supports fast search.
License:	License under which the dataset is made available.
Organisation:	Name of the organisation owning the dataset.
Source:	Online access point for dataset, e.g. URL to a Thredds server.
Version:	Version of the dataset.
Principal Investigator:	Name of principal investigator(s).
PI e-mail:	Email address of principal investigator(s).
Data Curator:	Name of data curator for the dataset.
Data Curator E-mail:	E-mail address of the data curator.

Appendix B. Information and consent form for participants in community-based observing

Monitoring in (..name of area..) of natural resources by local people for improved management

Background. The climate is changing. Many people in the Arctic face huge challenges. They rely on natural resources for food, income or both. Maintaining life requires observation of the environment.

Scientific knowledge of the environment is incomplete. Scientific monitoring in the Arctic is difficult. Local herders, fishers, hunters and other environmentally interested people observe the environment all year-round. Their observations and knowledge are, however, not consistently quantified, analyzed, or used for resource management.

INTAROS is a new international project. The project aims at developing an Arctic observation system to improve resource management. The observation system will be based on both community members' and scientists' monitoring. With support from the European Union, the project runs for 5 years from 2016 to 2021. This form is about the community-based monitoring activities of INTAROS. If you are interested in participating in the community-based monitoring activities of INTAROS, it is necessary for us that you fill out the form.

What. A simple system for community-based monitoring by herders, fishers and hunters of:

- Animals that you hunt (such as geese, ducks, foxes),
- Attacks by predators,
- Fishing activities and fishing methods,
- Quality of pasture and reindeer conditions in your area,
- Use of resources in your area by people from within and outside community,
- Changes in climate and the environment around you (snow, ice, pollution)

Why. Your observations, when regularly collected and shared, can be used to influence the way resources are being used in your area. To improve your livelihoods. To strengthen your rights to the use of the land. Your knowledge is important.
Examples of results may be:

- Better hunting regulations for animals that you hunt (such as geese and other)
- Better management of predators,
- Improved and more sustained access to fish,
- Improved addressing of pollution,
- Better addressing of challenges to management of pasture,
- Better acknowledgement of the rights of your own community to use of your land

How. Five steps:

1. The most experienced and interested herders, fishers and hunters establish a community monitoring group.
2. Notebooks. You record observations of natural resources during field trips

3. You summarize your observations in a summary format at meetings in the group every 3-month, you analyse trends, discuss challenges and management initiatives
4. You provide your summarized information to (..organisation..) and authorities
5. You present key observations at community meetings one time each year

When. Monitoring should only be done as part of your routine herding, hunting or fishing activities. After every field trip you note your observations in a calendar. Every three month you meet with other members of the community monitoring group. You discuss and agree on trends in natural resources. If you want, you propose management actions to (..institution..) and the authorities.

Who. Any local person interested in natural resources of their areas in (..municipality..) can participate. People and communities will decide on their own if they see a benefit in this and if they want to participate in the project. They will decide what they want to monitor. Participation is on a voluntary basis and people are not paid to do the monitoring; they should do it because they think it may help them sustain their resource use.

Questions:

1. Do you agree to participate in this activity? _____
2. Do you agree to be contacted later on, in the context of INTAROS? _____

Personal data will be treated with confidentiality. Participation will be entirely voluntary. Participants in community-based monitoring are free to leave the activity at any time. Just inform the project's contact person.

More information: (..contact person in the local area, institution, telephone numbers..).

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INTAROS

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