

the Nansen LEGACY



The Nansen Legacy Data Management Plan

Technical Documentation



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1 Admin details

Project Name	Nansen Legacy
Funding	Research Council of Norway
Partners	Akvaplan-niva (APN) Institute of Marine Research (IMR) Nansen Environmental Remote sensing Centre (NERSC) Norwegian Meteorological Institute (MET) Norwegian Polar Institute (NPI) Norwegian University of Science and Technology (NTNU) The University Centre in Svalbard (UNIS) University of Bergen (UiB) University of Oslo (UiO) University of Tromsø The Arctic University of Norway (UiT)

This document is to be considered a living document that will be updated twice yearly.

2 Data summary

2.1 Purpose of the data collection/generation

The Nansen *Legacy* comprises a dedicated Norwegian team of research excellence that has been assembled for the specific purpose of the 6-year project period (2018–2023). The Norwegian government has funded a pre-project for 2017 to prepare a project start in 2018.

The *Nansen Legacy* project explores the integrated nature of the environment, climate and the arctic marine ecosystem. The living Barents Sea is evolving under external constraints of physical forcing, and direct and indirect human impacts. The consequent management of the region and resources should be informed by, and based on the past, present and future.

The team reflects the complimentary scientific and logistic capabilities of the eight participating governmental institutions committed to Arctic research, and to the Barents Sea region in particular. The new Norwegian ice-breaker Kronprins Haakon will be a core facility.

The Nansen Legacy will improve the scientific basis for future sustainable management of a region characterised by rapid and unknown changes and unidentified potential for the harvesting of marine resources.

The main principles of data sharing within the Nansen Legacy project is defined in the Nansen Legacy Data Policy.

2.2 Relation to the objectives of the project

The Nansen Legacy project will establish a novel and holistic Arctic research platform and provide the integrated scientific knowledge base required for the sustainable management of the environment and marine resources of the Barents Sea and adjacent Arctic Basin through the 21st century.

The Nansen Legacy will improve, secure and operationalise national data archives and ensure data availability in accordance with national and international standards. A distributed data management system where physically distributed data repositories are forming a virtual data centre with seamless access to datasets regardless of physical location, will support the project by:

1. Unified data discovery through standardised discovery metadata indexed in the SIOS Data Management System.
2. Online access to datasets.
3. Visualisations of datasets.
4. Combination of datasets.

By bringing many types of observations together and asking questions about how these are influenced by each other new insights on the region's role in the Earth system is created.

The *Nansen Legacy* will pursue its vision by addressing the following overarching objectives:

1. Improve the scientific basis for sustainable management of natural resources beyond the present ice edge
2. Characterize the main human and natural influences on the changing Barents Sea ecosystems and their response – past, present, and future
3. Resolve the mechanisms governing the Barents Sea ice cover and climatic state, including predictive capability
4. Optimize use of emerging technologies, logistic capabilities, research recruitment and stakeholder interaction to explore and manage the emerging Arctic

2.3 Types and formats of data generated/collected

Nansen Legacy will collect a wide range of data, including but not restricted to biological information on species in the water masses, and physical, chemical and dynamical features of the ocean, the atmosphere and the cryosphere.

Self explaining file formats (e.g. NetCDF, HDF/HDF5) combined with semantic and structural standards like the Climate and Forecast Convention will be used. Where no clear standard is identified initially, dedicated work is attributed to identifying a common approach for those data.

The Nansen Legacy will gather and make available existing data collected from monitoring programs and research projects focused on the Barents Sea ecosystem over the past decades. Some of these data will be fundamental as reference conditions to assess change. In cases where such data are not already in repositories, attempts will be made to rescue them and make them available as part of the legacy of the project. Joint data rescue efforts with Russian colleagues focusing on oceanographic and atmospheric data from the Barents Sea and Franz Josef Land respectively will also be undertaken. Relevant information held in national and international catalogues, like WMO GTS, Norwegian Meteorological Institute/Arctic Data Centre, Norwegian Polar Institute, Norwegian Marine Data Centre, etc will be made searchable in the same catalogue.

Some data are already existing, some are already being sampled and will be included. Else data will primarily be collected through dedicated cruises with a number of research vessels (primarily RV Kronprins Haakon, RV G.O. Sars, and RV Helmer Hanssen) and through modelling efforts. The cruises will include dedicated field activities in the ice as well.

The total amount of data is yet not known currently in detail. A coarse estimate for the full

project duration is 45 Tb.

The data collected is vital to improve the understanding of the Barents Sea and its role in the climatic system and resource utilisation. This information is of relevance to scientists and management processes for the region.

2.4 Making data findable, including provisions for metadata [fair data]

2.4.1 Discoverability of data

Standardized interfaces to data in combination with standardized documentation makes integration of data between data centres and in scientific work flows possible. Well defined governance structures for data collection and a data management system based on data centres with a long term mandate ensure preservation of the scientific legacy. The metadata driven approach chosen, ensures interoperability with national and international systems and frameworks, including WMO Information System, Year of Polar Prediction (YOPP), and many national and international Arctic and marine data centres. The Svalbard Integrated Arctic Earth Observing System's (SIOS) Knowledge Centre (KC) capitalizes on the above mentioned efforts to provide an integrated data management solution. A dedicated data collection is established for Nansen Legacy. This is available through the [SIOS data search catalogue](#).

2.4.2 Standard identification mechanism

The Nansen Legacy promotes the implementation of Persistent Identifiers at each contributing data centre. Some have this in place, while others are in the process of establishing this.

2.4.3 Naming conventions

Nansen Legacy is promoting utilisation of standards. Geophysical data should be encoded using NetCDF following the Climate and Forecast convention and biological data should be encoded as Darwin Core Archives. Both these standards cover discovery and use metadata aspects.

2.4.4 Search keywords

The initial model is based on GCMD Science Keywords for parameter mapping. Not all data centres use this. Where possible, the central node will map between local vocabularies used by the data centres and the GCMD keywords until a more uniform tagging of data is possible.

2.4.5 Approach for clear versioning

Versioning of data is the responsibility of the contributing data centre. Documentation of

newer datasets should contain references to older versions where necessary. Some data centres have this in place, while others are working on this.

2.4.6 Standards for metadata creation

The central node can consume discovery metadata as GCMD DIF and ISO19115 records (using GCMD keywords to describe variables¹). Support for more formats is considered. For use metadata the Climate and Forecast convention is promoted for geophysical data and Darwin Core for biological data.

2.5 Making data openly accessible [fair data]

The Nansen Legacy embraces an open data policy and all metadata will be available through a dedicated human search interface. Some data may have access restrictions. This may be data that are ethical sensitive, are under processing or that are to be used in e.g. a doctoral dissertation. For the latter two categories, access restrictions will only be imposed for a limited time period. According to the decision of the board (2017-05-02), the embargo period may vary from dataset to dataset, depending on the time required for post-processing and quality assurance. However the basic principle is free and open access as soon as possible, and no later than 4 years after data collection for data used by Ph.D. students. For the first category, this may refer to e.g. information on endangered species in line with the data policies of the International Polar Year and the International Arctic Science Committee. All data will nevertheless be available online for the project participants as soon as technically possible. Data with access restrictions will be handled accordingly by the responsible data centre.

2.5.1 How the data will be made available

Data are made available by the responsible data centre. No data is handled centrally, only services towards the data. Initially a wide range of access solutions and formats will be used. To facilitate synthesis products, standardisation of data access interfaces and linkage to the Common Data Model through OPeNDAP² is promoted. This enables direct access of data within analysis tools like Matlab, Excel³ and R.

The intention is to use internationally accepted open standards (as mentioned above) which have a wide range of open software tools available.

1 This is in line with SIOS, NorDataNet and NMDC approaches.

2 <http://apievangelist.com/2014/12/05/history-of-apis-noaa-apis-have-been-restful-for-over-20-years/>

3 <https://www.opendap.org/support/faq/general/use-spreadsheet>

2.5.2 Deposition of data and associated metadata, documentation and code

Metadata and data for the datasets are maintained by the responsible data centres, metadata supporting unified search is harvested and ingested in the central node. Dedicated GitHub areas has been set up for sharing software by both SIOS, NMDC and NorDataNet. These will be used where necessary, but much of the software is already open source and in well maintained repositories. The addresses of these repositories will be collected and published.

2.5.3 Access in case of restrictions

Datasets with restrictions are initially handled by the responsible data centre. Generally the metadata will be searchable and contain information on how to request access to the dataset.

2.6 Making data interoperable [fair data]

2.6.1 Data and metadata vocabularies

The current situation for the legacy datasets of Nansen Legacy which is supported by the contributing data centres is that there is no common level of interoperability at the data level. Some data centres support OPeNDAP and use metadata following the Climate and Forecast conventions, but not all.

At the metadata level, interoperability is better as most of the data centres do support GCMD DIF with the appropriate controlled vocabularies.

A system for semantic translation of annotated discovery metadata content is under development, but a full overview of the controlled vocabularies applied are not available in machine readable form, neither are they cross walked. However, more important for much of the *Nansen Legacy* data no controlled vocabularies are used. This is a requirement for the new data that are collected.

Initially GCMD Science keywords will be used, but this has to be evaluated continuously. Currently mapping between GCMD and CF keywords is supported (but needs to be updated).

2.7 Increase data re-use (through clarifying licenses) [fair data]

The *Nansen Legacy* data policy promotes free and open data sharing. Each dataset need a license attached. The recommendation is to use [Creative Commons](#) attribution for data. This is compatible with the Norwegian License for Public Data (NLOD).

2.7.1 Availability for re-use

Similar to the SIOS, the *Nansen Legacy* is promoting free and open access to data. The general principle is that all data shall be public available as soon as possible.

Scientific datasets may be given an embargo period (see the Nansen Legacy Data Policy for details) to ensure the publication process for the data provider. However, independent of the embargo period, all data shall be available online for the project partners, regardless their affiliation.

The embargo period will vary depending on the dataset and the time required to complete and quality assure the data. The maximum embargo period allowed is 4 years and this is only used for datasets used by Ph.D. students. Within the embargo period, information on the dataset shall be available through searchable discovery metadata. This allows direct contact at the scientific level to explore potential reuse of data within the embargo period.

Concerning data generated by the permanent instrumentation of the vessels (hereafter referred to as standard cruise data), these data shall be public available within 1 week after the cruise⁴.

After the *Nansen Legacy* project has ended, data are still maintained by the contributing data centres and availability of data depends on the resources and priorities of those data centres.

2.7.2 Data quality assurance processes

Nansen Legacy relies on the data quality assurance processes implemented at each contributing data centre and by the Principal Investigators involved.

2.7.3 Time period for which the data will remain re-usable

Observations should be available at any time, for simulations or analysed products, the norm will be 10 years. Exceptions from this is decided by the Principal Investigator or the project steering board.

2.8 List of datasets, status and responsibilities

2.8.1 List of research cruises

The list of cruises where data will be generated is provided in Table 1.

⁴ This is applying to raw data which may require further quality control and processing to achieve a useful dataset.

Table 1: List of research cruises and their status concerning data management. Information in parentheses in column marked Cruise is Vessel abbreviation⁵/cruise number.

#	Cruise	Start date	End date	Status	Raw data in NIRD	Published data
1	Joint cruise 1-2 (KPH/2018707), Table 4, Table 5	2018-08-06	2018-08-23	Completed	Yes	
2	Physical process cruise (KB/2018616)	2018-09-11	2018-09-23	Completed	Yes	
3	Paleocruise (KPH/2018709)	2018-09-25	2018-10-19	Completed	Yes	
4	Seasonal study Q3 (KPH/2019706) Table 6, Table 7	2019-08-04	2019-08-27	Completed	Yes	
5	Mooring service/A-Twain (KPH/2019710) Table 8. Table 9	2019-11-12	2019-11-27	Completed	Yes	
6	Seasonal cruise Q4 (KPH/2019711) Table 10, Table 11	2019-11-28	2019-12-17	Completed	Yes	
7	Seasonal cruise Q1	2020-03-05	2020-03-29	Cancelled	NA	
8	Seasonal cruise Q2	2020-04-14	2020-05-07	Cancelled	NA	
9	Mooring service (GOS/2020113)	2020-10-06	2020-10-26	Completed	In progress	
10	Winter process cruise	2021-02-09	2021-03-01	Confirmed		
11	Seasonal cruise Q1	2021-03-01	2021-03-25	Confirmed		
12	Seasonal cruise Q2	2021-04-27	2021-05-20	Confirmed		
13	Joint cruise 2-1	2021-07-12	2021-07-29	Confirmed		
14	Joint cruise 2-2	2021-08-22	2021-09-24	Confirmed		
15	Mooring service/A-TWAIN	2021-11-04	2021-11-23	Confirmed		

2.8.2 Standard cruise data

Standard raw cruise data shall be publicly available within 1 week after the cruise ends. Standard cruise data are published through various frameworks (e.g. some through

⁵ Kronprins Haakon (KPH), Kristine Bonnevie (KB), G.O. Sars (GOS).

Copernicus Marine Environmental Monitoring Service, and some through WMO Global Telecommunication System). These data, as initially published are not always identified as Nansen Legacy datasets. Work is in progress to improve tagging in this publication process. A list of standard cruise data is provided in Table 2. All datasets have a space/time location. The time specification is coordinated between all logging systems. Responsibility indicates the institution and PI that has the primary responsibility for timely publication of the data. Some data are in raw versions, and post-processing is required before use.

Table 2: List of standard cruise data.

Dataset	Parameters	Responsibility	Embargo
Cruise logger	Date and time Ship heading and speed Ship position Ocean depth	IMR, Helge Sagen	None
Thermosalinograph	Date and time Ship position Surface temperature Surface salinity Fluorescence (4m) Density (4m) CDOM	IMR, Helge Sagen	
xCO ₂ , oxygen	Date and time Ship position xCO ₂ in surface water dissolved oxygen	NPI, Agneta Fransson	ICOS project, public after substantial QC, restricted for use by PD
ADCP	Date and time Ship position Ocean current profile	Responsible oceanographer on the cruise if embargo, IMR by Helge Sagen if not	None/Restricted access to data from RF1 process and mooring service cruises (list of cruises...) for use by PhD/PD candidates
CTD	Date and time Ship position Ocean profiles of pressure, temperature, salinity, density and other sensors on the CTD (e.g. oxygen, chl fluorescence, CDOM)	Responsible oceanographer on the cruise if embargo, IMR by Helge Sagen if not	None/Restricted access to data from RF1 process and mooring service cruises (list of cruises...) for use by PhD/PD candidates
Echosounder (EK80)	Date and time Ship position EK80 EM302 (multibeam, bottom topography)	IMR, Helge Sagen	None
Multibeam echosounder (EM302)		IMR, Helge Sagen	Embargo until data are published by PhD candidates. ⁶

⁶ Contact Katrine Husum and Matthias Forwick for details.

Dataset	Parameters	Responsibility	Embargo
TOPAS		IMR, Helge Sagen?	Embargo until data are published by PhD candidates. ⁶
Weather station	Date and time Ship position Wind speed and direction Relative humidity Mean sea level pressure Air temperature Photosynthetic Active Radiation Solar incoming broadband irradiance	MET, Øystein Godøy	None
Radiosonde	Date and time Ship position Atmospheric pressure, temperature and humidity profiles	IMR, Helge Sagen	None

2.8.3 Ad hoc datasets

The listing of these datasets is updated every 6 months and details are provided in Appendix 1 Ad hoc datasets. The information provided for each cruise is yet not complete and may be updated in future revisions of the document.

2.8.4 Interaction between work packages

Some inconsistency between datasets produced by work packages and expected datasets by other work packages has been identified, but the current overview is too sparse to identify consequences for the project. The gap is especially related to expected input in RF 3 and the output produced by RF 1. This will be elaborated (and if possible mitigated) when more details are available.

3 Allocation of resources

3.1 Costs and available resources for making data FAIR

It is not possible in the current situation to estimate the total cost of making *Nansen Legacy* data FAIR. Part of the reason is that is an ongoing effort at the national level and that the cost

thus will be shared with other national efforts. Basically, the resources allocated to data management within *Nansen Legacy* project are attributed to direct follow up on the data collected (i.e. preparation, documentation etc), data rescue for some specific datasets and tailoring of specific products based on the data. Costs for the sharing and preservation is covered through other activities.

3.2 Responsibilities for data management in the Nansen Legacy

The backbone of the data management system is the institutional archives (se Table below) and the National Research Data Archive (NIRD). These perform the data curation which includes life cycle management, data documentation, publication and preservation. Above these there is a number of national and international virtual data management systems. In particular this refers to the Norwegian Marine Data Centre (NMDC) and the Norwegian Scientific Data Network (NorDataNet). These are funded by the Research Council of Norway, and cooperates with the institutional archives and coordinate interoperability efforts. All data will be searchable through the data catalogue of Svalbard Integrated Arctic Earth Observing System (SIOS) which links activities to European and Arctic data management activities.

The following data centres are involved:

Data centre	URL	Contact	Comment
Norwegian Marine Data Centre	http://www.nmdc.no/	Helge Sagen	Subsystem is currently under development. Integrates information from many partners. Discovery metadata is served through OAI-PMH, the interoperability at the data level is varying from FTP with no standardisation to OPeNDAP and NetCDF-CF.
Norwegian Meteorological Institute	http://adc.met.no/	Øystein Godøy	This subsystem is integrated through NorDataNet. Discovery metadata interfaces are available, data interoperability is supported using OGC WMS and OPeNDAP. Will integrate relevant data from WMO GTS and NBS (Sentinel).

Data centre	URL	Contact	Comment
Norwegian Polar Institute	http://data.npolar.no/	Stein Tronstad	Metadata interoperability interfaces are available. Some challenges for data interoperability.
Norwegian Scientific Data Network	https://www.nordatanet.no/	Øystein Godøy	Interoperability interfaces are supported for discovery metadata and data through OAI-PMH, OGC WMS and OPeNDAP. Institutional archives that will connect (e.g. MET, HI, NP, NERSC and NILU) will have to support metadata and data interoperability in the long run (OAI-PMH, GCMD DIF or ISO19115 and OGC WMS and OPeNDAP). The national Research Data Archive hosted by UNINETT Sigma2, NIRD is under integration with Nansen Legacy through NorDataNet.
SIOS	https://www.sios-svalbard.org/	Øystein Godøy	SIOS will provide the single entry point to Nansen Legacy data. Nansen Legacy will be incorporated as a data collection in the system. This is available here .
University of Bergen	https://www.bcdc.no/	Benjamin Pfeil	OAI-PMH metadata interface available. Plans for OPeNDAP support.
UiT The Arctic University of Norway	https://opendata.uit.no	Rahman Mankettikara	OAI-PMH interface available for metadata interoperability.

Each data centre is responsible for accepting, managing, sharing and preserving the relevant datasets. Concerning interoperability interfaces the following interfaces are required:

1. Metadata

1. [OAI-PMH](#) serving either [CCMD DIF](#) or [ISO19115](#) minimum profile with [GCMD Science Keywords](#).
2. The project relies on tagging of datasets with “Nansen Legacy” in the project element of the metadata (both for long and short name).
2. Data (will also use whatever is available and deliver this in original form, for those data no synthesis products are possible without an extensive effort)
 1. OGC WMS (actual visual representation, not data)
 2. [OPeNDAP](#)

An open question currently is related to the data flow from RV Kronprins Haakon to the involved scientists.

The three owning and operating institutions of Kronprins Haakon (IMR, UiT, and NPI) will develop the necessary infrastructure to receive and manage data from the on-board instrumentation, under the umbrella of the Norwegian Marine Data Centre (NMDC). This system is however yet not fully developed and implemented. Thus, the project is partly relying on existing data streams at IMR and ad hoc solutions covering known gaps. For long term archiving of the *Nansen Legacy* data, mandated data centers and NIRD (Norwegian Infrastructure for Research Data) will be used. Traceability and cross-referencing of data, documentation, and software are ensured through the use of Digital Object Identifiers (DOIs) for all released data, issued through the national service implemented by UNIT. The primary services to the user community will include data discovery, visualization, retrieval and streaming to analysis tools, transformations (subsetting by time, space, and variables, reformatting, reprojecting, etc.), and data upload. Proper data management starts when collecting data, thus a primary focus of this RA is to develop guiding documentation and tools that help scientists manage data properly from the beginning, simplifying structured data management efforts and quality control of the data.

3.3 Costs and potential value of long term preservation

In the current situation there is no overview of the costs of long term preservation of data as this is the responsibility of the contributing data centres and the business model for these differs. This information will be updated during the project, to the extent it is possible to provide an accurate estimate.

4 Data security

4.1 Data recovery, secure storage and transfer of sensitive data

Data security relies on the existing mechanisms of the contributing data centres. The Nansen Legacy recommends to ensure the communication between data centres and users with secure HTTP. Concerning the internal security of the data centre, the Nansen Legacy recommends the best practises from [OAIS](#).

The central node relies on secure HTTP traffic, but not all contributing data centres support this yet. This is expected to evolve during implementation.

5 Ethical aspects

The Nansen Legacy is aligned with ethical considerations outlined by the [IASC Statement of Principles and Practises for Arctic Data Management](#) (April 16, 2013). In particular, The Nansen Legacy is supporting the IASC objective of “*Provide for the freedom and ethical conduct of science*” and adopts the IASC concept of “*Ethical Open Access*”. Within the IASC section on Ethical Open Access it specifically stated that the only exceptions to full, free and open access to data are:

- *where human subjects are involved, confidentiality shall be protected as appropriate and guided by the principles of informed consent;*
- *where local and traditional knowledge is concerned, rights of the knowledge holders shall not be compromised;*
- *where data release may cause harm, specific aspects of the data may need to be kept protected (for example, locations of nests of endangered birds or locations of sacred sites).*

6 Other

6.1 National structures used for data management

The *Nansen Legacy* data management is as mentioned above based on existing institutional systems as well as national and international research infrastructures (NMDC, NorDataNet and SIOS).

Appendix 1 Ad hoc datasets

Ad hoc datasets are collected on cruises (Table 1), based on experiments, the results of numerical modelling⁷ and/or from remote sensing activities⁸. A preliminary list of ad hoc datasets was prepared during the preparation of the proposal (Table 3) and the level of information provided differs. In particular, the concept of dataset differs between the responses received. The list is kept while working on a more detailed dataset overview in the form of tables like Table 11. At present, the full overview of datasets has been collected for the Joint Cruise (JC1-2), , the Mooring service/A-Twain cruise and the two seasonal cruises (Q3, Q4; Table 7-Table 11). Similar lists from other cruises and activities are continually being collected and will be updated in new versions of the DMP.

- 7 Concerning numerical simulations, identification of the subsets of simulations that will be published is ongoing. Full datasets are normally available upon request. This is normal procedure for simulated datasets due to the volumes created and since some variables are for internal use by the model development teams.
- 8 Concerning remote sensing products, identification of the end products that will be published is ongoing.

Table 3: Preliminary list of datasets from the planning of the project.

Dataset	Parameters	Responsibility	Embargo
About 25 datasets	Moorings producing temperature, salinity, oxygen, ocean currents, ice thickness, turbulence ++ Process studies producing irradiance, atmospheric fluxes, various fluxes under sea ice ++ Numerical simulations using ROMS+CICE	RF 1 (Arild Sundfjord)	No
About 3 datasets	- Persistent Organic Pollutants - Abiotic matrixes - Responses to Persistent Organic Pollutants in organisms - Health parameters for organisms	RF 2 (Ketil Hylland)	For some
About 9 datasets	- Abundance/biomass, point samples from cruises, species list (max. 2000 rows) times one or multiple columns for each station, georeferenced species occurrences; chlorophyll concentrations from standard depths at station locations. - Rate measurements, few data points from experiments on cruises and in labs. Experimental results on growth rates, respiration rates, egg production rates and such; vertical flux rates from sediment traps; in situ primary production measurements. - Sequences, can range from short sequences of environmental, mixed samples, to full genomes of individual species; should be interoperable with Genbank. - Stable isotopes, sample identifier linked in relational data base to station file and taxon (species name) with isotopic ratio, signal strength, reference standard etc. in separate columns; standard delta notation relative to reference standards. - Models, food web model could have compartments with topology (who eats who), rates (ingestion, egestion, productivity etc.). - Chromatographs, output from chemical analyses of e.g. plant pigments, fatty acid profiles, etc. - Photos, videos, may include photo documentation of biota, underwater imagery, video-plankton recorder etc.	RF 3 (Randi Ingvaldsen)	For some

Dataset	Parameters	Responsibility	Embargo
	- Acoustics, possibly long-term recordings on moorings (raw-data and ascii-files). Acoustic recordings of zooplankton, fish, marine mammals; multiple frequencies.		
Uncertain, expected around 10 datasets	Auxiliary data necessary for cruise preparations (including weather forecasts, satellite products, ice charts).	RF A (Øystein Mikelborg)	No
About 100 datasets	Biological, chemical, physical data from ROV, AUV, gliders, buoys and UAVs	RF C (Inger Utne)	For some

Table 4 Responsibilities for information from the permanent instrumentation at cruise #1 in Table 1.

Cruise participant	PI	Dataset	Publishing data	Ask for embargo of data?	If yes, why?	Comments
KHP instrumentation	Randi Ingvaldsen	Acoustic data surveying fish and zooplankton, logged continuously	2020			EK80
KHP instrumentation	Helge Sagen	Multibeam mapping	2020	Yes	PhD student project	EM302
KHP instrumentation	Øystein Godøy	Air and sea temperature (8 m depth), air pressure, wind speed and direction, relative humidity and solar radiation logged continuously	2020	No		Weather station
KHP instrumentation	Helge Sagen	Temperature, salinity, density and fluorescence at 4m, logged continuously	2020	No		Thermosalinograph
KHP instrumentation	Randi Ingvaldsen	Currents in the upper ~500 m legged continuously	2020			ADCP 150 kHz
KHP instrumentation	Agneta Fransson	pCO ₂ in air and ocean, dissolved O ₂ in ocean, saturation of O ₂ in ocean, sea water temperature	2021	Yes	PhD student project	pCO ₂ underway, takes time to quality-check data thus later publication
KHP instrumentation	Randi Ingvaldsen	Temperature, salinity, density fluorescence, oxygen profiles from NLEG stations	2020			CTD

Table 5: Datasets defined for cruise #1 in Table 1.

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Anna Vader/Tove M. Gabrielsen	Microbial eukaryote diversity across season based on rRNA metabarcoding	2019-20	RF3	2020	2020	No	
Anna Vader/Tove M. Gabrielsen	Metatranscriptomics and quantification of gene expression of select genes across season	2020	RF3	2021	2021	No	
Bente Edvardsen; Anna Vader; Tove M. Gabrielsen	Protist diversity, proportional abundance, seasonal dynamics and distribution	2019-2021	RF3	2020	2020-2021	Yes	PhD-project
Anna Vader	Chl a total and > 10um biomass	During cruise	RF3	2020	2020	No	
Camilla Svensen	Msozoplankton species abundances	2019	RF3	2024	2024	Yes	PhD project
Emmelie Åström/Bodil Bluhm	Food web and environmental variables	2018	RF3	2020	2021	No	
Emmelie Åström/Bodil Bluhm	Environmnetal variables (benthos)	2019	RF3	2020	2021	No	
Emmelie Åström/Bodil Bluhm	Environmnetal variables (benthos)	2019	RF3	2020	2021	No	
Emmelie Åström/Bodil Bluhm	Environmnetal variables (benthos)	2019	RF3	2020	2021	No	
Emmelie Åström/Bodil Bluhm	food web	2020-2021	RF3	2021	2021-2022		
Emmelie Åström/Bodil Bluhm	food web	2020-2021	RF3	2021	2021-2022		

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Emmelie Åström/Bodil Bluhm	food web	2020-2021	RF3	2021	2021-2022		
Espen Bagøien	Macroplankton species abundances, biomass and lengths	During cruise	RF3	2021	2021	Yes	PD-project
Espen Bagøien	Macroplankton species abundances, biomass and lengths	2019-09	RF3	2021	2021	Yes	PD-project
Gunnar Bratbak /Aud Larsen	Abundance of pico- and nanophytoplankton, HNF, synecococcus, bacteria and virus pr. mL	2019-20	RF3	2020	2021	No	
Gunnar Bratbak	Bacterial carbon production	2019-20	RF3	2020	2021	No	
Gunnar Bratbak / Lise Øvreås	Prokaryote diversity across season based on rRNA metabarcoding	2020-21	RF3	2021	2022	No	
Gunnar Bratbak /Ruth-Anne Sandaa	Viral diversity	2020-21	RF3	2021	2022	No	
Gunnar Bratbak / Tatiana Tsagaraki / Jorun Egge	Concentration of total particulate O, P, Na, Mg, Si, S, Ca, Mn, Fe, Zn (μM)	2019-20	RF3	2020	2021	No	
Gunnar Bratbak	particulate organic carbon and nitrogen (in $\mu\text{g C}$ or N L^{-1})	2020	RF3	2021	2021	No	
Bente Edvardsen, Luka Supraha,	LM (live), SEM, TEM (fixed) micrographs of protists. Taxonomic descriptions	2018-2020	RF3		2020-2022	Yes, possibly	PhD-project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Bente Edvardsen, Luka Supraha,	Microalgal strains, morphological, genetic (rDNA operon), phylogenetic and physiological characterisation.. Contribute to reference sequene databases.	2018-2020	RF3		2020-2021	Yes, possibly	PhD-project
Bente Edvardsen, Luka Supraha,	Microalgal strains, morphological, genetic (rDNA operon), phylogenetic and physiological characterisation.. Contribute to reference sequene databases.	2019-2020	RF3		2021-2022	Yes, possibly	
Luka Supraha, Karoline Saubrekka, Bente Edvardsen	Coccolithophore diversity, dynamics and distribution	2019-2020	RF3		2021	Yes, possibly	PhD-project
Murat V. Ardelan	Total and dissolved trace elements transect profile	2019-2020	RF2	2020	2021	yes	PosDoc work
Murat V. Ardelan	Variation, composition, and distribution of DOM and TOC, with ancillary POC and DOC measurements	2019-2020	RF2	2020	2021	yes	phd project
Murat V. Ardelan	Total and methylated Hg transect profile	2019-2020	RF2	2021	2021	yes	phd project
Raphaelle Descoteaux	Species composition of meroplankton communities from DNA barcoding	2019-2021	NA	NA	NA	NA	NA
Raphaelle Descoteaux	Species composition of benthic invertebrate juveniles using DNA barcoding	2019-2021	NA	NA	NA	NA	NA

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Raphaelle Descoteaux	Species composition of benthic invertebrate juveniles using DNA barcoding	2019-2021	NA	NA	NA	NA	NA
Raphaelle Descoteaux	Contributing DNA barcodes of Arctic benthic species to the Barcode of Life	2018-2019	NA	NA	NA	NA	NA
Raphaelle Descoteaux	Contributing DNA barcodes of Arctic benthic species to the Barcode of Life	2018-2019	NA	NA	NA	NA	NA
Sissel Jentoft	Whole-genome sequences	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project
Sissel Jentoft	Whole-genome sequences	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project
Sissel Jentoft	Population-genomic statistics	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project
Tobias Vonnahme/ Marti Amargant/ Rolf Gradinger	P vs I curve (in $\mu\text{g DIC L}^{-1} \text{h}^{-1}$)	2019	RF3	2020	2020	Yes	Martis PhD project
Tobias Vonnahme/ Marti Amargant/ Rolf Gradinger	Photosynthesis, Ammonia oxidation, bacterial production (in $\mu\text{g DIC L}^{-1} \text{h}^{-1}$)	2019	RF3	2020	2020	Yes	Martis PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Tobias Vonnahme/ Marti Amargant/ Rolf Gradinger	Ammonia oxidation, bacterial production (in $\mu\text{g DIC L}^{-1} \text{h}^{-1}$)	2020-2021	NA	2020/2021	2020/2021	No	
Miriam Marquardt, Rolf Gradinger, Bodil Bluhm	Ice meiofauna abundance/taxonomy	2020-2023	RF3	2020-2023	2022	Yes, possibly	
Rolf Gradinger	concentration of gel particles	2020					
Marit Reigstad, Yasemin Bodur	Chlorophyll a	During cruise	RF3	2020	2022	yes	PhD-project
Marit Reigstad, Yasemin Bodur	Chlorophyll a $>10\mu\text{m}$	During cruise	RF3	2020	2022	yes	PhD-project
Marit Reigstad, Yasemin Bodur	POC/PON	2019-21	RF3	2020	2022	yes	PhD-project
Marit Reigstad, Yasemin Bodur	stable isotopes	2019-21	RF3	2020	2022	yes	PhD-project
Marit Reigstad, Yasemin Bodur	phytoplankton communities	2019-21	RF3	2020	2022	yes	PhD-project
Marit Reigstad, Yasemin Bodur	fecal pellets	2019-21	RF3	2020	2022	yes	PhD-project
Rolf Gradinger/ Ulrike Dietrich/ Tobias Vohnahme	Exopolymer particle community	2020	RF3	2020	2022	yes	PhD-project
Rolf Gradinger/Ulrike Dietrich/ TomasVohnahme	Exopolymer particle	2020	RF3	2020	2022	yes	PhD-project
Melissa Chierici, Agneta Fransson	dissolved oxygen, pH, dissolved inorganic carbon, alkalinity, nutrients, d18O	analysed pH, AT,	RF2	2020	2021	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
		DIC onboard, O2 (winkler) on select stations					
Melissa Chierici, Agneta Fransson	pH, dissolved inorganic carbon, alkalinity, nutrients, d18O	analysed pH, AT, DIC onboard, O2 (winkler) on select stations	RF2	2020	2021	No	
Agneta Fransson	High frequency pCO2 and O2	data QC checked in 2019	RF2	Belong to other project ICOS	Await approval ICOS project	For collaboration on data contact Agneta Fransson (NPI)	
Jasmine Nahrgang		2020	RF2	2020	2021	NA	NA
Nicole Aberle-Malzahn	Micro- and mesozooplankton grazing dataset	2019-2021	RF3	2020	2022	yes	originally PhD-project, now researcher

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Dmitry Divine, Sebastian Gerland	Sea ice observations	2020	RF1	2019	2019	No	
Dmitry Divine, Sebastian Gerland	Vertical profiles of ice salinity, temperature, stratigraphy, density and optical properties	2020	RF1	2020	2021	Yes	PD-projects
Dmitry Divine, Sebastian Gerland	Ice and snow thickness along transect lines	2020	RF1	2020	2021	Yes	PD-projects

Table 6: Responsibilities for information from the permanent instrumentation at cruise #4 in Table 1.

Cruise participant	PI	Dataset	Publishing data	Asks for embargo of data	Reason for embargo request	Comments
KHP instrumentation	Randi Ingvaldsen	Acoustic data surveying fish and zooplankton, logged continuously	2020			EK80
KHP instrumentation	Helge Sagen	Multibeam mapping	2020	Yes	Ph.D. project	EM302
KHP instrumentation	Øystein Godøy	Air and sea temperature (8 m depth), air pressure, wind speed and direction, relative humidity and solar radiation logged continuously	2020	No		Weather station
KHP instrumentation	Helge Sagen	Temperature, salinity, density and fluorescence at 4m, logged continuously	2020	No		Thermosalinograph
KHP instrumentation	Randi Ingvaldsen	Currents in the upper ~500 m logged continuously	2020			ADCP 150 kHz
KHP instrumentation	Agneta Fransson	pCO ₂ in air and ocean, dissolved O ₂ in ocean, saturation of O ₂ in ocean, sea water temperature	2021	Yes	Ph.D. project	pCO ₂ underway, takes time to quality-check data thus later publication
KHP instrumentation	Randi Ingvaldsen	Temperature, salinity, density fluorescence, oxygen profiles from NLEG stations	2020			CTD

Table 7 Datasets defined for cruise #4 in Table 1.

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Anna Vader	Chl a total and > 10um biomass	During cruise	RF3	Sep-19	Oct-19	No	
Anna Vader/Tove M. Gabrielsen	Microbial eukaryote diversity across season based on rRNA metabarcoding	2019-20	RF3	2020	2020	No	
Anna Vader/Tove M. Gabrielsen	Metatranscriptomics and quantification of gene expression of select genes across season	2020	RF3	2021	2021	No	
Anna Vader/Bodil Bluhm/Camilla Svensen/Kim Præbel	Diversity of small zooplankton prey, possibly also zooplankton genetic identification	2019-21	RF3	2021	2021	Yes, possibly	PhD project
Anna Vader/Bodil Bluhm/Camilla Svensen/Kim Præbel	Diversity of zoobenthos prey, possibly also genetic identification of benthic species	2019-21	RF3	2021	2021	Yes, possibly	PhD project
Ketil Hylland	concentration of PAH metabolites from individual fish	2019-2022	RF2	2020-2022	2020-2022		
Ketil Hylland	percent DNA damage in individual fish	2019-2022	RF2	2020-2022	2020-2022		
Sissel Jentoft	Whole-genome sequences	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project
Sissel Jentoft	Whole-genome sequences	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Sissel Jentoft	Population-genomic statistics	2019-2022	RF2	2020-2022	2020-2022	Yes, possibly	PhD project
Paul Renaud	Sediment pigments	2019-2021	RF3	2020	2020-2022	No	
Elisabeth Alve & PhD student to be hired	sediment grain size fractions, sediment total organic carbon (TOC, %), sediment total nitrogen (TN, %), d13C (per mil), d15N (per mil)	2020-2022	RF1, RF3	2021-2023	2021-2023	possibly	PhD project (foraminifera)
Elisabeth Alve & PhD student to be hired (Foraminifera), Bodil Bluhm (metazoan meiofauna)	Foraminifera abundance, diversity and composition; metazoan meiofauna abundance, diversity and composition	2020-2022	RF1, RF3	2021-2023	2021-2023	possibly	PhD project
Paul Renaud	sediment pigments HPLC	?	RF3, CAO	?	?	yes	PhD project (vert flux)
Eric Jorda, Arunima Sen, Henning Reiss, Paul Renaud	Macrofauna abundance, diversity and composition; metazoan macrofauna abundance, diversity and composition, community analysis	2019-2020	RF3	2021-2023	2021-2023		

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Espen Bagøien, Post Doc	Key organisms, e.g. Euphausiids and amphipods, Map spatial distribution, taxonomic composition and biomass indices, temporal and spatial variation in abundance, biomass, diversity	2019-2021	RF3	2019-2022	2020-2022	No	
Lise Øvreås	Microbial eukaryote diversity in sediment across season based on metabarcoding	2019-2021	RF3	2021	?	Unsure	
Øystein Varpe, Katrine borga, Geir Wing Gabrielsen	Seasonal variation in macrozooplankton and fish energy content; Seasonal remobilization of pollutants in polar cod	2020-2021	RF2	2021	2021-2022	Unsure	PhD project
Janne Søreide & Camilla Svensen	Mesozooplankton abundance (ind/m ³), biomass (mg dry mass/m ³) and species composition (species list)	2020	RF3	2021-2022	2021-2022		
Janne Søreide	Total biomass of mesozooplankton	2019	RF3	2021-2022	2021-2022		
Camilla Svensen	Gelatinous zooplankton abundance (ind/m ³), volume & species composition (species list)	2020	RF3	2021-2022	2021-2022		

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Philipp Assmy; Doreen Kohlbach	Stable isotopes of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022		
Philipp Assmy; Doreen Kohlbach	Fatty acids of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022		
Philipp Assmy; Doreen Kohlbach	HBI of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022		
Philipp Assmy; Pedro Duarte							
Anders Goksoyr	Transcriptomics and quantification of selected genes and proteins across species	2019-2020	RF2	2020	2020	No	
Anders Goksoyr	Transcriptomics and quantification of selected genes and proteins across species	2019-2020	RF2	2020	2020	No	
Bente Edvardsen; Anna Vader; Tove M. Gabrielsen	Protist diversity, proportional abundance, seasonal dynamics and distribution	2019-2021	RF3	2020	2020-2021	Yes	PhD-project
Bente Edvardsen, Karoline Edvardsen, Luka Supraha	LM (live), SEM, TEM (fixed) micrographs of protists. Taxonomic descriptions	2019-2020	RF3		2021-2022	Yes, possibly	PhD-project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Bente Edvardsen, Karoline Saubrekka	Microalgal strains, morphological and genetic (rDNA operon) descriptions, phylogenetic and physiological characterisation. Contribution to reference sequence databases.	2019-2020	RF3		2021-2022	Yes, possibly	PhD-project
Luka Supraha, Karoline Saubrekka	Coccolithophore diversity, dynamics and distribution	2019-2020	RF3		2021	Yes, possibly	PhD-project
Philipp Assmy, Rolf Gradinger, Bente Edvardsen	Phytoplankton/protist abundance	2019-2020	RF3		2022		
Rolf Gradinger	Vertical profiles of primary production across latitude and seasons	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Primary production response to various light intensities	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Ratios of Carbon and Nitrogen stable isotopes before and after incubations, F-ratios of primary production	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Protist DNA sequences, phylogenetic positions and corresponding abundances linked to environmental conditions	2019-2020	RF3	2020	2021	Yes	PhD-project
Paul Renaud	oxygen uptake	2019-2020	RF3	2019-2020	2020-2021	no	
Torstein Pedersen	carbon content of benthic invertebrates	2019-2020	RF4	2020	2022?	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Bodil Bluhm, Andreas Altenburger	Taxonomic voucher inventory of Nansen Legacy fauna collected	2020-2023	RF3	n/a	n/a	No	
Bodil Bluhm, Lis Jørgensen	Carbon and nitrogen stable isotope composition	2021-2023	RF3	2022-2023	2023	possibly	Post doc project
Elisabeth Alve, Paul Renaud, Henning Reiss	Carbon and nitrogen stable isotope composition after incubation	2021-2023	RF3	2021-2023	2021-2023	possibly	PhD-project
Paul Renaud, Henning Reiss	Macronutrient concentrations in bottom water before and after incubation	2019-2020	RF3	2021-2023	2021-2023	no	
Murat V. Ardelan, Stephen Kohler	Total mercury and methylmercury transect profile	2019	RF2	2020-2021	2021	yes	PhD project
Tine L. Rasmussen	Relative and absolute abundance of marine calcifiers on the water column and their contribution to the carbonate pump	2020	RF2	2021	2021	yes	PhD project
Melissa Chierici and Agneta Fransson	DIC/Alkalinity, d18O and nutrients		RF2				
Marit Reigstad, Gunnar Bratbak	POC/PON	2020-2023	RF3	2020-2023	2021-23	yes	PhD-project
Miriam Marquardt, Rolf Gradinger	Nutrients	2020-2023	RF3	2020-2023			

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Miriam Marquardt, Rolf Gradinger, Bodil Bluhm	Ice meiofauna abundance/taxonomy	2020-2023	RF3	2020-2023			
Gunnar Bratbak	Bacterial production rate	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Aud Larsen	Abundance tables	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak	Plankton diversity, dynamics and distribution	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Jorun K. Egge, Tatiana Tsagaraki	Concentration of total particulate O, P, Na, Mg, Si, S, Ca, Mn, Fe, Zn (μM)	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Ruth-Anne Sandaa	Virus diversity across season based on metabarcoding	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Oliver Müller, Lasse Mørk Olsen	Dynamics of lower trophic level food web structure	2019-2020	RF3	2020	2021	No	
Murat V. Ardelan	Total and dissolved trace elements transect profile	2019-2020	RF2	2020	2021	Need to ask PI	
Murat V. Ardelan	Variation, composition, and distribution of DOM and TOC, with ancillary POC and DOC measurements	2019-2020	RF2	2020	2021	yes	phd project
Marit Reigstad, Yasemin Bodur	Chlorophyll a	During cruise	RF3	2020	2021	yes	PhD-project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Marit Reigstad, Yasemin Bodur	Chlorophyll a >10µm	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	POC/PON	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	stable isotopes	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Paul Renaud, Yasemin Bodur	HPLC	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Paul Renaud, Yasemin Bodur	IP25	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	phytoplankton communities	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	fecal pellets	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	Metatranscriptomics	2019-21	RF3	2020	2021	yes	PhD-project
Paul Renaud, Yasemin Bodur	fatty acids, stable isotopes, gut content	2019-21	RF3	2020	2021	yes?	PhD-project
Nicole Aberle-Malzahn	Dynamics of lower trophic level food web structure	2018 - 2021	RF3	2021	2021	Yes, possibly	PhD project
Camilla Svensen	specific egg production rate as estimate for copepod production	2019 - 2021	RF3	2020	2021	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2022	RF2	2022	2022	yes	PhD project
Murat V. Ardelan	Distribution of trace elements in sediments	2019-2020	RF2	2021	2021	maybe, check with PI	
Camilla Svensen	Influence of Oithona and Calanus on the microbial food web (top down control?), comparison between the two different feeding strategies	2019-2020	RF3	2020	2021	yes	PhD project
Camilla Svensen	Estimation of the copepod production during August 2019	2019 - 2021	RF3	2020	2021	yes	PhD project
Camilla Svensen	Determine trophic position of Oithona	2019 - 2021	RF3	2020	2021	yes	PhD project
Doreen Kohlbach	determine the quality of food of Oithona in different seasons	2019 - 2021	RF3	2020	2021	yes	PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Anna Vader	Diet of Calanus and Oithona	2020-2021	RF3	2020	2021	yes	PhD project
Jack Garnett	PFAS in the sea ice ecosystem	2019-20	RF2		2021		PhD project
Marit Reigstad	Sea ice type, extension, etc		RF1		2019		

Table 8: Responsibilities for information from the permanent instrumentation at cruise #5 in Table 2.

Cruise participant	PI	Dataset	Publishing data	Ask for embargo of data?	If yes, why?	Comments
KHP instrumentation	Randi Ingvaldsen	Acoustic data surveying fish and zooplankton, logged continuously	2020	No		EK80
KHP instrumentation	Helge Sagen	Multibeam mapping	2020	Yes	PhD student project	EM302
KHP instrumentation	Øystein Godøy	Air and sea temperature (8 m depth), air pressure, wind speed and direction, relative humidity and solar radiation logged continuously	2020	No		Weather station
KHP instrumentation	Arild Sundfjord	Temperature, salinity, density and fluorescence at 4m, logged continuously	2020	No		Thermosalinograph
KHP instrumentation	Arild Sundfjord	Currents in the upper ~500 m legged continuously	2020	Yes	Process cruise	ADCP 150 kHz
KHP instrumentation	Agneta Fransson	pCO ₂ in air and ocean, dissolved O ₂ in ocean, saturation of O ₂ in ocean, sea water temperature	2021	Yes	PhD student project	pCO ₂ underway
KHP instrumentation	Arild Sundfjord	Temperature, salinity, density fluorescence, oxygen profiles from NLEG stations	2020	Yes	Process cruise	CTD

Table 9: Datasets defined for cruise #5 in Table 2.

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publi shing data	Ask for embar go of data?	If yes, why?
Arild Sundfjord	MSC1 CTD	2020	1	2019	2020	No	
Arild Sundfjord	MSC1 ship-borne ADCP	2020	1	2020	2021	yes	post doc material
Arild Sundfjord	MSC1 CTD-mounted ADCP	2020	1	2020	2021	yes	post doc material
Melissa Chierici		2020	2				
Marit Reigstad	nutrient, POC/PON, Chlorophyll a	2020	3	2020	2022	yes	PhD material
Arild Sundfjord	NLEG M-moorings 2018-2019	2020	1	2020	2021	yes	post doc material
Sebastian Gerland		2020	1	2020	2021	yes	

Table 10: Responsibilities for information from the permanent instrumentation at cruise #6 in Table 2.

Cruise participant	PI	Dataset	Publishing data	Ask for embargo of data?	If yes, why?	Comments
KHP instrumentation	Helge Sagen	Acoustic data surveying fish and zooplankton, logged continuously	2020			EK80
KHP instrumentation	Helge Sagen	Multibeam mapping	2020	Yes	PhD project	EM302
KHP instrumentation	Øystein Godøy	Air and sea temperature (8 m depth), air pressure, wind speed and direction, relative humidity and solar radiation logged continuously	2020	No		Weather station
KHP instrumentation	Helge Sagen	Temperature, salinity, density and fluorescence at 4m, logged continuously	2020	No		Thermosalinograph
KHP instrumentation	Helge Sagen	Currents in the upper ~500 m logged continuously	2020			ADCP 150 kHz
KHP instrumentation	Agneta Fransson	pCO ₂ in air and ocean, dissolved O ₂ in ocean, saturation of O ₂ in ocean, sea water temperature	2021	Yes	PhD project	pCO ₂ underway, takes time to quality-check data thus later publication
KHP instrumentation	Helge Sagen	Temperature, salinity, density fluorescence, oxygen profiles from NLEG stations	2020			CTD

Table 11: Datasets defined for cruise #6 in Table 2.

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Mats Granskog; Børge Hamre; Pedro Duarte; Philipp Assmy	Particulate absorption from standard depth sampled from CTD at all process stations	Analysed by Tristan Petit at UiB. Samples have to be analysed within 6 months of sampling. If can be done depends on the travel (Norway, Germany) and working (Germany) regulations due to corona situation	RF1; RF3	2021	2021-2022	yes	PD project
Mats Granskog	Snow depth	2021-2022	RF1	2020	2022-2023	no	Post doc, not hired yet

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Janne Søreide; Kim Præbel	Barcoding Biodiversity	2020-2022	RF4	2021-2022	2021-2022	yes	master student
Anette Wold; Janne Søreide (in collaboration with sanna Majaneva at NTNU)	Gelatinous zooplankton abundance (ind/m3), volume & species composition (species list)	2020	RF3	2021-2022	2021-2022	Yes	Post doc project
Philipp Assmy; Doreen Kohlbach	Fatty acids of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022	Yes	Post doc project
Philipp Assmy; Doreen Kohlbach	HBI of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022	Yes	Post doc project
Philipp Assmy; Doreen Kohlbach	Stable isotopes of POM, main zooplankton taxa & fish	2020	RF3	2021-2022	2021-2022	Yes	Post doc project
Angela Stippkugel	Dynamics of lower trophic level food web structure	2018 - 2021	RF3	2021	2021	Yes, possibly	PhD project
Anna Vader	Chl a total and > 10um biomass	During cruise	3	Dec-19	Feb-20	No	
Anna Vader, Tove M. Gabrielsen	Microbial eukaryote diversity across season based on rRNA metabarcoding	2019-20	RF3	2020	2020	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Anna Vader, Tove M. Gabrielsen	Metatranscriptomics and quantification of gene expression of select genes across season	2020	RF3	2021	2021	No	
Bente Edvardsen; Anna Vader; Tove M. Gabrielsen	Protist diversity, proportional abundance, seasonal dynamics and distribution	2019-2021	RF3	2020	2020-2021	Yes	PhD-project
Camilla Svensen	spatial and temporal variability of copepod secondary production, specific egg production rate as an estimate for copepod production	2019 - 2021	RF3	2020	2021	yes	PhD project
Camilla Svensen	spatial and temporal variability of copepod secondary production, specific egg production rate as an estimate for copepod production	2019 - 2021	RF3	2020	2021	yes	PhD project
Camilla Svensen	spatial and temporal variability of copepod secondary production, female:egg ratio as an estimate for copepod production, copepod reproduction during the polar night	2019 - 2021	RF3	2020	2021	yes	PhD project
Camilla Svensen	characterization of the mesozooplankton community in relation to hydrography and seasons	2019 - 2021	RF3	2020	2021	yes	PhD project
Camilla Svensen	Influence of Oithona and Calanus on the microbial food web (top down control?), comparison between the two different feeding strategies	2019-2020	RF3	2020	2021	yes	PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Camilla Svensen	Determine trophic position of Oithona	2019 - 2021	RF3	2020	2021	yes	PhD project
Doreen Kohlbach	determine the quality of food of Oithona in different seasons	2019 - 2021	RF3	2020	2021	yes	PhD project
Anna Vader/Bodil Bluhm/Camilla Svensen/Kim Præbel	Diversity of zoobenthos prey, possibly also genetic identification of benthic species	2020-21	3	2021	2021	Yes, possibly	PhD project
Agneta Fransson, Tine L. Rasmussen	Relative and absolute abundance of marine calcifiers on the water column and their contribution to the carbonate pump	2020	RF2	2021	2021	yes	PhD project
Gunnar Bratbak	Bacterial production rate	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Aud Larsen	Abundance tables	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak	Plankton diversity, dynamics and distribution	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Jorun K. Egge, Tatiana Tsagaraki	Concentration of total particulate O, P, Na, Mg, Si, S, Ca, Mn, Fe, Zn (μM)	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Ruth-Anne Sandaa	Virus diversity across season based on metabarcoding	2019-2020	RF3	2020	2021	No	
Gunnar Bratbak, Oliver Müller, Lasse Mørk Olsen	Dynamics of lower trophic level food web structure	2019-2020	RF3	2020	2021	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Janne E. Søreide	Basal metabolic rate	autumn 2020	RF3	2020	2021	no	
Janne E. Søreide	Stable isotopes of zooplankton community	2021	RF3	2021	2021	no	
Janne E. Søreide	Individual dry weight of species identified Calanus males	2021	RF3	2021	2021	no	
Katrine Borgå	food web contaminant biomagnification	2019-2022	RF2	2022	2022	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project
Katrine Borgå	food web contaminant biomagnification	2019-2021	RF2	2021	2022	yes	PhD project
Melissa Chierici, Agneta Fransson	dissolved oxygen, pH, dissolved inorganic carbon, alkalinity, nutrients, d18O	2019-2021 (analysed onboard, except nutrients post.cruise analyses)	RF2	2020	2021	No	
Melissa Chierici, Agneta Fransson	pH, dissolved inorganic carbon, alkalinity, nutrients, d18O	2019-2021	RF2	2020	2021	No	
Lise Øvreås	Prokaryote diversity based on rDNA and rRNA metabarcoding	2020	3	2020	2021	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Murat V. Ardelan	Variation, composition, and distribution of DOM and TOC, with ancillary POC and DOC measurements	2019-2020	RF2	2020	2021	yes	phd project
Rolf Gradinger	Vertical profiles of primary production across latitude and seasons	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Primary production response to various light intensities	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Ratios of Carbon and Nitrogen stable isotopes before and after incubations, F-ratios of primary production	2019-2020	RF3	2020	2021	Yes	PhD-project
Rolf Gradinger	Protist DNA sequences, phylogenetic positions and corresponding abundances at different incubation times	2019-2020	RF3	2020	2021	Yes	PhD-project
Marit Reigstad, Gunnar Bratbak	POC/PON	2020-2023	RF3	2020-2023	2022	yes	PhD project
Miriam Marquardt, Rolf Gradinger, Bodil Bluhm	Ice meiofauna abundance/taxonomy	2020-2023	RF3	2020-2023	2022	Yes, possibly	
Melissa Chierici, Agneta Fransson	Nutrients	2020-2023	RF3	2020-2023	2023	No	
Murat V. Ardelan	Total and dissolved trace elements transect profile	2019-2020	RF2	2020	2021	Need to ask PI	
Nils Olav Handegard	Zooplankton target strengths	During cruise	RA-C	2020	2020-2022	No	
Nils Olav Handegard	Zooplankton acoustic backscatter	During cruise	RA-C	2020	2020-2022	No	

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Luka Supraha	Coccolithophore diversity, dynamics and distribution	2019-2020	RF3	2021-2022	2021-2022	Need to ask PI	PhD-project
Philipp Assmy, Rolf Gradinger, Bente Edvardsen	Phytoplankton/protist abundance	2019-2020	RF3	2020 or when ready	2021	No	
Bente Edvardsen; Anna Vader	Protist diversity, proportional abundance, dynamics and distribution through the seasons	2019-2021	RF3	2021	2021-2022	Yes	PhD-project
Bente Edvardsen, Philipp Assmy	Species lists and micrographs	2020-2021	RF3	2020-2021	2021	Need to ask Pis	PhD-project
Øystein Varpe, Katrine borga, Geir wing gabrielsen	Seasonal variation in macrozooplankton and fish energy content; Seasonal remobilization of pollutants in polar cod	2020-2021	RF2	2021	2021-2022	Unsure	PhD project
Paul Renaud	Sediment pigments	2019-2021	3	2020	2020-2022	No	
Elisabeth Alve & PhD- Thaise Freitas	sediment grain size fractions, sediment total organic carbon (TOC, %), sediment total nitrogen (TN, %), d13C (per mil), d15N (per mil)	2019-2022	1, 3	2020	2021-2022	Yes, possibly	PhD project
Elisabeth Alve & PhD student- Thaise Freitas (Foraminifera), Bodil Bluhm (metazoan meiofauna)	Foraminifera abundance, diversity and composition; metazoan meiofauna abundance, diversity and composition	2019-2022	1, 3	2020	2021-2022	Yes, possibly	PhD project
Paul Renaud	sediment pigments HPLC	2019-2020	RF3, CAO	2020	2021-2022	no	no embargo

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Henning Reiss, Paul Renaud	Macrofauna abundance, diversity and composition; metazoan macrofauna abundance, diversity and composition, community analysis	2019-2020	3	2021-2023	2021-2023	Yes, possibly	PhD project
Lise Øvreås	Microbial eukaryote diversity in sediment across season based on metabarcoding	2019-2021	RF3	2021	?	Unsure	
Paul Renaud	oxygen uptake	2019-2020	RF3	2019-2020	2020-2021	no	no embargo
Bodil Bluhm, Andreas Altenburger	Taxonomic voucher inventory of Nansen Legacy fauna collected	2020-2023	RF3	n/a	n/a	No	no embargo
Bodil Bluhm, Lis Jørgensen	Carbon and nitrogen stable isotope composition	2021-2023	RF3	2022-2023	2023	possibly	Post doc project
Paul Renaud, Henning Reiss	Macronutrient concentrations in bottom water before and after incubation	2019-2020	RF3	2021-2023	2021-2023	no	no embargo
Sissel Jentoft	Whole-genome sequences	2019-2022	2	2020-2022	2020-2022	Yes, possibly	PhD project
Sissel Jentoft	Whole-genome sequences	2019-2022	2	2020-2022	2020-2022	Yes, possibly	PhD project
Sissel Jentoft	Population-genomic statistics	2019-2022	2	2020-2022	2020-2022	Yes, possibly	PhD project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Anna Vader/Bodil Bluhm/Camilla Svensen/Kim Præbel	Diversity of small zooplankton prey, possibly also zooplankton genetic identification	2020-21	3	2021	2021	Yes, possibly	PhD project
Anna Vader	Diversity of prey in <i>C. finmarchicus</i> diet. Possible identification of symbiotes.	2020-2021	RF3	2021	2021	Yes, possibly	PhD project
Murat V. Ardelan, Stephen Kohler	Total mercury and methylmercury transect profile	2019	RF2	2020-2021	2021	yes	PhD project
Murat V. Ardelan	Distribution of trace elements in sediments	2019-2020	RF2	2021	2021	maybe, check with PI	
Espen Bagøien, Post Doc	Key organisms, e.g. Euphausiids and amphipods, Map spatial distribution, taxonomic composition and biomass indices, temporal and spatial variation in abundance, biomass, diversity	2019-2021	3	2020	2020-2022	No	
Martin Ludvigsen	Video	2019	RA-C	2019	2020	no	
Martin Ludvigsen		2019	RA-C	2019	2020	no	
Marit Reigstad, Yasemin Bodur	Chlorophyll a	During	RF3	2020	2021	yes	PhD-project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
		cruise					
Marit Reigstad, Yasemin Bodur	Chlorophyll a >10µm	During cruise	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	POC/PON	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	stable isotopes	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Paul Renaud, Yasemin Bodur	HPLC	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Paul Renaud, Yasemin Bodur	IP25	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	phytoplankton communities	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	fecal pellets	2019-21	RF3	2020	2021	yes	PhD-project
Kim Præebel; Paul Renaud	molecular diet analysis	2020	RF2/ RF3	yes	yes	no	
Marit Reigstad; Paul Renaud	bSi	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad; Paul Renaud	stable isotopes	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad	POC/PON	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad	DOC	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad	DOC characterization	2019-21	RF3	2020	2021	yes	PhD-project
Marit Reigstad, Yasemin Bodur	Metatranscriptomics	2019-21	RF3	2020	2021	yes	PhD-project

PI	Dataset	When are analyses planned for	RF	Sharing within project	Publishing data	Ask for embargo of data?	If yes, why?
Dmitry Divine, Sebastian Gerland	Sea ice observations	2020	RF1	2020	2021	No	

The Nansen Legacy in numbers

6 years

The Nansen Legacy is a six-year project, running from 2018 to 2023.

280 people

There are about 230 researchers working with the Nansen Legacy, of which 73 are early career scientists. In addition, 50 persons are involved as technicians, project coordinators, communication advisers and board members.

1 400 000 km² of sea

The Nansen Legacy investigates the physical and biological environment of the northern Barents Sea and adjacent Arctic Ocean.



10 institutions

The Nansen Legacy unites the complimentary scientific expertise of ten Norwegian institutions dedicated to Arctic research.



>10 fields

The Nansen Legacy includes scientists from the fields of biology, chemistry, climate research, ecosystem modelling, ecotoxicology, geology, ice physics, meteorology, observational technology, and physical oceanography.


50/50 financing

The Nansen Legacy has a total budget of 740 million NOK. Half the budget comes from the consortiums' own funding, while the other half is provided by the Research Council of Norway and the Ministry of Education and Research.



>350 days at sea

The Nansen Legacy will conduct 15 scientific cruises and spend more than 350 days in the northern Barents Sea and adjacent Arctic Ocean between 2018 and 2022. Most of these cruises are conducted on the new Norwegian research icebreaker *RV Kronprins Haakon*.

 nansenlegacy.org

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 nansenlegacy@uit.no