

NOTIFICATION OF PROPOSED RESEARCH CRUISE**PART A: GENERAL**

1. NAME OF RESEARCH SHIP
RV POLARSTERN CRUISE NO.
PS126

2. DATES OF CRUISE From 17.05.2021 To 01.07.2021

3. OPERATING AUTHORITY:

Alfred Wegener Institute Helmholtz Centre for Polar- and Marine Research
Am Handelshafen 12, 27570 Bremerhaven, Germany
Phone +49 (0) 471-4831-2241 , Fax +49 (0) 471-4831-1355,
E-mail: Schiffskoord@awi.de

4. OWNER: "Federal Ministry of Education and Research" - German Government -

5. PARTICULARS OF SHIP:

Name:	POLARSTERN
Nationality:	GERMAN
Overall length: (in metres)	117.91
Maximum draught: (in metres)	11.21
Net tonnage:	3532.30
Propulsion e.g. diesel/steam:	diesel
Call sign:	DBLK

6. CREW

Name of master:	
Number of crew:	44

7. SCIENTIFIC PERSONNEL

<u>Scientist in charge</u>	
Name and address : Dr. Thomas Soltwedel / Katja Metfies	
Street	: Am Handelshafen 12
City	: 27568 Bremerhaven
Phone	: +49 471 4831 -1775 / 2083
Fax	: +49 471 4831 1149
E-mail	: Katja.Metfies@awi.de
No. of Scientists : 52	

8. GEOGRAPHICAL AREA IN WHICH SHIP WILL OPERATE (with reference to latitude and longitude)

69°N, 10°W / 82°N, 20°E (see also attached map)

9. BRIEF DESCRIPTION OF PURPOSE OF CRUISE

To perform basic marine research in biological, chemical, geological and physical oceanography.

10. DATES AND NAMES OF INTENDED PORTS OF CALL
Departure: 17.05.2021 - Bremerhaven (Germany);
Stopover: in the period 07.-11.06.2021 - Tromsø (Norway);
Arrival: 01.07.2021 – Bremerhaven (Germany)

11. ANY SPECIAL REQUIREMENTS AT PORTS OF CALL
Exchange of personnel; unloading/loading of equipment; logistics.

NOTIFICATION OF PROPOSED RESEARCH CRUISE

PART B: DETAILS

1. NAME OF RESEARCH SHIP
RV POLARSTERN

CRUISE NO.
PS126

2. DATES OF CRUISE

From 17.05.2021

To 01.07.2021

3 a) PURPOSE OF RESEARCH

The work during the RV POLARSTERN expedition PS126 in late summer 2021 will support SIOS (Svalbard Integrated Observing System) and ICOS (Integrated Carbon Observation System). It will also contribute to the research programme of the AWI called PACES II (Polar Regions and Coasts in the changing Earth System). The cruise will further contribute to the infrastructure project FRAM (Frontiers in Arctic marine Monitoring), financially supported by the German Helmholtz Association (HGF) and aiming to establish an open-ocean observing system in Fram Strait.

The proposed research during PS126 will mainly contribute to the time-series studies at the LTER (Long-Term Ecological Research) site HAUSGARTEN (78°N-80°N, 5°W-12°E), where we investigate the impacts of Climate Change on an Arctic marine ecosystem through field studies, observations, and models since 1999. Multidisciplinary research activities at HAUSGARTEN cover almost all compartments of the marine ecosystem from the pelagic zone to the benthic realm.

Water column studies during PS121 include the assessment of physico-chemical parameters as well as flux measurements of particulate organic matter to the deep seafloor, at atmospheric measurements. Plankton investigations comprise the regular sampling of organisms with water bottles and nets to conduct molecular investigations on pico- and nanoplankton. Benthic investigations include analyses of biogenic sediment compounds to estimate organic matter input to the deep seafloor as well as the activity, biomass, numerical abundance and diversity of the benthic fauna from bacteria to megafauna.

The central HAUSGARTEN station at 2,500 m water depth off Svalbard serves as an experimental area for unique biological short- and long-term experiments at the deep seafloor to determine the factors controlling deep-sea biodiversity. The small benthic biota (size range: bacteria to meiofauna) is in focus of in situ experimental work. We study their reaction to sporadic food supplies or the diminishing of food/energy supply as well as effects of physical disturbances. Results from these experiments help to elucidate how the small benthic biota interacts with each other and with their changing environment.

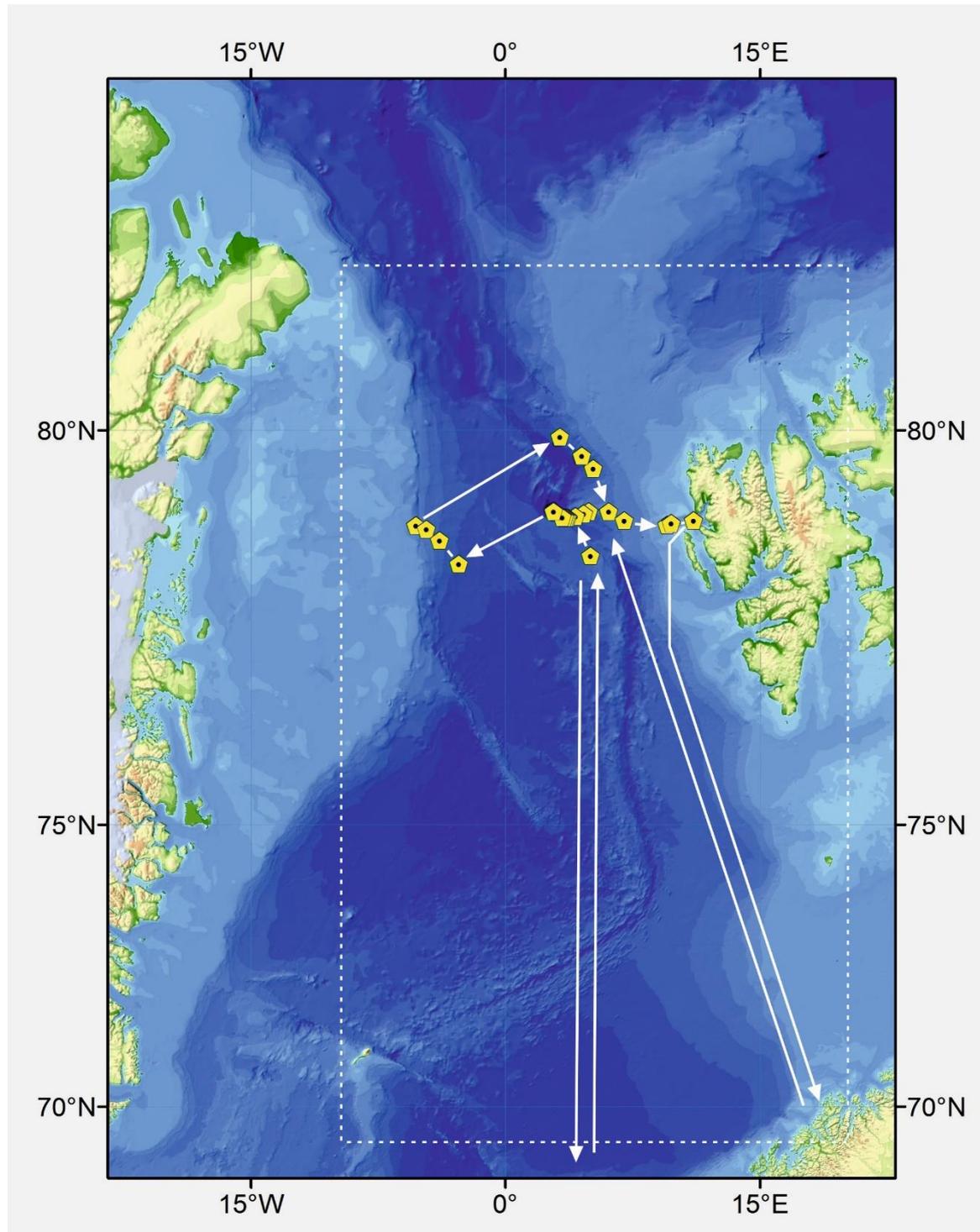
3 b) GENERAL OPERATIONAL METHODS (including full description of any fish gear, trawl type, mesh size, etc.)

- Operation of an Autonomous Underwater Vehicle (AUV) equipped with a camera system, CTD, CO₂ sensor, optical chlorophyll *a* sensor, and a water sampler (15 x 250 ml tubes) down to max. 3000 m.
- Operation of *in situ*-camera systems for observation of organisms in the water column
- CTD/Rosette-Sampler deployments to assess water column properties (temperature, salinity, oxygen).
- Exchange of moorings with autonomous water samplers and sediment traps to assess particle fluxes and sensors for temperature, chemical constituents, current velocity and direction, oxygen and light.
- Deployment of cabled camera systems to assess zooplankton organisms and sinking particles.
- Deployment of a cabled camera systems to assess distribution patterns of epi/megabenthic organisms, including a side-scan sonar to assess seafloor topography and a mini-ROV for closer inspections of seafloor structures, benthic organisms, and temporary deployed under-water platforms (benthic crawler).
- Deployment of a cabled light-meter to determine properties of light in the water column.
- Deployment and recovery of short-term and long-term free-falling systems (bottom-lander) equipped with microprofiler carrying oxygen electrodes, optodes for oxygen and pH, larvae sampler, and cameras.
- Deployment and recovery of short-term and long-term mobile seafloor platforms equipped with microprofiler carrying electrodes for oxygen and pH, optodes, and camera systems.
- Collection of sediment samples with multicorer and box corer.
- Collection of plankton organisms with water samplers, *in situ*-pumps, and plankton nets (20-4000 µm).
- Collection of sinking particles with drifting trap-moorings and a marine snow catcher.
- Collection of sea-ice samples.
- Collection of air-samples with a filter-packed sampling system.
- Recording data by (some ship-borne) acoustic devices (e.g. Simrad EK 60, Parasound).
- Posidonia USBL navigation, necessary for locating moorings at the seafloor and tracking them after release through the water column for safe recovery.

4. ATTACH CHART showing (on an appropriate scale) the geographical area of intended work, positions of intended station, tracks of survey lines, positions of moored/ seabed equipment, areas to be fished areas of planned operations

see Attachment I

Attachement I: Planned cruise track (solid white lines) and main sampling stations (yellow pentagons) of Polarstern expedition PS126 (broken line: geographical area in which the ship will operate)



5 a) TYPES OF SAMPLES REQUIRED (e.g., geological/water/plankton/fish/radionuclide)

Water, sea ice and surface sediment samples; 'marine snow' (sinking particles); bacteria, plankton, and benthos; underwater photographs and videos; hydrographic profiles from CTDs; current-meter data (velocities, directions); salinometer data; sediment profiles from multi-beam echosounding and parasound; microprofiles to measure surface sediment properties.

EnRoute or Underway measurements:

WaMoS II - wave radar

The WaMoS II wave radar of firm OceanWaves / Rutter is operating on X-band and is providing sea state parameters: significant wave height, peak wave direction, peak wave period, peak wave length, and sea surface current. The system is able to detect and analyze different wave systems of swell and wind sea at once.

Measurements are used to support synoptic observations of meteorologist, especially at night. To increase safety on board, the data are also visualized on the bridge to detect freak waves.

Synoptic observations are sent periodically to WMO (World Meteorological Organization) data center. Raw data and resulting parameters of wave radar are recorded and archived on hard disc. They are not available online but on demand. Product description can be found at

<http://www.rutter.ca/wamos-ii-wave-and-current-monitoring>.

Cloud camera

The cloud camera makes pictures in optical spectrum with resolution of 1280 x 720 pixels. The field of vision covers one-third the ocean and two-thirds the sky. The pictures are made periodically with frequency of one picture per ten minutes.

Every hour one picture is sent by email to the German Weather Forecast – Training Center (DWD – Trainingszentrum) to give an impression about the weather situation in comparison to the numerical meteorologic values. The pictures are used for that training purpose only. See also <http://www.eumetrain.org/polarstern.html>.

DOAS

The DOAS (Differential Optical Absorption Spectroscopy) system is measuring several atmospheric tracer gases like NO₂, NO₃, SO₂, O₃, HONO, HCHO, ... by detecting/analyzing scattered light.

The data are recorded and archived on local hard disc. They are not available and distributed online but offline on demand. See also at homepage of University of Heidelberg

http://www.hce.uni-heidelberg.de/analytics_en/lab_doas_pla.html.

Distrometer

The optical distrometer ODM 470 is measuring and analyzing precipitation. Measuring particle sizes and in correlation with meteorological data solid, fluid, and mixed phase precipitation can be distinguished to be aimed at an automatic classification.

The system is still under development. The data are recorded and archived on local hard disc. They are not available or distributed online but offline on demand.

Cosmic Ray

Myon detector and neutron detector are passive sensors to count cosmic rays that are energetic particles, which are modulated by the Sun and are occasionally sent out by the Sun.

The measurements are also set in correlation to atmospheric parameters, i.e. the pressure. Data are collected for education and for basic research. The neutron monitor project is realized in cooperation with North-West University Potchefstroom (see <http://www.nwu.ac.za/neutron-monitor>, contact nmsupport@nwu.ac.za). Data are sent per email once per day to DESY (Deutsches Elektronen Synchrotron) Zeuthen and University of Kiel. Data of neutron monitor are published in database: <http://www.nmdb.eu/nest/> (station: POL1).

pCO₂ analyzer

The pCO₂ system measures the partial pressure of carbon dioxide (CO₂) of water and air using a LI-COR infrared analyzer. For calibration purposes, four reference gases are used which contain air with a known concentration of CO₂. The data are registered for fundamental research of the world-wide carbon cycle in the oceans and in the atmosphere. Onboard Polarstern there are two different systems installed: System one from company General Oceanics (GO) and system two from the company SubCtech. Following parameters of the SubCtech analyzer are recorded in the ships data management system (<https://dship.awi.de/dship-extraction/>): CO₂ (air) [ppm], CO₂ corrected (water) [ppm], CO₂ density [mmol/m²], H₂O (air) [ppt], H₂O density [mmol/m²], xCO₂ dry [μmol].

The parameter of the GO system archived in DShip is CO₂ corrected (water) [ppm] only. The data are processed in the home laboratory. They are part of and delivered to the world-wide data collection effort SOCAT (Surface Ocean CO₂ Atlas), which collects all oceanic CO₂ data and produces a freely available CO₂ data product.

Thermosalinograph (Polarstern)

The sensors Seabird SBE21 and SBE38 (<http://www.seabird.com/sbe21-seacat-thermosalinograph>) are measuring conductivity [mS/cm] and temperature [°C]. Additional parameters salinity [PSU] and sound velocity [m/s] are internally calculated and are also recorded in ships data management system (<https://dship.awi.de/dship-extraction/>). Data are collected for basic research.

After postprocessing and validation the data are archived in PANGAEA database: <http://www.pangaea.de>. (use keywords: polarstern thermosalinograph)

Water sound velocity – SVP/T (Polarstern)

The sensor of type SVP 70 from firm Teledyne RESON is measuring sound velocity of sea water taken from the ship's keel. Data are collected for realtime refraction correction of multibeam echo sounder data and for basic research. The data are recorded continuously in ships data management system (<https://dship.awi.de/dship-extraction/>).

FerryBox

The system FerryBox of firm 4H-Jena (<http://www.4h-jena.de/en/maritime-technologies/flow-systems/ferrybox/>) is a flow-through system analyzing characteristics of sea water: CDOM (Carbon Dissolved Organic Material) [ppb], conductivity [mS/cm], fluorescence chlorophyll a (raw) [μg/l], fluorescence chlorophyll a (TR) [μg/l], oxygen corrected [μmol/l], pH [], phycocyanin [cells/ml], turbidity [NTU], and water temperature [°C]. Data are collected for basic research and are archived in ship data management system: <https://dms.awi.de/dship-extraction/>.

ADCP

The Acoustic Doppler Current Profiler (ADCP) of type Ocean Surveyor from firm Teledyne RDI (<http://www.teledynemarine.com/ocean-surveyor-adcp>) is operating on 150 kHz. Transmitting power is 0.4 kW at source level of 217 db re 1µPa @ 1m. By default 40 bins with size of 8m each are detected. The measurements are performed for basic research. Detected velocities are recorded in files without verification. First bin is also archived in ships data management system: <https://dms.awi.de/dship-extraction/>.

Hydroacoustic Water Depth

Single beam echo sounder measurements are performed to amend precise knowledge of sea floor depths. The depths are measured by Simrad EK60 echo sounder, which has no beam steering, an opening angle of 11° and is operating on 18 kHz. The transmission power amounts to 2 kW at noise level of 226.6 db re 1µPa @ 1m. The system does not apply sound velocity profile but static c-mean value of 1500 m/s. Measured depths are recorded in ships data management system: <https://dms.awi.de/dship-extraction/>.

Endotherm observation

For statistical purpose the nautical officers are recording sightings of endotherm like whales and seals into digital log. In case of environmental protection obligations the nautical officers are assisted by scientific observers at this task. If requested the observation is supported by infrared camera.

An additional camera is available for the helicopter to support above mentioned tasks.

Magnetics

To measure deviations of the earth's magnetic field two fluxgate magnetometers from Firm Magson GmbH are installed in the crow's nest. The data are registered for basic research. The data will not be available in public repository but will be archived password protected in the PANGAEA database: <https://www.pangaea.de/>

Gravimetry

To measure deviations of the earth's gravity field a sea gravimeter of type KSS 32-M from Firm Bodensee Gravimeter Geosystem (BGGs) GmbH is installed. The data are registered for basic research. The data will not be available in public repository but will be archived password protected in the PANGAEA database: <https://www.pangaea.de/>

Meteorological measurements

Miscl. meteorological measurements, incl. balloon sampling

Air- and water measurement/sampling

Above instruments and others

Expedition specific measurements

TYPES OF SAMPLES REQUIRED (e.g., geological/water/plankton/fish/radionuclide):

- Geological/sediment samples,
- water samples
- sea-ice samples

5 b) METHODS OF OBTAINING SAMPLES (e.g., dredging/coring/drilling/fishing, etc. When using fishing gear, indicate fish stocks being worked, quantity of each species required, and quantity of fish to be retained on board).

AUV surveys, CTD/rosette water sampler hauls, drilling of sea ice, exchange of moorings with autonomous water samplers, current meters and sediment traps, plankton net hauls, in situ microprofiler (glass electrodes) measurements, multicorer and box corer hauls to collect bacteria, meio- and epi/megabenthos (no fishing), multibeam echosounder and sediment profiling echosounder measurements, use of cameras systems (still and video), deployment of free-falling systems (bottom-lander).

6. DETAILS OF MOORED EQUIPMENT

Mooring ID	Station ID	Latitude	Longitude	Water depth (m)	Top Float (m)
HG-IV-FEVI-40	PS121/026-3	78° 59.996' N	04° 19.92' E	2614	52
HG-IV-S-4	PS121/026-2	79° 01.34' N	04° 15.75' E	2603	20
HG-IV-SWIPS-2019	PS121/026-1	79° 01.37' N	04° 23.97' E	2542	138
F4-19	PS121/013-1	78° 59.98' N	06° 59.98' E	1246	53
F4-S-4	PS121/013-2	79° 00.71' N	06° 57.81' E	1264	18
F4-W-2	PS121/013-3	79° 00.70' N	07° 02.15' E	1280	150
HG-N-FEVI-39	PS121/046-3	79° 44.35' N	04° 30.36' E	2711	48
HG-N-S-1	PS121/044-1	79° 56.64' N	03° 07.19' E	2564	15
HG-EGC-6	PS121/031-3	78° 59.75' N	05° 23.78' W	1031	50
Long-term Lander 1	PS121/050-1	79° 04.09' N	04° 09.59' E	2471	-
Long-term Lander 2	PS121/022-1	79° 00.14' N	05° 26.74' W	1015	-
TRAMPER (<i>moving!</i>)	PS121/035-8	78° 59.99' N	05° 26.36' W	985	-
NOMAD (<i>moving!</i>)	PS121/050-2	79° 07.44' N	04° 20.05' E	2424	-

7. ANY HAZARDOUS MATERIALS (chemicals/explosives/gases/radioactives, etc.)
(Use separate sheet if necessary)

- a) Type and trade name
 b) Chemical content (and formula)
 c) IMO IMDG code (reference and UN no.)
 d) Quantity and method of storage on board
 e) If explosives give dates of detonation **NO EXPLOSIVES**
 Method of detonation
 Position of detonation
 Position of detonation
 Frequency of detonation
 Depth of detonation
 Size of explosive charge in kg.

See attachment II

8. DETAIL AND REFERENCE OF

a) Any relevant previous/future cruises

Previous cruises:

POLARSTERN ARK XV/1	23.06.-18.07. 1999
POLARSTERN ARK XVI	01.07.-31.08. 2000
L'ATALANTE "Arctic 2001"	19.06.-24.07. 2001
POLARSTERN ARK XVIII	25.06.-24.08. 2002
POLARSTERN ARK XIX/3	23.05.-07.08. 2003
POLARSTERN ARK XX/1	16.06.-16.07. 2004
POLARSTERN ARK XXI/1b	13.08.-19.09. 2005
MARIA S. MERIAN MSM02/4	20.08.-16.09. 2006
POLARSTERN ARK XXII/1a-c	29.05.-25.07. 2007
POLARSTERN ARK XXIII/2	04.07.-10.08. 2008
POLARSTERN ARK XXIV/2	10.07.-03.08. 2009
POLARSTERN ARK XXV/2	30.06.-29.07. 2010
POLARSTERN ARK XXVI/2	13.07.-03.08. 2011
POLARSTERN ARK XXVII/2	15.07.-30.07. 2012
MARIA S. MERIAN MSM29	23.06.-12.07. 2013
POLARSTERN PS85	06.06.-03.07. 2014
POLARSTERN PS93.2	21.07.-15.08. 2015
POLARSTERN PS99	13.06. – 16.07.2016
POLARSTERN PS107	23.07. – 19.08.2017
POLARSTERN PS114	10.07. – 03.08.2018
POLARSTERN PS121	10.08. – 13.09.2019

Future cruises are planned.

b) Any previously published research data relating to the proposed cruise

All cruise reports with detailed station lists are published in the series "Reports on Polar Research" by Alfred-Wegener-Institute for Polar-und Marine Research, Bremerhaven and are online available at the AWI web page.

9. NAMES AND ADDRESSES OF SCIENTISTS OF THE COASTAL STATE(S) IN WHOSE WATERS THE PROPOSED CRUISE TAKES PLACE WITH WHOM PREVIOUS CONTACT HAS BEEN MADE

Dr. Jon Børre Ørbæk, The Research Council of Norway, P.O Box 564, N-1327 Lysaker, Norway.

Prof. Paul Wassmann, UiT Norges arktiske universitet, Postboks 6050, Langnes, N-9037 Tromsø, Norway.

Prof. Stig Falk-Petersen, Polarmiljøsenderet, N-9296 Tromsø, Norway.

Prof. Jürgen Mienert, Department of Geology, University of Tromsø, Dramsveien 201, N-9037 Tromsø, Norway.

Dr. JoLynn Carroll, Akvaplan-Niva A/S, Polarmiljøsenderet, N-9296 Tromsø, Norway

Dr. Marit Reigstad, University of Tromsø, Norwegian College of Fishery Sciences, Breivika, N-9037 Tromsø, Norway.

Prof. Stein Sandven, Dr. Hanne Sagen, Nansen Environmental and Remote Sensing Center, NERSC, Thormøhlens gate 47, N-5006, Bergen, Norway.

Dr. Anna Vader, The University Centre in Svalbard, P.O. Box 156 N-9171 Longyearbyen, Norway

10. STATE

a) Whether visits to the ship in port by scientists of the coastal state concerned will be acceptable
(Yes/No)

Yes

b) Participation of an observer from the coastal state for any part of the cruise together with the dates and the ports for embarkation and disembarkation

Possible but not planned.

c) When research data from the intended cruise are likely to be made available to the coastal state and by what means

Data are available digitally within one year after the cruise. In addition, the data are published in the Reports of Polar Research by AWI and in other reports, papers and in international scientific journals. Via Internet:
<http://www.pangaea.de/>
<https://www.pangaea.de/expeditions/cr.php/Polarstern>

PART C. SCIENTIFIC EQUIPMENTCoastal state: **Denmark /Greenland** Port of call: Bremerhaven/Bremerhaven Dates: 17.05.-01.07.2021

Indicate "YES" or "NO":

<u>Scientific work by function:</u>	Water column and/or sediment sampling of the seabed	Fisheries research within fishing limits	Research concerning the natural resources of the continental shelf or its physical characteristics	DISTANCE FROM COAST		
				Within 3 nm	Between 3-12 nm	Between 12-200 nm
Meteorological measurements	N	N	N	N	N	Y
Balloon sampling	Y	N	N	N	N	Y
Air sampling: (DOAS, Neutron detector & Cosmic particles, pCO ₂ measurement)	Y	N	N	N	N	Y
Water sampling: (pCO ₂ measurement, Thermosalinograph, Ferrybox)	Y	N	N	N	N	Y
Endotherme observing	Y	N	N	N	N	Y
ADCP sea current measurement	Y	N	N	N	N	Y
Gravity	N	N	N	N	N	Y
Magnetometry	N	N	N	N	N	Y
Depth measurements	Y	N	N	N	N	Y
Cosmic particles	Y	N	N	N	N	Y
"PARASOUND" sediment echo sounder	Y	N	N	N	N	Y
"EK60" watercolumn sounder	Y	N	N	N	N	Y
"HYDROSWEEP" multibeam echo sounder	Y	N	N	N	N	Y
CTD & multiwater sampler (rosette)	Y	N	N	N	N	Y
Wave -/ seacurrent radar	N	N	N	N	N	Y
Seabed sampling	Y	N	N	N	N	Y
Fishing	N	N	N	N	N	N
Moored instruments	Y	N	N	N	N	Y
Towed instruments	Y	N	N	N	N	Y
Seismics	Y	N	N	N	N	Y
	N	N	N	N	N	N

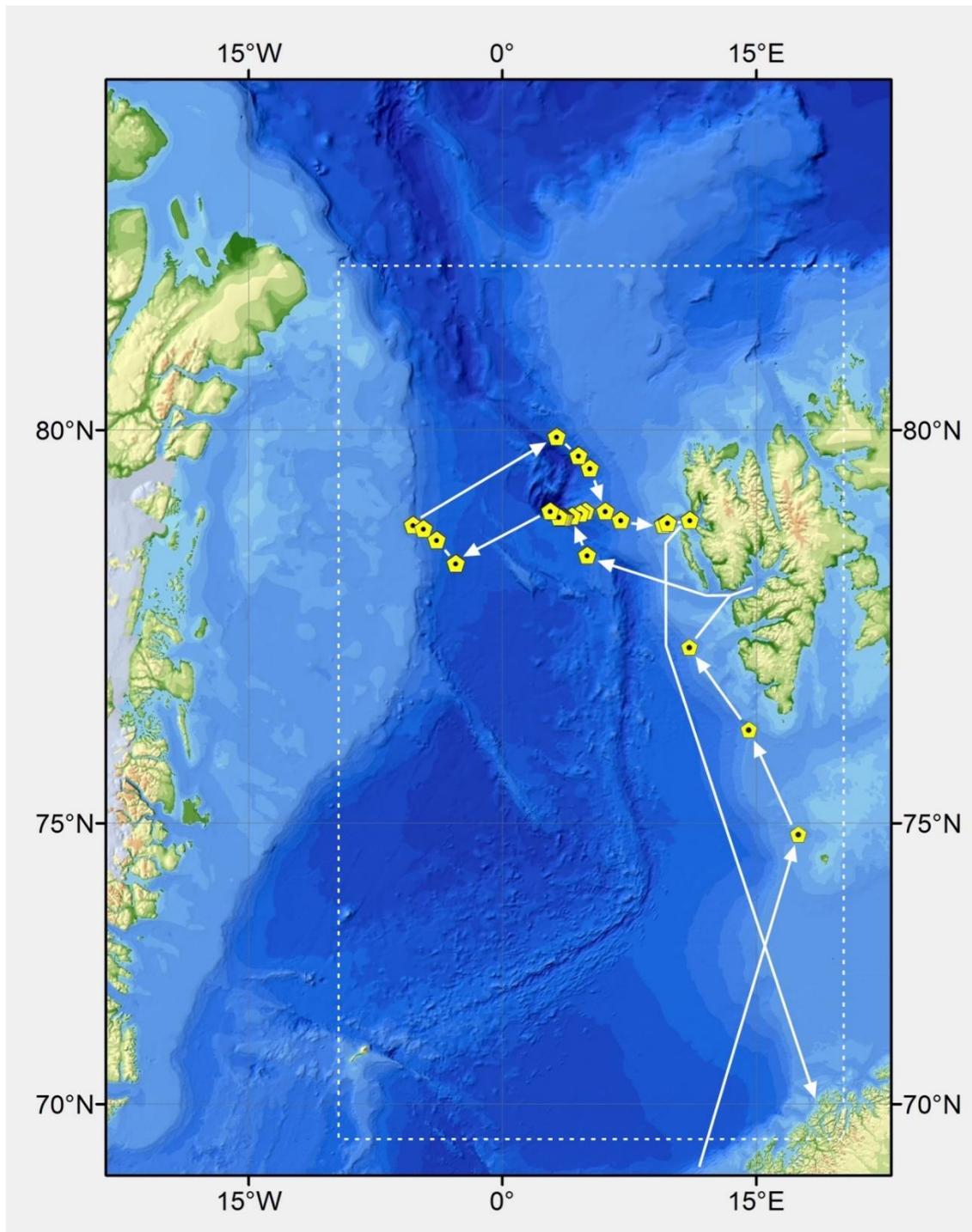
(M.Hirse Korn)

Date: 19.11.2020

(On behalf of the Principal Scientist)

IF ANY DETAILS ARE MATERIALLY CHANGED REGARDING DATES/AREA OF OPERATION AFTER THIS FORM HAS BEEN SUBMITTED, THE COASTAL STATE AUTHORITIES MUST BE NOTIFIED IMMEDIATELY

Attachment 1 (Map)



Planned cruise track (solid white lines) and sampling stations (yellow pentagons) of Polarstern expedition PS99 (broken line: geographical area in which the ship will operate)

Attachment II (Dangerous goods)

No.	Proper Shipping Name	IMO	UN-Code	Pack.Group	Approx. Amount [ml]	Approx. Amount [Pieces]	Approx. Amount [g]
1	HYDROCHLORIC ACID, LTD QTY (37%)	8	1789	III	3750		
2	Mercury compounds, liquid, n.o.s. (Mercuric Chloride Solution, satu	6.1	2024	II	750		
3	ETHANOL, LTD QTY (99,9% Mol Bio Grade)	3	1170	II	38750		
4	ETHANOL, LTD QTY (95% TECHNICAL GRADE)	3	1170	II	9500		
5	FORMALDEHYDE SOLUTION with not less than 25 % formaldehyde, L	8	2209	III	25000		
6	AEROSOLS, LTD QTY	2.1/2.2	1950	n.a.	2700		
7	WD40 LTQ		1950		400		
8	Spray paint LTQ		1950				
9	Formaldehyd buffered with hexamethylenetetramin	8/4.1	2209/1328	III	4000		
10	Mercury II chloride (5%)	6.1	1624	II	3200		
11	Bacilloid				4000		
12	ACETONE 100%ig	3	1090	II	4000		
13	ACETONE 90%ig for CPE	3	1090	II	8000		
14	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Manga	9	3077	III	400		
15	SODIUM HYDROXIDE, SOLID, LTD QTY	8	1823	II		80	
16	POTASSIUM HYDROXIDE, SOLID, LTD QTY	8	1813	II		450	
17	PHOSPHORIC ACID SOLUTION, LTD QTY	8	1805	III	1500		
18	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	2024	I	1000		
19	SULPHURIC ACID, LTD QTY	8	2796	II	400		
20	NITROGEN, COMPRESSED	2.2	1066		50000		
21	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9	3090				500
22	Environmentally hazardous substance, liquid, N.O.S (Diisopropyl nap	9	3082	III	7000		
23	Sodium hydroxide, solution	8	1824	II	750		
24	AEROSOLS (Butane)	2 (2.1)	1950	N/A	600		
25	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Glutar	9	3082	III	150		
26	Trichloroacetic Acid, solid	8	1839	II			200
27	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE- LIMITED QUANTITY OI	7	2910	III			20
28	Formaldehyd	3	1198	III	250		
29	Batteries (AUV; Bluefin 1.5 kWh Subsea Battery)	9	3480			6	
30	Batteries (ICR18650-26 ZLF)	9	3480			48	