NOTIFICATION OF PROPOSED RESEARCH CRUISE

PART A: GENERAL

1. NAME OF RESEARCH SHIP: **RV POLARSTERN** — CRUISE NO.: **ARK-XXVIII/2**

2. DATES OF CRUISE: **From 5th June, 2014** **To 29th June, 2014**

3. OPERATING AUTHORITY:

Stiftung Alfred-Wegener-Institute 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:	**T. Wunderlich**
Number of crew:	**46**

7. SCIENTIFIC PERSONNEL

Scientist in charge
Dr. Benjamin Rabe
Bussestr. 24, 27570 Bremerhaven, Germany
E-mail : Benjamin.Rabe@awi.de
Phone : +49 471 4831 2403
Fax : +49 471 4831 1797
No. of Scientists : 50

8. GEOGRAPHICAL **AREA** IN WHICH SHIP WILL OPERATE (with reference to latitude and longitude)
Northern Fram Strait and North of Svalbard, within the box 75-82°N 20°W-25°E. Few additional stations will be undertaken on the way from the western Fram Strait to Tromsoe, near the deployment locations of the autonomous vehicles and floats floats (within the boxes: 75°-78°50'N, 10°W-5°E; 73-77°N, 15°W-5°E; 68-71°N, 20°W-5°E;; 66-69°N, 0-6°W; 74-76°N, 0-6°W; 69-71°N, 0-6°E)).

See also attached maps (attachment I).

9. BRIEF DESCRIPTION OF PURPOSE OF CRUISE
Studies of the physical oceanography, biogeochemistry and ecology of the northern Fram Strait

10. DATES AND NAMES OF INTENDED PORTS OF CALL
Longyearbyen, Svalbard: 1 day within 5th to 29th June, 2014; planned: 5th June, 2014;
Tromsø, Norway: 3 day within 28th June to 02th July 2014; planned: 29th June to 01th July 2014.

11. ANY SPECIAL REQUIREMENTS AT PORTS OF CALL
Crew / scientist change, ships supply all via local agency.

NOTIFICATION OF PROPOSED RESEARCH CRUISE

PART B: DETAILS

1. NAME OF RESEARCH SHIP **RV POLARSTERN** CRUISE NO. **ARK-XXVIII/2**

2. DATES OF CRUISE **From 5th June, 2014** **To 29th June, 2014**

3. a) PURPOSE OF RESEARCH

Studies of the physical oceanographyof the northern Fram Strait and the Nordic Seas (only ARGO floats and glider mission)

b) GENERAL OPERATIONAL METHODS (including full description of any fish gear, trawl type, mesh size, etc.)
- deployment of the autonomous vehicle (gliders) – ***see attachment II***;
- deployment of the autonomous profiling drifter (ARGO float) – ***see attachment III***;

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

see attachment I

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

- Water samples;
- Plankton samples;
- Sea Ice samples;

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).

- Sampling with CTD Rosette;
- Plankton nets (Multinet, bongo nets);
- Surface water sampling (continuous intake)
- Sampling with hand-gear and ice drills on, in and under sea ice floes, reachable by helicopter

6. DETAILS OF MOORED EQUIPMENT
One mooring will be deployed containing acoustic realisers, sediment traps and floating devices.

None in the Icelandic EEZ

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

N/A

8. DETAIL AND REFERENCE OF

a) Any relevant previous/future cruises

Previous: annual summer/autumn crusies of Polarstern (and occasionally other research vessels: Maria S. Merian, Lance) to the northern Fram Strait since 1997 (ARKXIII/2,ARKXIV/2, ARKXXV/3, ARKXVI/2, ARKXXVII/1, ARKXXVIII/1, ARKXIX/1, ARKXX/2, ARKXXI/1b, MSM02/04, L2007, ARKXXIII/2, ARKXXIV/1, ARKXXV/2, ARKXXVI/1, ARXXVII/1)

Future: summer polarstern cruise in the northern Fram Strait in 2016

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.

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

Hedinn Valdimarsson
Marine Research Institute
Skulagata 4
IS-121 Reykjavik
Iceland
E-mail: hv@hafro.is

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.

PART C. SCIENTIFIC EQUIPMENT

Coastal state: **Iceland** Port of call: **None** Dates:

Indicate "YES" or "NO":

	Scientific work by function:	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
Optional ships equipment	Meteorological measurements	N	N	N	N	N	N
	Balloon sampling	N	N	N	N	N	N
	Air sampling: (DOAS, Neutron detector & Cosmic particles, pCO_2 measurement)	N	N	N	N	N	N
	Water sampling: (pCO_2 measurement, Thermosalinograph, Ferrybox)	N	N	N	N	N	N
	Whale observing	N	N	N	N	N	N
	"DWS" deep water sounder	N	N	N	N	N	N
	"PARASOUND" sediment echosounder	N	N	N	N	N	N
	"EK60" watercolumnsounder	N	N	N	N	N	N
	"HYDROSWEEP" multibeam echosounder	N	N	N	N	N	N
	"ADCP" sea current measurement	N	N	N	N	N	N
	CTD (Glider/Float)	**Y**	N	**Y**	N	N	**Y**
	Magnetometry	N	N	N	N	N	N
	Gravity	N	N	N	N	N	N
To be modified acc. to the sci. programm	Seabed sampling	N	N	N	N	N	N
	Fishing	N	N	N	N	N	N
	Moored instruments	N	N	N	N	N	N
	Towed instruments	N	N	N	N	N	N
	Seismics	N	N	N	N	N	N

M.Hirsekorn M. Hirsekorn

(On behalf of the Principal Scientist)

Date: 10.12.2013

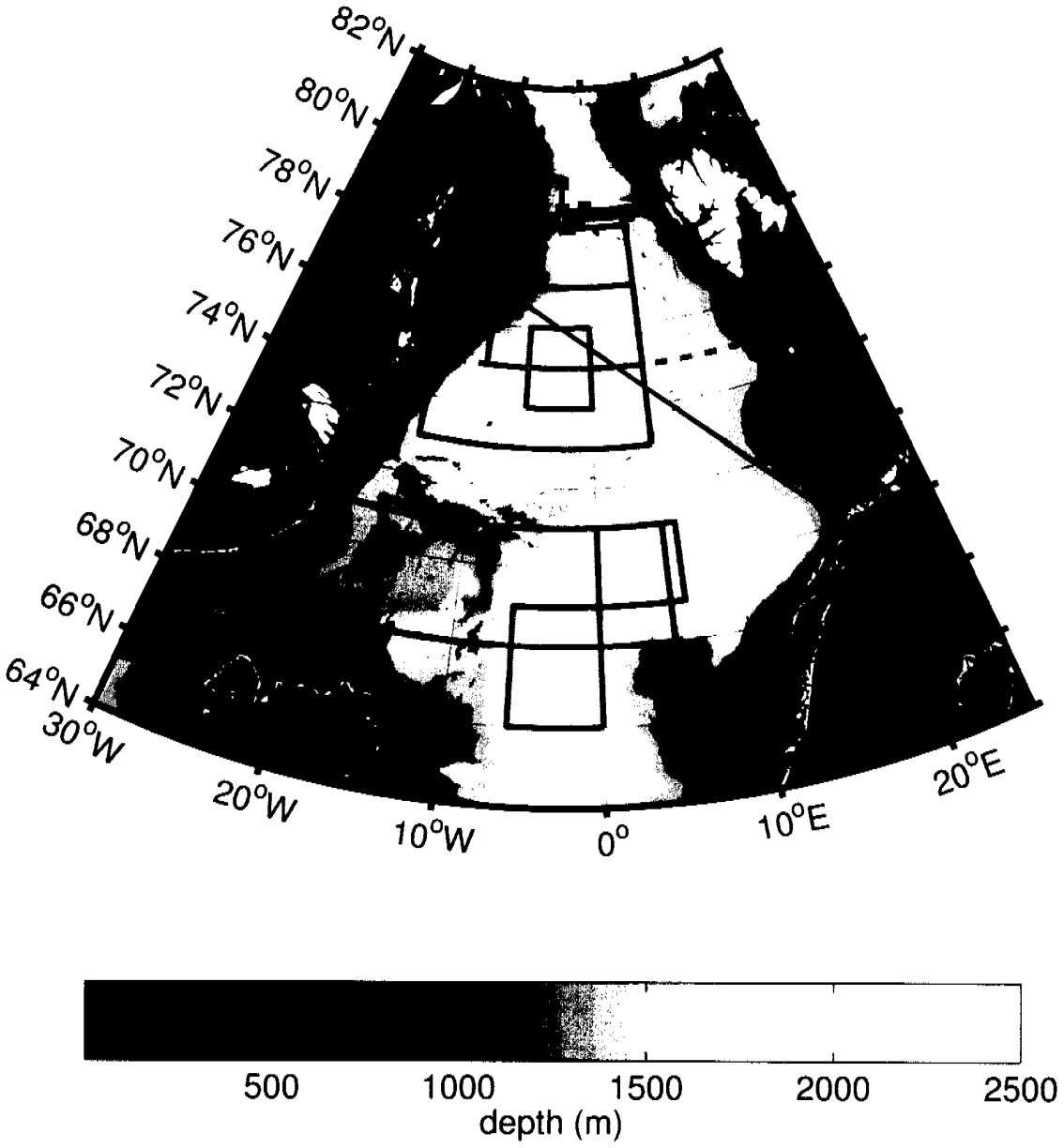
Alfred-Wegener-Institut
Helmholtz-Zentrum für
Polar- und Meeresforschung
Logistik und Forschungsplattformen
Am Alten Hafen 26
27568 Bremerhaven

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

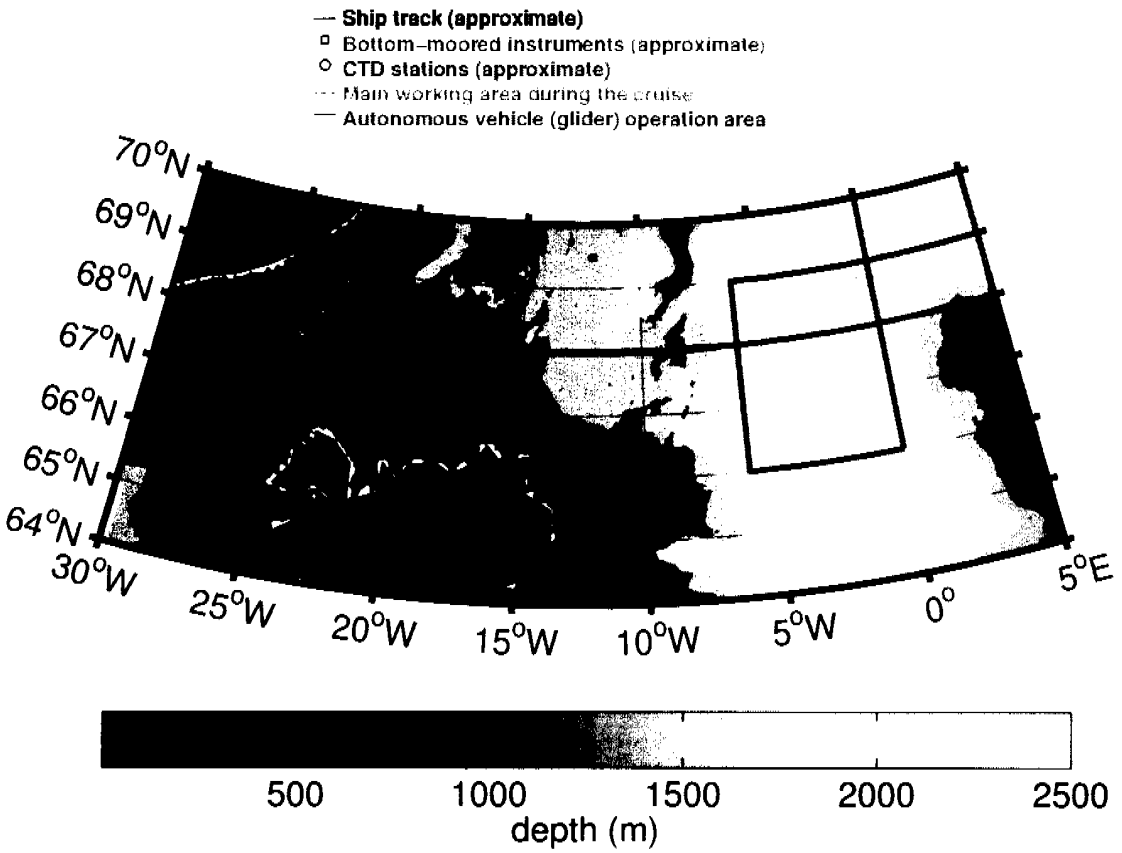
Attachment I (Maps: Overview and work in EEZ)

Location of moorings may be adjusted due to ice conditions.
In particular, the moorings around 15W may be deployed further North or South within the magenta box (main working area).

— **Ship track (approximate)**
▫ Bottom-moored instruments (approximate)
○ **CTD stations (approximate)**
--- Main working area during the cruise
— **Autonomous vehicle (glider) operation area**



Attachment I (Maps: Overview and work in EEZ) Page 2/2



Attachment II (Deployment of autonomous vehicles)

Deployment of 2 Seagliders during ARKXXVIII/2

- Instrument description:

Seaglider is the long-range, high endurance unmanned underwater vehicle for oceanographic, chemical and biological measurements in the upper water column. Seaglider flies through the water with extremely modest energy requirements using changes in buoyancy for thrust coupled with a stable, low-drag, hydrodynamic shape. Designed to operate at depths up to 1000 meters, the hull compresses as it sinks, matching the compressibility of seawater. The body of a Seaglider is 1.8 m long, wing span is 1m, max. diameter is 0.30 m. Antenna mast is 1 m long. The dry weight of vehickle is 52 kg. Seaglider was developed by University of Washington, currently is commercially manufactured and refurbished by Kongsberg Maritime AS, US.

- Area of operation:

Seagliders SG558 and SG127 will be deployed during the Polarstern cruise ARKXXVIII/2 within the box 75°-78°50'N and 10°W-5°E.
For SG558 the operation area during the 3- to 4 -month long mission will cover the box 73-77°N and 15°W-5°E, in ice free waters and near the ice edge. The main objective of the summer 2014 glider mission is to profile 75° N between the East Greenland Current and the Greenland Sea Basin to monitor the freshwater outflow from the Arctic Ocean into the western Nordic Seas.
For SG127 the operation area during the 3- to 4 -month long mission will cover the box 68-71°N and 20°W-5°E, in ice free waters and near the ice edge. The main objective of the summer 2014 glider mission is to profile 70.5° N between the East Greenland Current and the Icelandic Plateau to monitor the freshwater outflow from the Arctic Ocean into the western Nordic Seas.

- Measured parameters:

Seaglider is equipped with temperature and salinity sensors (Sea-Bird SBE43), pressure sensor (Paine), dissolved oxygen sensor (Aanderaa 4330 Optode), WET Labs Fluorescence and Backscatter sensor (ECO Triplet).

- Time schedule:

The Seagliders will be deployed from Polarstern in the northern Fram Strait in June 2014. The summer mission will last until September 2014 when the glider will be recovered by Polarstern.

- Steering:

Seaglider will be operated from the Glider Operation Center in Bremerhaven, Germany. Seaglider flies along the waypoints saved in its memory prior deployment or received from the operation center during the mission. Communication sessions with the glider take place via Iridium satellite data telemetry when the vehicle is at the surface. Only then it is possible to transfer new commands and correction of the way points to the vehicle. Depending on mission parameters, glider comes to the surface with an interval from 1 to 6-8 hours (the latter for full deep dives). When underwater, glider navigates by dead reckoning and can deviate from programmed track due to ocean currents.

Attachment III (Deployment of autonomous profiling floats)

Deployment of 6 Argo floats during ARKXXVIII/1 and 2

- Instrument description:

Argo is an international collaboration that collects high-quality temperature and salinity profiles from the upper 2000m of the ice-free global ocean and marginal seas. The data come from battery-powered autonomous floats that spend most of their life drifting at depth where they are stabilised by being neutrally buoyant at the parking depth pressure by having a density equal to the ambient pressure and a compressibility that is less than that of sea water. At 10-day intervals, the floats pump fluid into an external bladder and rise to the surface over about 6 hours while measuring temperature, salinity and pressure. Satellites determine the position of the floats when they surface, and receive the data transmitted by the floats. The bladder then deflates, the float sinks down to parking depth again and drifts with the currents until the cycle is repeated. Floats are designed to make about 150 such cycles, i.e. have an average life time of 3-4 years. The body of a float is 1.3 m long and diameter is 0.17 m. Antenna mast is 0.70 m long. The dry weight of vehickle is 25 kg. The six floats are manufactered by Teledyne Webb Research, Massachusetts, US.

- Area of operation:

The floats will be deployed during the transit from Bremerhaven, Germany, to Fram Strait on Polarstern cruise ARKXXVIII/1 or on the way back on ARKXXVIII/2 from Fram Strait to Tromsø, Norway. 2 floats are deployed in the Norwegian Basin (approx. 66-69°N, 0-6°W), 2 in the Lofoten Basin (approx. 69-71°N, 0-6°E) and 2 in the Greenland Sea Basin (approx. 74-76°N, 0-6°W). The main objective of the float measurements is to monitor changes in the hydrography of the upper 2000m of the deep Basins of the Nordic Seas on seasonal time scales.

- Measured parameters:

The floats are equipped with temperature, salinity and pressure sensors.

- Time schedule:

The floats will be deployed from Polarstern in the Nordic Seas in May/June 2014.