INSTITUTE OF OCEANOLOGY
POLISH ACADEMY OF SCIENCES

REPORT
FROM THE RESEARCH CRUISE
AREX 2015
7.06 - 25.08.2015

Coordination

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IO PAS
SOPOT

1. Leg I, Gdansk-Tromsø, 8-19.06.2014

1.1. Scientific goals

- Observations of taxonomic and size structure of meio- and macrobenthos and Foraminifera in the Norwegian fjords (project DWARF, project BIOSIZE);
- Observations of taxonomic and size structure, and primary productivity of epipelagic plankton along the environmental temperature gradient from boreal to polar zone (project DWARF);
- Observations of benthic productivity in the Norwegian fjords (project DWARF, project BIOSIZE, Topic III.1);
- Observations of size structure of selected macrozoobenthos species (project DWARF);
- Observations of size structure of the selected zooid species Bryozoa (project DWARF);
- Studies of environmental conditions, including hydrography, granulometry and organic material concentration, impacting the distribution of pelagic and benthic organisms in fjords (project DWARF);
- Observations of sedimentation rate and bioturbidity in sediments (project DWARF, Topic III.1);
- Analysis of mineralogical composition of benthic organisms with calcareous skeletons in fjords (project POLNOR, Topic III.3);
- Studies of the impact of varying sea water chemistry on the structure and distribution of benthic organisms with calcareous skeletons in fjords (project POLNOR, Topic III.3).

1.2. Work at sea

In Rauenfjorden samples of hard bottom benthic fauna were collected on June 11 with use of a triangular dredge from the depths of 50, 100 and 150 m.

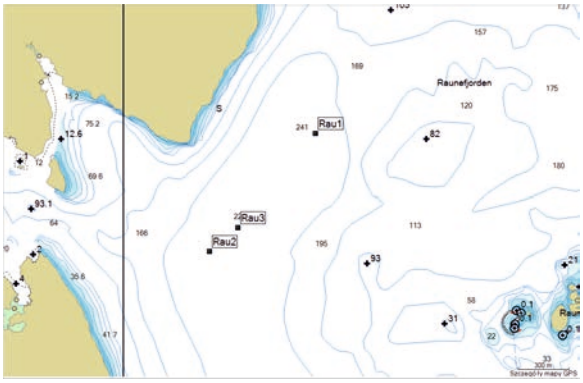
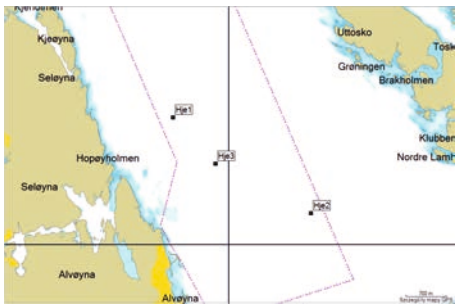


Fig. 1.1 Sampling stations in Raunefjorden during AREX2015.

On June 12 samples of plankton and benthos were collected on 3 stations together with sediment sampling taken with a Nemisto. Three cores were collected from each station, which were later divided into 1 cm slices and frozen for biogeochemical analyses. Biological samples included 3 macrozoobenthos samples (collected with a van Veen grab), 3 samples for large nematodes (collected with a Nemisto grab), 3 samples of meiozoobenthos collected with syringes from the box corer sediment sample), 1 sample for Foraminifera (collected with a syringe from sediment sample).

At the same station plankton samples were collected. Water samples, including surface layer and samples from 5, 15, 25, 35, 50 and 100 m depths, were collected for chlorophyll a concentration. Mesozooplankton samples were collected with MPS/180 net from vertical profiles from the bottom to the surface, from 5 layers selected in accordance to TS structure. Microzooplankton sample were collected with a WP2/60 net from vertical profiles from the bottom to the surface, in 3 layers. Additionally the laser optical particle counter (LOPC) was used to measure distributions of size and concentrations of particles along 3 vertical profiles from the surface to the bottom.

a) 

b) 

Fig.1.2. Sampling stations in (a) Hjeltefjorden and (b) Balsfjorden during AREX2015.

The same sampling pattern was used on June 13 in Hjeltefjorden except the bottom samples with Nemisto. Bottom sediments found in Hjeltefjorden could not be sampled with Nemisto therefore sediment samples were collected only with a van Veen grab.

Due to bad weather measurements in Hjeltefjorden were stopped prematurely and on June 16 sampling was continued in Balsefjorden with the same sampling scheme of hard and soft bottom benthos, sediments, water and plankton as described above.

2. Leg II (Norwegian Sea-southern Fram Strait, 21.06-7.07) and III (Fram Strait-northern Nansen Basin, 8-23.07.2015)

2.1. Scientific goals

Large oceanic exchanges between the North Atlantic and the Arctic Ocean result in the strong conversion of water masses when warm and salty Atlantic water (AW), transported through the Nordic Seas into the Arctic Ocean undergo cooling, freezing and melting. As a result it is transformed into freshened shelf waters over the shallow shelves, sea ice and dense (and highly saline) deep waters. Southward transport of the Arctic origin waters is one of main mechanisms of the global thermohaline circulation (THC). Better understanding of the variability of volume and heat transports between the North Atlantic and Arctic Ocean as well as processes of water mass conversion is necessary for improved qualitative and quantitative estimation of the large-scale meridional overturning circulation and its role in shaping the climate change in the northern hemisphere on inter-annual to decadal time scales.

Fram Strait is the only deep passage linking the Nordic Seas and the Arctic Ocean. The northward transport of warm and salty Atlantic water, carried by the Norwegian-Atlantic Current and farther by the West Spitsbergen Current, has a significant impact on conversion and circulation of water masses in the Arctic Ocean as well as on sea ice and atmospheric fluxes in the Arctic. The complex bottom topography of the northern Greenland Sea and Fram Strait results in splitting of both currents into several branches, located along the underwater ridges and the continental slope. Spatial extent and relative intensity of these branches to a great degree determine oceanic heat flux into the Arctic Ocean.

The Institute of Oceanology Polish Academy of Sciences (IO PAS) in Sopot has been carrying out the oceanographic, atmospheric, biogeochemical and ecological observations in the Nordic Seas and Fram Strait since 1987. The main aim is to recognize and describe processes of the ocean-atmosphere interactions and exchanges, ocean climate and ecosystem of the sub-Arctic and Arctic regions with the special focus on the European Arctic. Initially the long-term observations had been carried under national projects and later continued in the frame of international European projects VEINS (Variability of Exchanges in the Nordic Seas, 1997-2000), ASOF-N (Arctic and sub-Arctic Oceanic Fluxes - North, 2003-2005), DAMOCLES (Developing Arctic Modelling and Observing Capabilities for Long-term Environment Studies, 2006-2009). In recent years the annual measuring campaigns in the Nordic Seas, Fram Strait and in last 2 years in the northern Nansen Basin took place under the Polish-Norwegian projects (Polish-Norwegian Funds) AWAKE, AWAKE-2 and PAVE as well as under the statuory research programs of IO PAS the GAME project, funded by NCN.

During the legs II and III of the research expedition AREX2015 the following scientific tasks and questions were addressed:

- Structure and dynamics of the Norwegian-Atlantic and West Spitsbergen Currents (projects PAVE and AWAKE-2).

- Variability of temperature, salinity and sea currents over the shelf and continental slope west and north of Svalbard (projects PAVE and AWAKE-2).
- Estimation of the volume and heat transport by the West Spitsbergen Current (projects PAVE and AWAKE-2).
- Variability of water masses and circulation in the Horsund fjord (projects AWAKE-2, GAME, GLAERE).
- Overflow of dense brine waters in the Storfjordrenna (project MIXAR).
- Distribution of water masses and mixing processes in the frontal zones from distributions of temperature, salinity and nutrients (projects PAVE, AWAKE-2, MIXAR).
- Spatial distribution of magnitudes and spectral characteristics of optical CDOM absorption and fluorescence on the west Spitsbergen shelf and in the north-eastern Fram Strait and Barents Sea Opening (project CDOM-HEAT).
- DOM composition based on spectral characteristics of CDOM absorption and fluorescence on the west Spitsbergen shelf and in the north-eastern Fram Strait and Barents Sea Opening to validate the statistical multiparameter model PARAFAC (project CDOM-HEAT).
- Solar radiation transmission in the water column on the west Spitsbergen shelf and in the north-eastern Fram Strait and Barents Sea Opening (project CDOM-HEAT).
- Inherent and apparent optical properties of different water masses in the Barents Sea along the section from Tromsø to Longyearbyen (project CDOM-HEAT).
- Studies of the impact of varying sea water chemistry on the structure and distribution of benthic organisms with calcareous skeletons in fjords (project POLNOR, Topic III.3).
- Estimation of the droplet flux from the sea surface and their impact on ocean-atmosphere mass and energy exchanges (Topic I.3);
- Estimation of the vertical CO_2 fluxes in the atmospheric boundary layer (Topic I.3);
- Estimation of latent and sensible heat fluxes between ocean and atmosphere (Topic I.3);
- Description of marine aerosols in the Arctic region, aerosol optical thickness and ozone concentration in atmosphere (Topic I.3);
- Description of the spatial distributions and quantitative-qualitative composition of zooplankton communities in the epi- and mesopelagic zones in the Norwegian-Atlantic and West Spitsbergen Current (project PAVE).
- Genetic diversity in zooplankton population of Calanus species in the Norwegian-Atlantic and West Spitsbergen Current (project 'Struktura populacji widlonogow').

2.2. Work at sea - oceanography

During the AREX2015 expedition (legs II and III) all oceanographic measurements were conducted on the station grid consisting of standard sections repeated annually since 2000, and along new sections located north of Svalbard. Location of oceanographic sections s shown on Fig. 1. During both legs of the cruise 227 full-

depth CTD stations were measured (116 stations during the leg II and 111 stations during the leg III), providing profiles of temperature, salinity, dissolved oxygen and fluorescence (as proxy for chla). The standard CTD system Seabird 9/11+ was equipped with double pairs of temperature and conductivity sensors (primary temperature SBE3 SN4670, primary conductivity SBE4 SN3342, secondary temperature SBE3 SN2937, secondary conductivity SBE4 SN2971) and pressure sensor Digiquartz 410K-105 SN100967. Additionally CTD system carried two oxygen sensors (one standard SeaBird sensor SBE43 SN1620 and Rinko optode SN72, connected directly to the CTD registration system), fluorescence sensor SeaPoint SN2935 and altimeter Benthos PSA-916 SN51308. The CTD system was mounted on the SeaBird bathymetric rosette (carousel) equipped with 9 large Nansen bottles (12 l each and 3 small bottles (1.75 l each). Originally the rosette is designed to carry 12 large bottles but due to the mounting system for LADCP only 9 bottles can be use in the current configuration. RDI Teledyne Workhorse 300 kHz SN21589 was used as Lowered Acoustical Doppler Profiler (LADCP), mounted in downward-looking configuration. The collected CTD data were registered on the PC hard drive with a second back-up on the same unit and third one on the external drive. The preliminary data processing was done in the near-real time while the final data set will be available after the post-cruise calibration of sensors. The LADCP data were read out after each station and stored in single files for each cast.

All sensors of the CTD system have been working properly during the AREX2015 cruise except a few first stations when the primary CT sensors failed. Due to difficult weather and sea ice conditions (high sea state, followed by strong swell and compact ice cover), in particular at the beginning and during the last days of the oceanic part of AREX2015 cruise, measurements at several stations were collected with some delay (with two stations entirely cancelled) but it did not influence the overall measurement strategy and quality of final results. Collected data were archived locally at the external hard drive with a double backup. Data preprocessing was done on board while final processing will be done after post-cruise calibration of TC sensors.

28 water samples were collected from a deep layer of small vertical gradients of hydrographic properties at 11 stations for calibration of conductivity sensor. Additionally 244 water samples at 46 stations were collected and frozen at -5°C for post-cruise lab analysis of nutrients and $_{16}O$ and $_{18}O$ tracers.

During the entire cruise the underway measurements of sea currents in the upper ocean of approx. 300m depth were collected with the Vessel Mounted Acoustic Doppler Current Profiler (RDI VM-ADCP 150 Hz).

CTD casts were distributed along 12 hydrographic sections in total, 6 section during the leg II and 6 sections during the leg III of the cruise. The standard sections EX, Y and WB had to be shortened due to unfavorable ice conditions (ice edge at 2°E). Section NB, measured last time in 2013 was not possible to reach to the sea ice extent. The detailed list and schedule of CTD casts is given in the station list (Att. 1) and cruise itinerary (Att. 2).

During both legs of the AREX2015 cruise high resolution hydrographic sections were measured with a towed CTD scanfish system, covering the upper ocean layer of 300-

350 m with a typical distance between subsequent casts of a few km. Two sections were measured during the leg II, one in vicinity of the Horsund outlet across the shelf break and shelf and ne along the fjord axis. During the leg III three high-resolution towed section were measured north-west and north of Svalbard. These sections occupied the shelf and the upper continental slope at the Yermak Plateau and Whalers Bay but due to extensive ice cover it was not possible to continue them towards the deep water as planned. Description of the towed sections' schedule can be found in the cruise itinerary (Att. 2).

2.3. Work at sea - plankton sampling

During the 2nd and 3rd legs of AREX2015 the zoo- and phytoplankton samples were collected at the selected stations in the Norwegian, Barents and Greenland Seas for post-cruise analysis.

Mesozooplankton samples were collected with a MPS/180 net along the vertical profiles down to the depth of 1000 m (or to the bottom on shallower stations) in the standard layers (1000-600, 600-200, 200-50, 50-25, 25-0 for stations deeper than 500m or bottom-200, 200-100, 100-50, 50-25, 25-0 m on stations shallower than 500 m). Collected zooplankton samples were treated with formaldehyde (4%) with addition of borax. Microzooplankton samples were collected with a plankton net WP-2/ along the vertical profiles down to the depth of 200 m, in the layers: 200-50; 50-25; 25-0 m. Water samples for chlorophyll a concentration were collected from the carousel bottles from the depths: 100, 50, 35, 25, 15, 5 m and from the surface. Water samples were filtrated (filters Whatmann GF/F 25 mm) and frozen in -80°C. Water transparency was measured with the Secchi disc. Samples for the PAVE project were collected on the stations V8, V9, V13, N-2, Z5, Z7, EB2-3, EB2-4, EB2-10, WB12, and Y12. Altogether 55 mesozooplankt samples were collected with the MPS net, 36 plankton samples with the WP2/60 net and 60 samples were filtrated for chlorophyll a.

Standard AREX2015 stations

Based on the CTD profiles, three layers were identified during each sample collection: deep layer (DL), intermediate layer with thermocline (IL) and mixed surface layer (ML). 70 zooplankton samples were collected with use of the WP2 nets (180µm) at 25 stations: Collected zooplankton samples were treated with formaldehyde (4%) with addition of borax.

Protozoan plankton samples and chlorophyll a and pheophytin samples were collected from the upper layer with the carousel bottles. On most of the stations samples were taken from the upper 100m layer from 7 levels. Samples were treated with Lugol's iodine (2%) and Glutaraldehyde (1%). Additionally qualitative samples were collected along the vertical profiles in the layer 0-25 m with a oplankton net 20 µm. Water samples were immediately filtered on GGF filters (Whatman) and extracted in 90% acetone for 8 to 12hours. Concentration of different pigments was measured with fluorymeter Trilogy (Turner) with two repetitions for each level. Altogether 40 samples of protozoan plankton were collected together with 40 water samples on 40 stations.

2.4. Work at sea - meteorological and aerosol measurements

Atmospheric measurements during legs II and III of the AREX2015 cruise were aimed in studying variability of the vertical structure of the marine aerosols physical and optical properties in the polar region and their impact on solar radiation (direct climatic impact). The measurements included:

- Measurements of the vertical concentration of marine aerosols with laser particle counter (PMS) and condensation particles counter (CPC).
- Parallel infrared measurements of CO_2 and H_2O in atmosphere with the analyser LI-7500A.
- Measurements of aerosol optical properties with photometer Microtops II.
- Estimation of spatial and temporal variability of physical properties of marine aerosol.

Collected data will be applied for description of the direct aerosol effect thus they will contribute to improvement of climate models. This study is carried on under the frameworks of international projects POLAR-AOD (www.nadc.isti.cnr.it:8080/PolarAOD/jsp/home/) and ASTAR-Arctic Study of Tropospheric Aerosols, Clouds and Radiation (http://www.awi-bremerhaven.de/www-pot/astar/index.html).

Additionally the meteorological observations 'SHIP' were collected 8 times per day during the entire cruise except the fjord leg. Collected meteorological data will be used for validation and calibration of the ship automatic meteorological station 'Observer'. Data will be archived in and accessible from the IOPAS database.

2.5. Work at sea - optical measurements

During the AREX2015 legs II and II measurements of inherent and apparent optical properties of different water masses in situ were complemented with collection of water samples for analyses of apparent optical properties in the lab. Measurements and samples were collected on all planned stations due to good weather conditions. On the stations measurements were performed with the modified Integrated Optical-Hydrographic Probe, including the WETLabs marine spectrophotometer ac-9, Sea-Bird CTD, WetStar 3-channel fluorimeter from WETLabs Inc., USA, measuring CDOM and two fluorimeters from TriOS, Germany for chlorophyll a fluorescence and for CDOM. Together with above measurements, vilume concentration of suspended matter was measured with laser *in situ* counter LISST-100X from Sequoia Scientific, USA. Inherent optical properties were measured with the C-OPS (Compact Optical Profiling System), Biospherical Instroments Inc, USA. Water samples were collected for lab analyses of chlorophyll a, DOC, coefficient of light absorption by suspended matter, coefficient of light absorption by CDOM and measurements of the excitation and fluorescence emission matrix by CDOM.

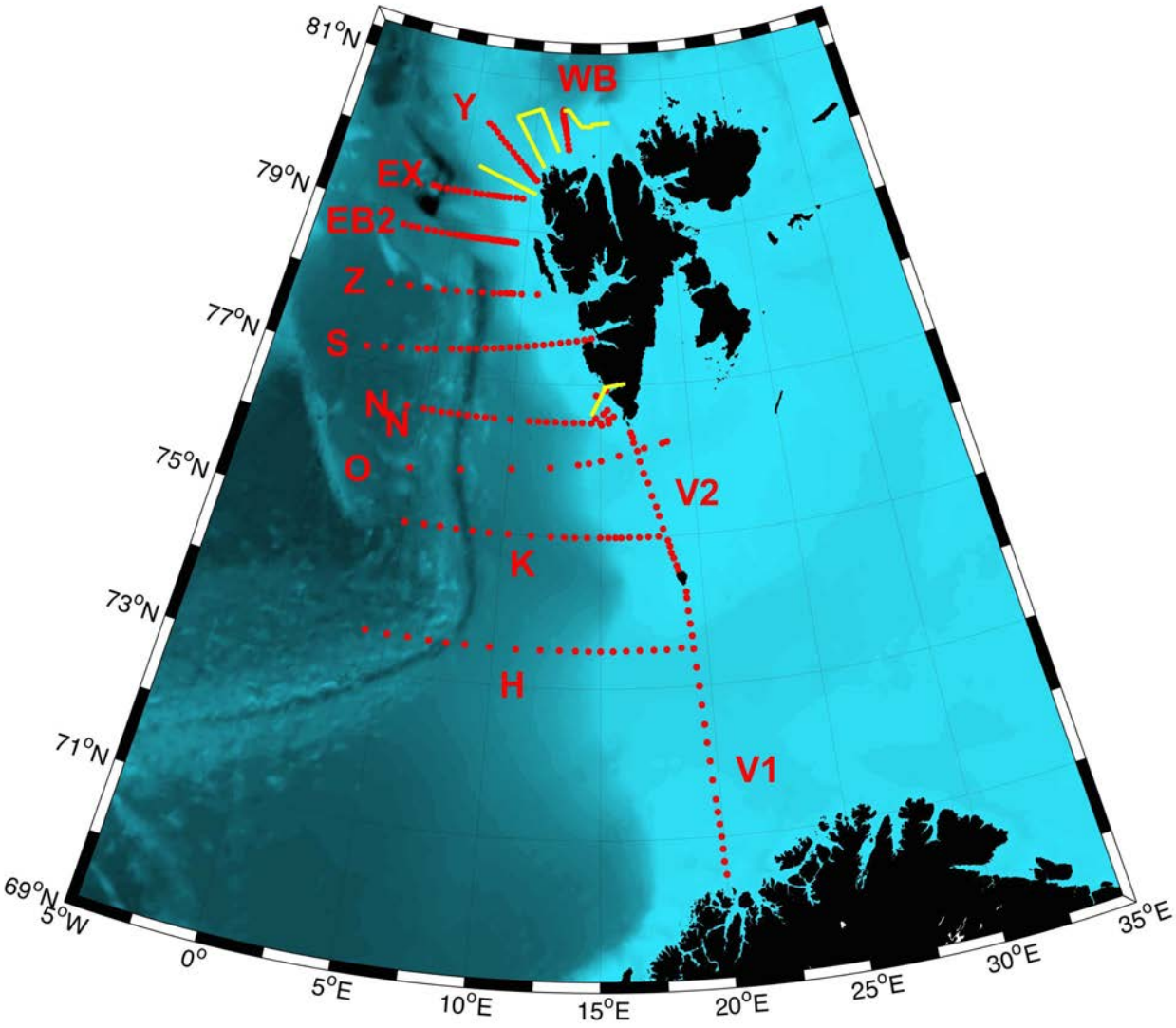


Fig. 2.1 Distribution of CTD stations during the open ocean part (legs II and III) of the AREX 2015 cruise (21.06 - 23.07.2015).

Table 2.1 List of stations measured during the open ocean part of the AREX2015 cruise in the Norwegian Sea, Barents Sea Opening and Fram Strait.

File	Station	Latitude	Longi-tude	Water depth	Max Pres	Day	Month	Year	Hour	Minute
AREX2015 leg II (20.06-07.07.2015)										
ar15_001.awi	V1	70.495	20.003	133	131	20	6	2015	16	16
ar15_002.awi	V2	70.668	19.933	162	160	20	6	2015	18	30
ar15_003.awi	V3	70.834	19.932	182	181	20	6	2015	19	58
ar15_004.awi	V4	70.996	19.901	193	192	20	6	2015	21	46
ar15_005.awi	V5	71.161	19.868	214	213	21	6	2015	0	4
ar15_006.awi	V6	71.324	19.837	211	210	21	6	2015	1	53
ar15_007.awi	V7	71.492	19.792	238	237	21	6	2015	3	22
ar15_008.awi	V8	71.749	19.729	268	268	21	6	2015	5	56
ar15_009.awi	V9	71.999	19.678	309	308	21	6	2015	8	54
ar15_010.awi	V10	72.243	19.622	322	321	21	6	2015	11	48
ar15_011.awi	V11	72.488	19.569	391	392	21	6	2015	13	59
ar15_012.awi	V12	72.742	19.511	399	400	21	6	2015	15	56
ar15_013.awi	V13	72.996	19.467	423	426	21	6	2015	18	26
ar15_014.awi	V14	73.245	19.401	448	451	21	6	2015	21	45
ar15_015.awi	V15	73.491	19.335	475	479	22	6	2015	0	18
ar15_016.awi	V16	73.667	19.312	349	351	22	6	2015	2	47
ar15_017.awi	V17	73.826	19.268	235	236	22	6	2015	4	39
ar15_018.awi	V18	73.995	19.218	131	130	22	6	2015	6	3
ar15_019.awi	V19	74.165	19.184	76	71	22	6	2015	8	14
ar15_020.awi	V20	74.251	19.185	56	55	22	6	2015	9	54
ar15_021.awi	H1	73.514	18.775	428	431	22	6	2015	16	5
ar15_022.awi	H2	73.500	18.099	412	414	22	6	2015	18	39
ar15_023.awi	H3	73.500	17.488	426	429	22	6	2015	21	12
ar15_024.awi	H5	73.499	16.836	442	444	22	6	2015	22	50
ar15_025.awi	H6	73.498	16.192	462	465	23	6	2015	0	25
ar15_026.awi	H7	73.498	15.598	482	486	23	6	2015	1	58
ar15_027.awi	H4	73.498	15.015	687	693	23	6	2015	3	39
ar15_028.awi	H8	73.496	14.456	1019	1030	23	6	2015	5	36
ar15_029.awi	H9	73.500	13.843	1300	1315	23	6	2015	7	43
ar15_030.awi	H10	73.501	13.103	1573	1594	23	6	2015	10	21
ar15_031.awi	H11	73.500	12.198	1807	1831	23	6	2015	13	25
ar15_032.awi	H12	73.491	11.071	2063	2093	23	6	2015	16	39
ar15_033.awi	H13	73.500	9.840	2292	2326	23	6	2015	20	40
ar15_034.awi	H14	73.497	8.694	2488	2524	24	6	2015	0	24
ar15_035.awi	H15	73.498	7.811	3046	3098	24	6	2015	4	30
ar15_036.awi	H16	73.500	7.014	2307	2342	24	6	2015	8	21
ar15_037.awi	H17	73.500	6.015	1947	1975	24	6	2015	12	1
ar15_038.awi	H18	73.499	5.056	2749	2795	24	6	2015	15	1
ar15_039.awi	H19	73.500	4.008	2760	2805	24	6	2015	19	20
ar15_040.awi	K16	74.994	4.984	3059	3112	25	6	2015	6	8
ar15_041.awi	K15	75.002	5.998	2828	2874	25	6	2015	9	52

ar15_042.awi	K14	75.004	6.818	2019	2048	25	6	2015	13	39
ar15_043.awi	K13	75.000	7.637	2170	2202	25	6	2015	16	23
ar15_044.awi	K12	75.000	8.484	2890	2939	25	6	2015	19	16
ar15_045.awi	K11	75.001	9.312	2546	2587	25	6	2015	22	51
ar15_046.awi	K10	75.000	10.283	2502	2542	26	6	2015	2	12
ar15_047.awi	K9	74.999	11.450	2382	2419	26	6	2015	5	46
ar15_048.awi	K8	74.999	12.481	2147	2179	26	6	2015	9	32
ar15_049.awi	K7	74.999	13.159	1983	2012	26	6	2015	12	10
ar15_050.awi	K6	74.994	13.709	1807	1832	26	6	2015	14	32
ar15_051.awi	K5	75.000	14.324	1515	1534	26	6	2015	17	10
ar15_052.awi	K4	75.000	14.991	1108	1121	26	6	2015	19	20
ar15_053.awi	K3	74.999	15.408	807	815	26	6	2015	20	55
ar15_054.awi	K2	74.996	5.767	349	351	26	6	2015	22	20
ar15_055.awi	K1	74.999	16.074	222	222	26	6	2015	23	17
ar15_056.awi	K0	75.000	16.500	231	232	27	6	2015	0	24
ar15_057.awi	K-1	74.999	16.983	127	126	27	6	2015	1	30
ar15_058.awi	K-2	74.996	17.467	117	116	27	6	2015	2	37
ar15_059.awi	K-3	74.999	17.978	154	153	27	6	2015	3	47
ar15_060.awi	V21	74.530	18.873	26	24	27	6	2015	12	36
ar15_061.awi	V22	74.604	18.793	68	67	27	6	2015	14	18
ar15_062.awi	V23	74.698	18.677	99	98	27	6	2015	16	3
ar15_063.awi	V24	74.772	18.576	235	236	27	6	2015	17	19
ar15_064.awi	V25	74.862	18.505	205	205	27	6	2015	18	44
ar15_065.awi	V26	74.944	18.423	74	73	27	6	2015	19	36
ar15_066.awi	V27	75.097	18.221	68	67	27	6	2015	21	13
ar15_067.awi	V28	75.261	18.058	63	62	27	6	2015	23	35
ar15_068.awi	V29	75.380	17.921	105	104	28	6	2015	1	10
ar15_069.awi	V30	75.524	17.730	133	132	28	6	2015	2	24
ar15_070.awi	V31	75.698	17.559	212	213	28	6	2015	4	18
ar15_071.awi	V32	75.832	17.334	291	293	28	6	2015	6	24
ar15_072.awi	V33	75.984	17.140	319	321	28	6	2015	8	19
ar15_073.awi	V34/O4	76.128	17.031	289	290	28	6	2015	9	43
ar15_074.awi	V35	76.240	16.840	215	215	28	6	2015	11	32
ar15_075.awi	V36	76.312	16.790	107	106	28	6	2015	12	32
ar15_076.awi	V37P	76.371	16.682	40	40	28	6	2015	14	2
ar15_077.awi	O5	76.165	17.409	307	308	28	6	2015	16	19
ar15_078.awi	O7	76.215	18.419	249	250	28	6	2015	19	20
ar15_079.awi	O8B	76.235	18.697	253	254	28	6	2015	20	19
ar15_080.awi	O2	76.067	16.031	387	390	29	6	2015	0	40
ar15_081.awi	M4	75.999	15.046	338	340	29	6	2015	2	41
ar15_082.awi	O-2	75.966	14.386	344	346	29	6	2015	4	47
ar15_083.awi	O-4	75.949	13.794	914	924	29	6	2015	6	11
ar15_084.awi	O-7	75.898	12.296	1789	1814	29	6	2015	9	11
ar15_085.awi	O-9	75.849	10.201	2296	2331	29	6	2015	13	46
ar15_086.awi	O-11	75.781	7.478	2539	2581	29	6	2015	20	9
ar15_087.awi	O-13	75.702	4.763	2840	2888	30	6	2015	2	19
ar15_088.awi	N-11	76.500	3.999	2609	2651	30	6	2015	10	16
ar15_089.awi	N-10	76.499	4.980	2382	2419	30	6	2015	13	59

ar15_090.awi	N-9	76.500	5.462	2540	2581	30	6	2015	16	29
ar15_091.awi	N-8	76.497	6.006	2543	2584	30	6	2015	19	15
ar15_092.awi	N-7	76.500	6.472	2431	2469	30	6	2015	21	56
ar15_093.awi	N-6	76.503	6.973	2884	2933	1	7	2015	0	49
ar15_094.awi	N-5	76.500	7.460	2500	2540	1	7	2015	4	15
ar15_095.awi	N-4	76.502	7.984	1838	1865	1	7	2015	6	53
ar15_096.awi	N-3	76.502	8.492	2263	2298	1	7	2015	9	26
ar15_097.awi	N-2	76.499	8.981	2260	2294	1	7	2015	12	4
ar15_098.awi	N-1	76.499	9.925	2152	2184	1	7	2015	17	19
ar15_099.awi	N0	76.501	10.995	2075	2106	1	7	2015	21	1
ar15_100.awi	N0P	76.501	11.495	1996	2025	1	7	2015	23	44
ar15_101.awi	N1	76.503	11.952	1879	1905	2	7	2015	2	11
ar15_102.awi	N1P	76.504	12.462	1719	1735	2	7	2015	5	24
ar15_103.awi	N2	76.501	13.000	1509	1522	2	7	2015	10	34
ar15_104.awi	N2P	76.501	13.498	1254	1269	2	7	2015	13	24
ar15_105.awi	N3	76.503	13.978	739	746	2	7	2015	15	56
ar15_106.awi	N3P	76.500	14.498	214	214	2	7	2015	18	33
ar15_107.awi	AUK10	76.563	14.745	142	141	2	7	2015	19	41
ar15_108.awi	N4	76.501	15.001	157	157	2	7	2015	20	48
ar15_109.awi	AUK15	76.476	15.059	170	171	2	7	2015	21	43
ar15_110.awi	n4p	76.502	15.492	142	141	2	7	2015	22	58
ar15_111.awi	auk14	76.551	15.466	94	93	3	7	2015	0	34
ar15_112.awi	auk13	76.591	15.745	39	37	3	7	2015	1	26
ar15_113.awi	auk11	76.622	15.184	63	61	3	7	2015	2	58
ar15_114.awi	auk12	76.672	15.402	50	49	3	7	2015	4	6
ar15_115.awi	auk2	76.867	14.754	103	102	3	7	2015	6	12
ar15_116.awi	auk1	76.933	15.350	168	168	3	7	2015	7	27
AREX2015 leg III (8-23.07.2015)										
ar15_117.awi	S-2	77.617	14.458	142	139	8	7	2015	1	38
ar15_118.awi	S-1	77.599	14.022	136	136	8	7	2015	2	43
ar15_119.awi	S0	77.582	13.548	146	146	8	7	2015	3	39
ar15_120.awi	S1	77.565	13.048	138	137	8	7	2015	5	19
ar15_121.awi	S2	77.550	12.557	155	102	8	7	2015	6	19
ar15_122.awi	S3	77.531	12.039	175	174	8	7	2015	8	14
ar15_123.awi	S3	77.515	11.528	276	274	8	7	2015	10	15
ar15_124.awi	S5	77.499	11.025	747	754	8	7	2015	13	32
ar15_125.awi	S6	77.480	10.534	1259	1271	8	7	2015	15	9
ar15_126.awi	S7	77.464	10.031	1616	1637	8	7	2015	18	4
ar15_127.awi	S7P	77.450	9.500	1925	1949	8	7	2015	20	26
ar15_128.awi	S8	77.432	9.030	2059	2089	8	7	2015	23	7
ar15_129.awi	S8P	77.417	8.549	1341	1357	9	7	2015	1	51
ar15_130.awi	S9	77.401	8.049	2278	2313	9	7	2015	3	50
ar15_131.awi	S9P	77.382	7.521	3521	3584	9	7	2015	6	39
ar15_132.awi	S10	77.369	7.039	2637	2678	9	7	2015	10	45
ar15_133.awi	S11	77.350	6.564	2079	2108	9	7	2015	13	18
ar15_134.awi	S12	77.334	6.037	2567	2607	9	7	2015	15	43
ar15_135.awi	S13	77.301	5.040	2404	2439	9	7	2015	20	1
ar15_136.awi	S14	77.282	4.548	2269	2301	9	7	2015	22	47

ar15_137.awi	S15	77.268	4.034	1495	1524	10	7	2015	2	8
ar15_138.awi	S16	77.237	3.038	2882	2930	10	7	2015	4	54
ar15_139.awi	S17	77.202	2.062	1545	1524	10	7	2015	9	32
ar15_140.awi	S18	77.166	1.039	3176	3229	10	7	2015	12	14
ar15_141.awi	Z14	78.043	1.526	3058	3107	10	7	2015	20	36
ar15_142.awi	Z13	78.065	2.761	2994	3045	11	7	2015	1	22
ar15_143.awi	Z12	78.081	3.937	2776	2824	11	7	2015	5	34
ar15_144.awi	Z11	78.091	4.976	2483	2520	11	7	2015	10	8
ar15_145.awi	Z10	78.101	5.805	2475	2512	11	7	2015	12	44
ar15_146.awi	Z9	78.118	6.618	2289	2323	11	7	2015	15	24
ar15_147.awi	Z8	78.129	7.432	3424	3485	11	7	2015	18	5
ar15_148.awi	Z7	78.139	8.134	2197	2228	11	7	2015	22	7
ar15_149.awi	Z6	78.144	8.602	1546	1565	12	7	2015	3	15
ar15_150.awi	Z5	78.152	8.979	1083	1094	12	7	2015	4	45
ar15_151.awi	Z4	78.157	9.219	687	692	12	7	2015	7	45
ar15_152.awi	Z3	78.160	9.412	264	263	12	7	2015	9	25
ar15_153.awi	Z2	78.164	9.951	263	262	12	7	2015	10	30
ar15_154.awi	Z1	78.171	10.956	257	257	12	7	2015	12	29
ar15_155.awi	EB2-1	78.830	9.279	202	201	12	7	2015	18	13
ar15_156.awi	EB2-1P	78.833	9.072	211	211	12	7	2015	19	27
ar15_157.awi	EB2-2	78.833	8.816	208	207	12	7	2015	20	47
ar15_158.awi	EB2-2P	78.833	8.644	389	390	12	7	2015	21	19
ar15_159.awi	EB2-3	78.833	8.461	655	660	12	7	2015	22	2
ar15_160.awi	EB2-3P	78.833	8.316	836	843	13	7	2015	0	31
ar15_161.awi	EB2-4	78.833	8.112	953	962	13	7	2015	1	38
ar15_162.awi	EB2-4P	78.832	7.886	1049	1060	13	7	2015	4	48
ar15_163.awi	EB2-5	78.833	7.656	1102	1113	13	7	2015	6	3
ar15_164.awi	EB2-5P	78.834	7.353	1197	1211	13	7	2015	7	23
ar15_165.awi	EB2-6	78.835	7.100	1340	1356	13	7	2015	9	38
ar15_166.awi	EB2-6P	78.834	6.905	1536	1555	13	7	2015	11	1
ar15_167.awi	EB2-7	78.834	6.691	1729	1752	13	7	2015	12	27
ar15_168.awi	EB2-7P	78.832	6.429	2045	2074	13	7	2015	14	22
ar15_169.awi	EB2-8	78.831	6.170	2312	2347	13	7	2015	16	21
ar15_170.awi	EB2-8P	78.834	5.927	1575	1524	13	7	2015	19	14
ar15_171.awi	EB2-9	78.834	5.683	2518	2557	13	7	2015	20	56
ar15_172.awi	EB2-9P	78.834	5.473	1540	1523	13	7	2015	23	10
ar15_173.awi	EB2-10	78.834	5.163	2596	2637	14	7	2015	1	3
ar15_174.awi	EB2-10P	78.832	4.705	1506	1524	14	7	2015	5	39
ar15_175.awi	EB2-11	78.833	4.204	2354	2390	14	7	2015	7	13
ar15_176.awi	EB2-11P	78.833	3.699	1504	1523	14	7	2015	10	14
ar15_177.awi	EB2-12	78.835	3.191	2384	2420	14	7	2015	12	4
ar15_178.awi	EB2-12P	78.833	2.559	1505	1524	14	7	2015	14	51
ar15_179.awi	EB2-13	78.834	2.071	2497	2536	14	7	2015	16	34
ar15_180.awi	EB2-14	78.835	1.522	2476	2515	14	7	2015	19	41
ar15_181.awi	EX12	79.416	3.001	2537	2577	15	7	2015	2	0
ar15_182.awi	EX11	79.406	3.452	1494	1524	15	7	2015	5	33
ar15_183.awi	EX10	79.410	3.998	3175	3230	15	7	2015	7	44
ar15_184.awi	EX9	79.413	4.508	2495	2533	15	7	2015	11	58

ar15_185.awi	EX8P	79.417	5.005	2438	2475	15	7	2015	15	47
ar15_186.awi	EX8	79.414	5.472	2194	2225	15	7	2015	19	9
ar15_187.awi	WB15A	80.605	12.061	1086	1098	17	7	2015	11	28
ar15_188.awi	WB14	80.578	12.021	1018	1028	17	7	2015	13	25
ar15_189.awi	WB13	80.552	12.078	931	940	17	7	2015	14	38
ar15_190.awi	WB12	80.520	12.101	794	801	17	7	2015	16	28
ar15_191.awi	WB11	80.484	12.127	638	643	17	7	2015	21	12
ar15_192.awi	WB10	80.466	12.168	542	544	17	7	2015	23	4
ar15_193.awi	WB9	80.450	12.178	469	472	18	7	2015	1	22
ar15_194.awi	WB8	80.438	12.210	367	368	18	7	2015	2	58
ar15_195.awi	WB7	80.420	12.234	231	230	18	7	2015	3	49
ar15_196.awi	WB6	80.393	12.269	180	179	18	7	2015	4	37
ar15_197.awi	WB5	80.355	12.312	169	168	18	7	2015	5	20
ar15_198.awi	WB4	80.296	12.370	181	182	18	7	2015	7	9
ar15_199.awi	WB3	80.233	12.453	191	190	18	7	2015	8	10
ar15_200.awi	WB2	80.159	12.535	180	179	18	7	2015	9	26
ar15_201.awi	WB1	80.099	12.607	186	186	18	7	2015	10	13
ar15_202.awi	Y1	79.663	10.368	34	32	20	7	2015	6	3
ar15_203.awi	Y2	79.674	10.283	82	80	20	7	2015	6	33
ar15_204.awi	Y3	79.699	10.146	133	132	20	7	2015	7	4
ar15_205.awi	Y4	79.728	9.979	309	310	20	7	2015	8	45
ar15_206.awi	Y5	79.752	9.852	370	371	20	7	2015	9	27
ar15_207.awi	Y6	79.786	9.661	426	428	20	7	2015	10	9
ar15_208.awi	Y7	79.832	9.405	451	454	20	7	2015	11	1
ar15_209.awi	Y8	79.891	9.071	469	472	20	7	2015	13	2
ar15_210.awi	Y9	79.945	8.764	479	482	20	7	2015	14	6
ar15_211.awi	Y10	80.006	8.429	494	497	20	7	2015	15	19
ar15_212.awi	Y11	80.069	8.061	509	512	20	7	2015	16	28
ar15_213.awi	Y12	80.126	7.736	533	537	20	7	2015	18	26
ar15_214.awi	Y13	80.182	7.403	560	563	20	7	2015	21	30
ar15_215.awi	Y14	80.246	7.027	575	579	20	7	2015	23	30
ar15_216.awi	Y15	80.306	6.696	560	565	21	7	2015	0	47
ar15_217.awi	Y16A	80.344	6.284	557	560	21	7	2015	2	45
ar15_218.awi	EX7P	79.415	6.021	1776	1799	21	7	2015	8	41
ar15_219.awi	EX7	79.414	6.452	1462	1481	21	7	2015	10	58
ar15_220.awi	EX6	79.414	6.931	1200	1213	21	7	2015	14	9
ar15_221.awi	EX5	79.417	7.344	1027	1037	21	7	2015	16	14
ar15_222.awi	EX4P	79.414	7.604	789	795	21	7	2015	17	56
ar15_223.awi	EX4	79.413	7.852	552	555	21	7	2015	20	9
ar15_224.awi	EX3P	79.415	8.116	270	269	21	7	2015	21	22
ar15_225.awi	EX3	79.415	8.472	189	186	21	7	2015	22	22
ar15_226.awi	EX2	79.415	8.992	131	130	21	7	2015	23	50
ar15_227.awi	EX1	79.415	9.450	132	131	22	7	2015	0	49

Table 2.2 Cruise itinerary

20 June	Arrival to Tromso, embarking of the scientific team. 16:00 UTC Departure to the measurement area.
21 June	16:00 UTC. First station V1. Favorable weather conditions.
22 June	10:00 UTC Station V20, end of section V1. 16:20 UTC station H1. Beginning of section H.
23 June	Continuation of section H.
24 June	End of section H, transit to section K.
25 June	06:20 UTC, station K16. Beginning of section K.
26 June	Continuation of section K.
27 June	End of section K, transit to section V2.
28 June	End of section V2, beginning of section O.
29 June	Continuation of section O.
30 June	End of section O (station O13). Beginning of section N (station N11)
1 July	Continuation of section N.
2 July	23:40 UTC, station N4P. End of section N.
3 July	Stations AUK.
4 July	Arrival to Horsund. Towed CTD section along the fjord axis.
5 July	Measurements in Hornsund.
6 July	Departure from Hornsund. Towed CTD section HS across the shelf.
7 July	Exchange of scientific team, 14:00 LT embarking of new scientists. 19:30 LT training ship alarm. 20:30 LF information briefing for the leg III. 21:00 LT departure for the measurement area, transit to section S. Wind B5-6, waves 1-1.5 m.
8 July	3:30 LT Station S-2, beginning of section S. Optical measurements on stations S0, S2, S4, S6, S7P. Biological sampling on stations S3, S6. Morning moderate to strong wind B5-6, waves 1-1.5 m. Decreasing in the afternoon. Two periods of aerosol measurements.
9 July	Continuation of section S from station S8. Optical measurements on stations S9P, S12; Biological sampling on stations S10, S8. Good weather (B1-2, small waves).
10 July	Continuation of section S from station S14 to S18. two stations added to the standard section to extend it westward for crossing the second branch of the Atlantic water flow. Transit to section Z, beginning on station Z14. Optical measurements on stations S14, S16, Z14; Biological sampling on station S14. No wind, no waves.
11 July	Continuation of section Z from station Z13 to Z8. Optical measurements on stations Z12 and Z8; biological sampling (Multinet) on station Z11. Weak breeze, no waves.
12 July	Continuation of section Z from station Z7 to Z1. Transit to section EB2 (coastward) and measurements on stations EB2-1 to EB2-2P. Optical measurements on stations Z4, Z1 and EB2-1P; biological sampling (Multinet and nets) on stations Z5 and Z7 (additionally only nets on station EB2-1). Weather calm, no waves.
13 July	Continuation of section EB2 from station EB2-3 to EB2-9. Optical measurements on stations EB2-5P i EB2-8; biological sampling (Multinet and nets) on stations EB2-3 and EB2-4 (additionally only nets on station EB2-6). Weather calm, no waves.
14 July	Continuation of section EB2 from station EB2-9P to EB2-14. Optical measurements on stations EB2-11, EB2-13 and EB2-14; biological sampling (Multinet and nets) on station EB2-10, additionally only nets on stations EB2-9 i EB2-14. Section EB2 ended on station EB2-14 (1°30'E) due to reaching ice edge. Weather good in the morning (B1-2), worsening towards afternoon (B3). Forecast of strong winds for next 3 days with a center NW of Svalbard.
15 July	In the night transit to section EX towards station EX13. Ice edge between stations EX12 and EX13, beginning of measurements from station EX12 coastward. In the afternoon fast weather worsening (wind gusts to 20 m/s). Continuation of measurements up to station EX8. On the next station (EX7) cancelling the measurements due to harsh weather (B7, wind gusts 25-30 m/s, waves 1.5-2 m) and transit to section NB with about 6 knots.
16 July	Transit to the area north of Svalbard with the speed of 5-6 knots. Weather B7, wind

	gusts 25-30 m/s, waves 1.5-2 m. Transit through the inner strait on NW tip of Svalbard (Smeerenburgfjoden). On the way to section NB, ice edge reached approx. 10 Nm from station NB1. Cancelling section NB due to ice cover in the area. 21:30 LT start of the towed CTD section between sections NB and WB, beginning next to the Hinlopen Trench exit. Towed CTD section NBWB with the length of 45 Nm, duration ~10 hours. Weather improving, wind gusts 15-20 m/s, fog and drizzling.
17 July	In the night continuation of towed CTD section NBWB northward, after reaching the ice edge continuation along the ice edge towards WB15. Beginning of measurements on section WB on station WP15 A (between WB15 and WB14 due to the ice edge). Optical measurements on stations WB15A and WB13. Biological sampling (Multinet and nets) on station WB12, planned sampling on WB10 cancelled due to high waves. Aerosol measurement station (1 h). in the afternoon, worsening of the weather (B4-5, waves 1-1.5 m).
18 July	Continuation of measurements on section WB on stations WB9 - WB1. Optical measurements on stations WB9 and WB1. After finishing section WB at 14:00 LT transit to the coast for ship mast repair (loosened exhaust pipe in the mast). One hour break for repair. Transit back to section WP. 15:30 LT start of the towed CTD section 2WB seaward. Weather improvement (B3-4, waves 1 m). After reaching the ice edge, change of the section direction to westward along the ice edge.
19 July	Continuation of the towed CTD section 2WB along the ice edge and next coastward. Short failure of the towed CTD, burst and spikes in conductivity due to the blocking of conductivity glass pipe). Cleaning the sensor and connectors, back to measurements. Good weather (B3), waves below 1 m.
20 July	3:20 LT End of the towed CTD section. Transit to section Y and measurements on stations Y1 to Y13. Optical measurements on stations Y3, Y7, Y11 i Y13. Biological sampling (Multinet and nets) on station Y12. Weather good (B2-3), waves 0.5 - 1 m.
21 July	Continuation of section Y towards the ice edge, stations Y14 to Y16A. Last station between Y15 and Y16 due to ice cover on Y16. Optical measurements on stations Y15. After finishing measurements on section Y, transit to section EX to complete missing stations. Measurements on stations EX7P to EX3P. Optical measurements on stations EX7 and EX4P. Weather good (B1-2), waves 0.5 m.
22 July	Continuation of section EX, stations EX3 to EX1. Optical measurements on station EX1. Transit to the towed CTD section EXY and beginning of measurements at 05:50 LT. During the day weather good, in the evening worsened, strong wind and increasing waves (1.5 - 2 m), forecast to B5-6. In the night failure of data transmission from the towed CTD (cable problem). Change to the small winch continuation of measurements.
23 July	Continuation of the towed CTD section EXY until 01:00 LT. End of measurements and transit to Longyearbyen with 9-10 knots. 18:00 LT on anchor in Longyearbyen. End of the AREX2015 leg III.

3. Leg IV, West Spitsbergen fjords, 25.07-12.08.2015

3.1. Scientific goals

- Multidisciplinary studies of plankton and benthos in the West Spitsbergen fjords with main study areas in Horsund, Kongsfjorden and shelf waters in vicinity of both fjords. Collection of samples and in situ hydrographic and biological measurements will contribute to long-term observations of plankton and benthos in the Arctic fjords by IOPAN Marine Ecology Group. Observations and biological sampling will be also part of different national and international projects, including Polish-Norwegian projects PicMac, DWARF, GLAERE, POL-NOR, and MareIncognitum, and three PhD projects.
- Description of physical environment of Svalbard fjords based on hydrographic measurements (temperature, salinity, dissolved oxygen), acoustical and optical measurements, and collection of water and sediment samples.
- Description of the spatial distributions and quantitative-qualitative composition of protozoan plankton and zooplankton communities in Horsund and Kongsfjorden.
- Evaluation of zooplankton abundance in the feeding grounds of the planktivorous little auks in the vicinity of the Horsund outlet.
- Estimation of the droplet flux from the sea surface and their impact on ocean-atmosphere mass and energy exchanges;
- Estimation of the vertical CO_2 fluxes in the atmospheric boundary layer;
- Estimation of latent and sensible heat fluxes between ocean and atmosphere;
- Description of marine aerosols in the Arctic region, aerosol optical thickness and ozone concentration in atmosphere;

3.2. Work at sea

Day	Hours	Area	Measurements and sampling
25.07.2015	00-06.00	Longyearbyen	03.00 Departure from Adventfjorden
25.07.2015	06.00-12.00	Hornsund	
25.07.2015	12.00-18.00	Hornsund	14.00 on anchor in Isbjornhamna
25.07.2015	18.00-24.00	Hornsund	Off-loading for the Polish Polar Station, off-loading for Gnall, acoustic buoy
26.07.2015	00-06.00	Hornsund profile	Beginning of the CTD section along the fjord axis
26.07.2015	06.00-12.00	Hornsund profile	09.30 End of the CTD section along the fjord axis
26.07.2015	12.00-18.00	Hornsund profile	CTD sections across the fjord
26.07.2015	18.00-24.00	Hornsund profile	Plankton sampling on station H1, water chemistry, LOPC, CTD
27.07.2015	00-06.00	Hornsund H1- H3	Plankton sampling on station H2, water chemistry, LOPC, CTD
27.07.2015	06.00-12.00	Hornsund H1- H3	Plankton sampling on station H4, (Burgerbukta), H3 (Burgerbukta) water chemistry, LOPC, CTD
27.07.2015	12.00- 18.00	Hornsund H1- H3	H1, H2 failed Multinet sampling
27.07.2015	18.00-24.00	Hornsund H1- H3	16.30 shelter in Burgerbukta/Lorchbreen, chemical sediment sampling, 12 G-max, 3 box corers, 6 Van Venn, camera
28.07.2015	00-06.00	Hornsund H1- H3	On anchor in Burgerbukta, necrophagic trap

28.07.2015	06.00-12.00	Hornsund H1- H3	Filming of the bottom at 70m on anchor, acoustic measurements at the glacier front
28.07.2015	12.00-18.00	Hornsund H1- H3	Filming, Muhlbaher, CTD, Kvalfanger at 70m on anchor, acoustic profiles
28.07.2015	18.00-24.00	Hornsund H1- H3	Burgerbukta sill, Adriabukta, bottom filmingat 40m-50mon anchor, acoustic measurements
29.07.2015	00-06.00	Burgerbukta	H3 benthos monitoring, water chemistry, CTD, photos
29.07.2015	06.00-12.00	Burgerbukta	Hansbreen on anchor, necrophagic trap, photos at 22m
29.07.2015	12.00-18.00	Brepolen	Hansbreen on anchor at 54m, water chemistry, CTD, photos
29.07.2015	18.00-24.00	Centrum	Burgerbukta, dredge at 100m, 40m, Mulbacher 1 i 2 , Peierl 1 i 2, Tucker Trawl bottom and subsurface
30.07.2015	00-06.00	Burgerbukta	Transit to Samarinvagen, acoustic measurements, anchorage
30.07.2015	06.00-12.00	Burgerbukta	Samarinvagen CTD, photo, 4 x Tucker Trawl on stations S1 and S2
30.07.2015	12.00-18.00	Brepolen	H3 - Brepolen, recovery of acoustic buoy, photos of the bottom and water column at 5, 25, 50, 75, 100, 120m. Transit to H2, strong wind
30.07.2015	18.00-24.00	Centrum	Mendelejewbreen photos, 4x Tucker Trawl
31.07.2015	00-06.00	SW Spitsbergen	Departure for the shelf area for the little auk polygon, GIS measurements on land
31.07.2015	06.00-12.00	SW Spitsbergen	GIS measurements on land in Burgerbukta
31.07.2015	12.00-18.00	SW Spitsbergen	GIS measurements on land in Burgerbukta
31.07.2015	18.00-24.00	SW Spitsbergen	GIS measurements on land in Burgerbukta
01.08.2015	00-06.00	SW Spitsbergen	Strong wind, collection of Gammarus samples on the shore
01.08.2015	06.00-12.00	SW Spitsbergen	Strong wind, collection of Gammarus samples on the shore
01.08.2015	12.00-18.00	SW Spitsbergen	Strong wind, collection of Gammarus samples on the shore
01.08.2015	18.00-24.00	Hornsund outer	18.00 return from the little auk study area, collection of the land group from Gnall and Hornsundu
02.08.2015	00-06.00	Hornsund to LYR	Departure to Longyearbyen, PN1 CTD, water samples, 2 x dredges at 100 and 50m
02.08.2015	06.00-12.00	Hornsund to LYR	Departure to Longyearbyen, PN1 CTD, water samples, 2 x dredges at 100 and 50m
02.08.2015	12.00-18.00	Hornsund to LYR	Dredges, water samples, CTD, Pol-Nor, PN3, end at 13:00
02.08.2015	18.00-24.00	LYR	Arrival to Longyearbyen 17.00, exchange of scientists, 21.00 departure to NyAlesund
03.08.2015	00-06.00	LYR	Station PN 4 dredges at 50m, PN5 dredges at 50, 100, 150m , CTD, water samples
03.08.2015	06.00-12.00	LYR to Kongsfjorden	Station PN 6, CTD, water samples, dredges at 50, 100, 150m
03.08.2015	12.00-18.00	LYR to Kongsfjorden	Ny Alesund, water tanking for the ship 15:10- 18:30
03.08.2015	18.00-24.00	LYR to Kongsfjorden	Benthos sampling on station KST1, 350m
04.08.2015	00-06.00	Kongsfjorden profiles	Benthos and sediment sampling on station KST1, 315m
04.08.2015	06.00-12.00	Kongsfjorden profiles	Benthos and sediment sampling on station KST3, 305m
04.08.2015	12.00-18.00	Kongsfjorden profiles	Benthos and sediment sampling on station KST2, 285m; from 15:00 station K585m
04.08.2015	18.00-24.00	Kongsfjorden profiles	Kongsfjorden profile, CTD, acoustic measurements, LOPC
05.08.2015	00-06.00	KGF 1 to KGF 5	Kongsfjorden profile, CTD, acoustic measurements, LOPC
05.08.2015	06.00-12.00	KGF 1 to KGF 5	Kongsfjorden profile, CTD, acoustic measurements, LOPC, end at 09:15, transit to K7
05.08.2015	12.00-18.00	KGF 1 to KGF 5	Drop camera next to the glaciers Dyrevika1-7, collection of water samples from rivers
05.08.2015	18.00- 24.00	KGF 1 to KGF 5	ROV software testing USBL, necrophagic trap, acoustics

06.08.2015	00-06.00	KGF 1 to KGF 5	Necrophagic trap next to the glacier, acoustics until 06:00
06.08.2015	06.00-12.00	KGF 1 to KGF 5	Drop camera at Blomstrandhalvoya, 6x Van Venn, Mi4
06.08.2015	12.00-18.00	KGF 1 to KGF 5	Dredge EBS at Blomstrandhalvoya and Kapp Guissez 50, 100 and 200m
06.08.2015	18.00-24.00	KGF 1 to KGF 5	Drop camera from K1 to K3 - 8 stations at 100m, collection of water samples from rivers
07.08.2015	00-06.00	KGF profiles	On anchor, acoustic measurements at Kongsbreen K5
07.08.2015	06.00-12.00	KGF profiles	Dredges on K5, Photo 9 , 2x Tucker Trawl W from K5, start of plankton measuremetns at K5
07.08.2015	12.00-18.00	KGF profiles	Plankton station K5, photos 10, Tucker Trawl K sill, K4,
07.08.2015	18.00-24.00	KGF profiles	Tucker Trawl k3 x 3, photos KGFoto10-13
08.08.2015	00-06.00	Kongsfjorden	On anchor, acoustic measurements at Kongsbreen, Kongsvegen,
08.08.2015	06.00-12.00	Kongsfjorden	KGF3 plankton MN, WP2 500um, 60um, water samples, CTD, LOPC
08.08.2015	12.00-18.00	Kongsfjorden	KGF2 plankton MN, WP2 500um, 60um, water samples, CTD, LOPC
08.08.2015	18.00-24.00	Kongsfjorden	KGF1- V12, V14, plankton MN, WP2 500um, 60um, water samples CTD, LOPC, TT for chemistry
09.08.2015	00-06.00	Shelf area	Transit to K0, plankton, water samples, CTD, LOPC, MN, TT, transit to anchorage next to Blomastrandoya
09.08.2015	06.00-12.00	Kongsfjorden	Land group packing
09.08.2015	12.00-18.00	Ny Alesund, central, K5	Collection of scienctists from Ny Alesund, retrieval of underwater cameras
09.08.2015	18.00-24.00	Ny Alesund, central, K5	Departure for the open ocean plankton stations 18.00, dresge at 100m for chemistry
10.08.2015	00-06.00	Shelf area	Plankton stations V10 and V6, leaving the area due to strong wind waves 1.5m, B5
10.08.2015	06.00- 12.00	Kongsfjord to LYR	Transit to Isfjorden, 08.00 station ISF section KSB CTD, Juday, Wp2 100um, WP2 500um, water samples from 6 levels
10.08.2015	12.00-18.00	Isfjorden	KBS Isfjord profile, station IFF4 & 3, plankton, LOPC, LISST
10.08.2015	18.00-24.00	Isfjorden	KBS Isfjord profile station BAB (ISF1),BAB1, plankton, LOPC, LISST
11.08.2015	00-06.00	Isfjorden	On shore collection of Gammarus samples and plants in Billefjord - Piramiden
11.08.2015	06.00-12.00	Isfjorden	Return to Adventfjorden
11.08.2015	12.00-18.00	Isfjorden	On anchor in Adventfjorden
11.08.2015	18.00-24.00	Isfjorden	On anchor in Adventfjorden
12.08.2015	00-06.00	Isfjorden	On anchor in Adventfjorden
12.08.2015	11.30	Isfjorden	Disembarking of scientits, transfer to the airport in Longyearbyen