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HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

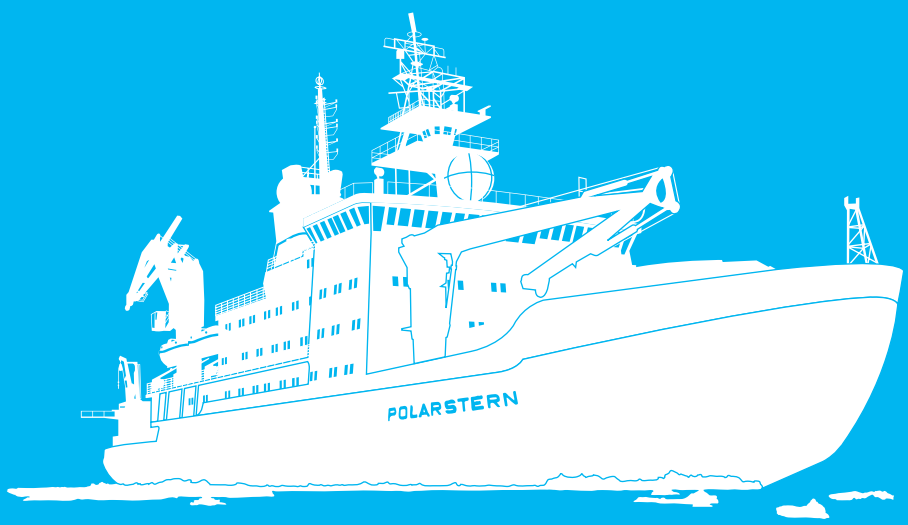
EXPEDITION PROGRAMME
PS152

Polarstern

PS152
Walvis Bay – Punta Arenas
15 December 2025 – 02 February 2026

Coordinator: Ingo Schewe

Chief Scientists: Heike Link and Felix C. Mark



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Alfred-Wegener-Institut
Helmholtz-Zentrum
für Polar- und Meeresforschung
Am Handelshafen 12
D-27570 Bremerhaven

Telefon:	+49 471 4831-0
Telefax:	+49 471 4831-1149
E-Mail:	info@awi.de
Website:	http://www.awi.de
Email Coordinator:	ingo.schewe@awi.de
Email Chief Scientist PS152:	heike.link@uni-rostock.de, felix.christopher.mark@awi.de

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Editorial editing and layout
Susan Amir Sawadkuhi

Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und Meeresforschung
Am Handelshafen 12
27570 Bremerhaven
Germany

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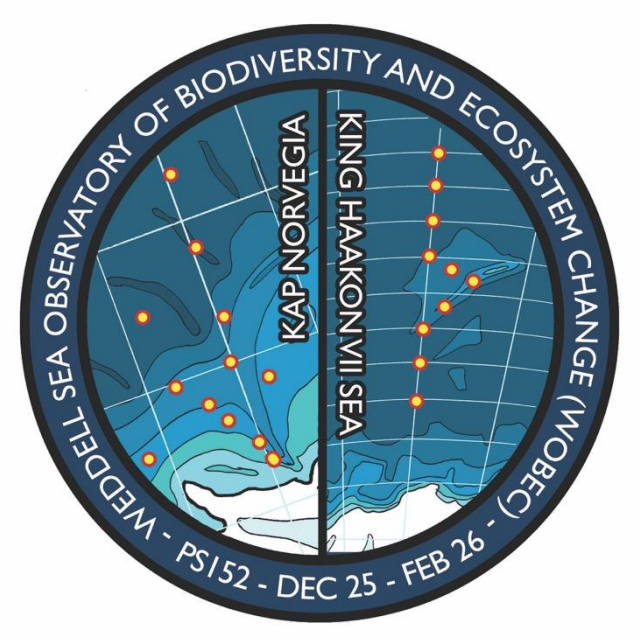
PS152
WOBEC

15.12.2025 – 02.02.2026

Walvis Bay, Namibia – Punta Arenas, Chile



Chief scientist
Heike Link

Co-chief scientist
Felix Christopher Mark

Coordinator
Ingo Schewe

Contents

1. ÜBERBLICK UND EXPEDITIONSVERLAUF

Heike Link[1], Felix Christopher Mark[2], Hauke Flores[2]

[1]DE.UNI-Rostock
[2]DE.AWI

Im Weddellmeer fehlen systematische Langzeitstudien zur Biodiversität und Ökosystemdynamik, obwohl solche Untersuchungen unerlässlich sind, um die ökologischen Auswirkungen von Umweltveränderungen zu ermitteln. Das multinationale Projekt Weddell Sea Observatory of Biodiversity and Ecosystem Change (WOBEC) stellt quantitative Informationen über das antarktische Ökosystem innerhalb einer definierten Referenzregion im östlichen Weddellmeer zur Verfügung.

Die WOBEC-Expedition PS152 wird Daten von Schiffsexpeditionen, Fernerkundungssmissionen und autonomen Observatorien mittels innovativer Methoden (z. B. eDNA-Sequenzierung, Hydroakustik, Meeresoptik) in einem Monitoringkonzept integrieren. Im Südsommer 2026 werden wir (i) in der Schelfregion vor Kapp Norvegia (KN) (ii) entlang des Prime Meridian Transect durch die King Haakon VII See (KHS), einschließlich des Seeberges Maud Rise arbeiten (Abb. 1.1).

Unsere Ziele sind: (1) Das Verständnis der Ökosysteme der KN und KHS verbessern, um die Auswirkungen künftiger Klimaveränderungen zu messen (2) autonome Beobachtungssysteme für Biodiversität und Ökosystemfunktionen erproben (3) Daten autonomer Geräte mit schiffsbasierten Messungen abgleichen (4) das im WOBEC Projekt auf Analyse bestehender Daten entwickelte WOBEC Monitoringkonzept und SOPs erproben (5) Erfolg und Schwierigkeiten eines multinationalen mit Stakeholdern entwickelten Monitoringkonzeptes während der Durchführung analysieren. Die WOBEC-Expedition wird die biologische Vielfalt, die Kohlenstoff- und Nährstoffflüsse und den Elementkreislauf zwischen Atmosphäre, Wassersäule, Meeresboden, Eishabitaten und den zugehörigen Organismen quantifizieren und so wertvolle Erkenntnisse über die biologische Vielfalt und die Funktionsweise von Ökosystemen in einer selten untersuchten Region gewinnen, die sich absehbar stark verändern wird. Die Ergebnisse unterstützen die Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) sowie für die Entwicklung von Meeresschutzgebieten.

Darüber hinaus wird PS152 das Argo Programm unterstützen und Floats des BSH ausbringen, welche Daten für die Modellierung der Ozeanographie des Südlichen Ozeans liefern werden. En-route Messungen werden mit fest installierten Instrumenten auf *Polarstern* erhoben. Während PS152 wird auch die *Neymayer-Station III* versorgt.

SUMMARY AND ITINERARY

Systematic long-term studies on ecosystem dynamics are largely lacking for the East Antarctic Southern Ocean, although it is well recognized that such investigations are indispensable to identify the ecological impacts of environmental change. Through regular autonomous and ship-based observations, changes in ocean dynamics, geochemistry, biodiversity and ecosystem functions and services can be systematically explored and monitored, providing long-term data availability and ecosystem understanding. The Weddell Sea Observatory of Biodiversity and Ecosystem Change (WOBEC) initiative is conceived as a multinational initiative to address the need for quantitative information on the Antarctic ecosystem within in a well-defined region in the Eastern Weddell Sea. Prior to WOBEC, the Eastern Weddell Sea Observing System (EWOS) initiative was carried out as a proof of concept on *Polarstern* (PS129) in March-April of 2022. EWOS was an international collaborative scientific effort, with participating scientists from Germany (AWI and universities), Belgium, Italy, the Netherlands, Spain, Switzerland, the United Kingdom, and the United States. Building on this network, WOBEC will be based on collaborative and autonomous multinational sampling, including the coordination with related sampling efforts.

During this WOBEC expedition PS152, we will perform sampling of sea-ice properties, biodiversity, carbon and nutrient fluxes and cycles between atmosphere, sea-ice, water column, seafloor and the respective biota, including marine living resources, such as Antarctic krill and Antarctic toothfish, to be integrated with data collected from autonomous and remote sampling.

Two work areas are foreseen: (i) along the Prime Meridian Transect through the King Haakon VII Sea; (ii) the shelf and inflow region off Kapp Norvegia (Fig. 1.1). WOBEC represents a refined continuation of sustained measurements along the previously sampled transects by Germany and Norway, providing valuable quantitative information for ecosystem functions such as carbon export and secondary production from a rarely studied region bound for change. It will therefore also support the necessary monitoring efforts for the possible establishment of the WSMPA.

The expedition will further support the international Argo Float and SOCCOM (Southern Ocean Carbon and Climate Observations and Modelling) programs, which are observing and modelling the biogeochemical cycles of the Southern Ocean as a means of improving climate modelling. Observations are made using core or biogeochemical profiling floats (BGC-Argo) that are being distributed in the international waters throughout the Southern Ocean. Along the expedition route, en-route measurements will be collected, as described below.

In addition to the immediate scientific program, this expedition also serves to resupply the German *Neumayer Station III*, to support the multifaceted scientific activities originating from there.

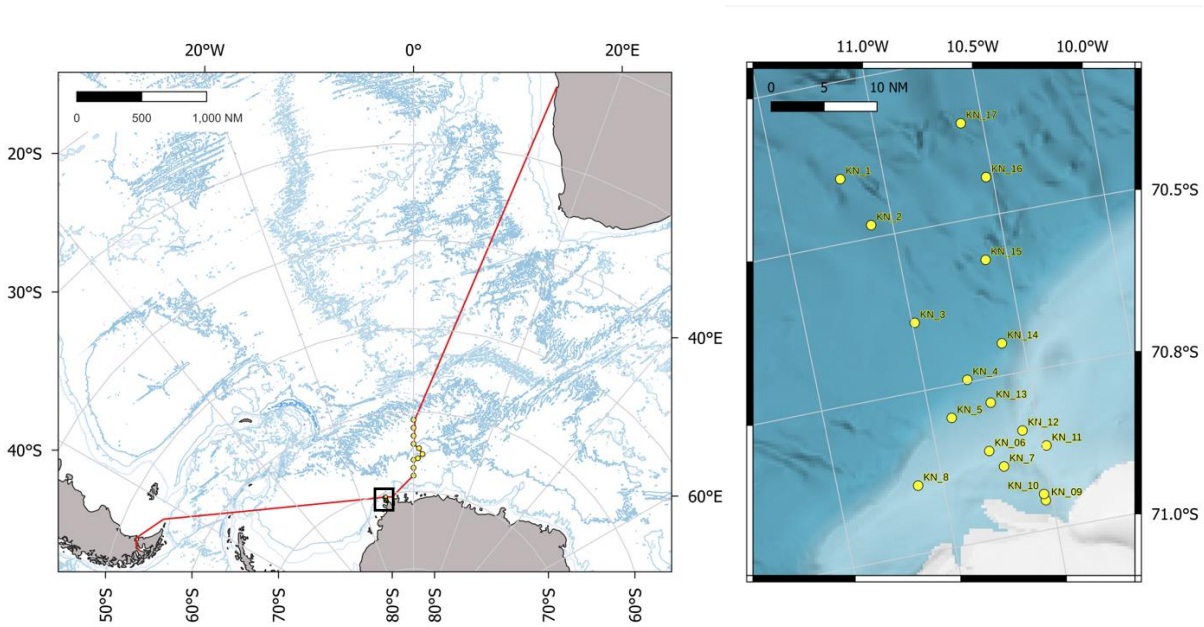


Abb. 1.1: Überblick des Expeditionsplans mit Nahaufnahme des Kapp-Norvegia Untersuchungsgebietes

Fig. 1.1: Overview of the expedition plan with close-up of Kapp Norvegia study area

2.1 PELAGIC AND SYMPAGIC HABITAT, PRIMARY PRODUCTION AND BIODIVERSITY AND ECOSYSTEM FUNCTIONS

Jacqueline Stefels[1*], Sebastien Moreau[2*], Maria van Leeuwe[1], Anette Wold[2], Megan Lenss[2], Laura Dalman[4]

Not on board: Karley Campbell[3]

* j.stefels@rug.nl

* sebastien.moreau@npolar.no

[1]NL.RUG

[2]NO.NPOLAR

[3]NO.UiT

[4]BE.ULB

Grant-No. AWI_PS152_01 and AWI_PS152_07

Outline

The working groups of both grants will work together on different aspects including, e.g. primary production, physical oceanography, light properties (focus of grant _01) and ecosystem functions and cycling of climate-active gases such as CO_2 and DMS (focus of grant _02), in both, the pelagic and sympagic habitat.

2.1.1 Pelagic habitat, primary production and biodiversity and ecosystem functions

Objectives

This WP intends to investigate the role of the Weddell Sea in the global climate system with a focus on the Biological Carbon Pump (BCP), the production of sulfur-containing climate gases and linked to the biodiversity of microbial communities, their primary productivity and their transfer to the deep ocean and to higher trophic levels.

Work at sea

At all stations, we will deploy a Conductivity, Temperature, Depth probe (SBE911plus CTD system) equipped with a water sampling rosette (24 Niskin bottles), an oxygen probe, a transmissometer and a fluorescence sensor to obtain automated data on physical-chemical properties, particle distribution, chlorophyll a concentration, and water samples. To determine the distance to the bottom, an altimeter from Benthos is mounted. Additionally, two RDI-150 kHz ADCPs, one pointing upward, one pointing downward are attached to the rosette sampler to measure the current velocity profile. Furthermore, we will sample the vertical distribution of particles and organisms using an Underwater Vision Profiler (UVP) mounted on the CTD rosette.

Water samples from discrete depths will be used to calibrate and validate sensor data for, e.g., chlorophyll a concentration, and oxygen concentration, as well as to sample particulate organic matter (POM), dissolved organic matter (DOM), oxygen isotopic fractionation, macronutrients (NO_3, NO_2, PO_4, dissolved Si), biogenic silica, methane, sulfur compounds (particulate and dissolved dimethylsulfoniopropionate (DMSP)), microbial and phytoplankton species composition (flow cytometry, microscopy, HPLC pigment analysis), and molecular biodiversity assessments through eDNA. eDNA samples will inform about taxonomic and functional

diversity using complementary high-throughput sequencing approaches. In addition, stable-isotope (^{13}C) and oxygen-optode incubation experiments will be run aboard the ship to assess gross primary production rates and production of DMSP, which is the precursor of the climate-active gas dimethylsulfide (DMS) (Stefels et al. 2009), as well as net community production (Campbell et al. 2016), respectively. These rates will be determined for the surface and deep Chlorophyll maximum.

The standard profile depth of the CTD will be 1,000 m, covering key processes in the epipelagic and mesopelagic habitats where most of the pelagic biomass resides. On the shelf and at transect endpoints in the Kapp Norvegia region as well as on Maud Rise, we will perform full-depth CTD profiles from the surface to the seafloor. In addition, at each CTD station we deploy the 20 µm hand-net sample down to 20 m depth to collect fresh taxonomy samples.

On 5 occasions, we will deploy a short-term sediment trap (KC Denmark A/S) with 10 sampling cups placed at 5 depths from the near surface to 200 m depth (i.e., at 40, 60, 100, 150 and 200 m depth). The traps will be left free-drifting for 24h deployments after which they will be retrieved onboard and the cups will be analysed for Chl*a*, particulate organic matter (POM), BSi, exopolymeric sustances (EPS) and taxonomy.

2.1.2 Sympagic habitat, primary production and biodiversity and ecosystem functions

Objectives

This WP will focus on sea-ice biology and biogeochemistry in the Weddell Sea, and its role in the global climate system (i.e., its contribution to the BCP and to DMS(P)), linked to the biodiversity of the microbial communities, their primary productivity and their transfer to higher trophic levels.

Work at sea

During 10 short-term sea ice stations, we will measure physical and bio-optical properties of sea ice using ice corers, under-ice water pumps as well as hyperspectral light sensors (RAMSES; TRiOS, Germany). Ice cores and under-ice water samples will be used for analysis of similar parameters to those sampled in the water column with the CTD rosette: temperature, salinity, dissolved organic matter (DOM), oxygen isotopic fractionation, macronutrients (NO_3, NO_2, PO_4, dissolved Si), biogenic silica, chlorophyll a concentration, particulate organic matter (POM), microbial and algal species composition (flow cytometry, microscopy, HPLC pigment analysis), EPS, mycosporine-like Amino Acids (MAAs), and sulfur coumpounds. In addition, stable-isotope (^{13}C) and oxygen-optode incubation experiments will be run aboard the ship to assess gross primary production rates and rates of DMSP production (Stefels et al. 2009), as well as net community production (Campbell et al. 2016), respectively.

Expected results

We expect to secure data from a large proportion of the instruments with ship-based CTD- and lowered ADCP data. We also expect to obtain a large dataset about ocean biogeochemistry and biology from the water samples retrieved from the CTD-rosette.

With the help of the nutrient data, we will get an overview of water masses and biological activity prior to sampling. Dissolved organic matter will inform us on this pathway of the biological carbon pump. The oxygen isotopic fractionation will inform us on the presence of sea ice and meteoric meltwater, both of which are considered sources of iron in the Southern Ocean. The analysis of $\delta^{13}C$ / $\delta^{15}N$-POM will highlight the interaction between sympagic and pelagic communities. The analyses of POM and BSi will inform us on the productivity of the

phytoplankton and diatoms communities, which will be complementary to the microbial and phytoplankton species composition. The data on sulfur fluxes, and specifically on DMSP-concentrations will be used to assess the importance of the area for climate regulation.

An inventory of sea-ice biochemistry will contribute to deeper knowledge on the importance of sea ice as a unique and biologically very rich habitat. Primary production analyses will inform us on the contribution of sea-ice algae to the polar foodweb, including krill. Sampling of the algal species composition will show how sea-ice biology contributes to the biodiversity of the Weddell Sea. The contribution of sea-ice algae to the biological pump and climate control is assessed through the analyses of POC and DMSP.

2.2 PELAGIC METAZOAN BIODIVERSITY AND ECOSYSTEM FUNCTIONS

Hauke Flores[1*], Anton Van de Putte[2], Serdar Sakinan[3], Charlie Plasman[2], Jennifer Freer[4], Kira Kremer[1], Martina Vortkamp[1], Michiel van Dorssen[5], Insa Kaphegyi[6]

not on board: Fokje Schaafsma[3], Doreen Kohlbach[1], Barbara Niehoff[1], Astrid Cornils[1], Yi Ming Gan[2]

*hauke.flores@awi.de

[1]DE.AWI
[2]BE.IRSNB
[3]NL.WUR
[4]UK.BAS
[5]NL.DORSSEN
[6]DE.UOL

Grant-No. AWI_PS152_02 and PS152_08

Objectives

The WOBEC project aims to develop the basic framework of a transnational multidisciplinary distributed observatory of biodiversity and ecosystem change in the EWS. The team *Pelagic metazoan biodiversity and ecosystem functions* contributes to this overarching aim by collecting data on pelagic metazoan communities in order to (1) contribute to the baseline understanding of the Eastern Weddell Sea ecosystem to be tested against the effects of future climate change; (2) test a new autonomous observatory of biodiversity and ecosystem functions; (3) ground-truth data from autonomous devices with ship-based measurements. Specifically, we aim to assess the abundance, biomass and biodiversity of pelagic and under-ice fauna and their ecosystem functions.

Work at sea

Our work builds on the experiences of the Eastern Weddell Sea Observation System (EWOS) study conducted during PS129 (2022). We will use the broadband mode of the EK80 in four frequency ranges (around 38, 70, 120 and 200 kHz) to achieve higher taxonomic resolution and greater accuracy of biomass estimates than with single-band echosounders. Imaging profiles of zooplankton will be obtained from the UVP. In addition, we will deploy an autonomous bio-physical sea-ice observatory (provided by AWI; Flores et al. 2023) equipped with a multifrequency echosounder and various environmental sensors on an ice floe in the Weddell Gyre. The observatory will record data for up to one year during its drift, and transmit the data to AWI at regular intervals. Quantitative data from organismic samples will be used to provide a reliable calibration and validation of the automated sensor data (EK80, UVP) necessary for future transitions to automated methods. The abundance and community composition of under-ice zooplankton and micronekton in the upper 2 m of the water column will be sampled with a Surface and Under-Ice Trawl (SUIT). A sensor array mounted on SUIT will collect real-time data on sea-ice and water-column properties during fishing. The sensor array includes an Acoustic Doppler Current Profiler (ADCP), an under-water video camera, and a CTD with built-in fluorometer, and spectroradiometers to estimate the amount of ice algal biomass along SUIT profiles (Castellani et al. 2020; collaboration with secondary user proposal Icelight, Ch. 2.7). Macrozooplankton, Antarctic krill and mesopelagic fish will be sampled in the pelagic layer (0–1,000 m) with a Multiple Rectangular Midwater Trawl (M-RMT). A Multinet

(MN, Hydrobios) will be used to sample the distribution of the mesozooplankton community in 5 depth strata down to 1,000 m depth. The species and size composition of animals caught with the various nets will be used in combination with hydroacoustic profiles and taxonomic composition derived from eDNA sequencing (in collaboration with secondary user proposal SeaCaT, Ch. 2.8) to estimate the species composition, abundance and biomass of the pelagic and under-ice fauna at various overlapping spatial scales and taxonomic resolutions. We will also sample animals, particulate organic matter from sea ice and from the water column for trophic marker analysis (fatty acid profiles, HBIs, sterols, bulk- and compound-specific stable isotope compocomposition) to quantify the flux of carbon into the pelagic food web from ice algae and phytoplankton, respectively (Helmholtz Young Investigators Group Double Trouble). Seasonally migrating copepods will be opportunistically sampled for lipid and carbon composition as part of the UK (NERC) funded program BIOPOLE. In addition, we will collect samples of Antarctic zooplankton and fish for pollutant analyses on behalf of the German Environmental Agency (UBA) and to complement pre-existing datasets of the Helmholtz Young Investigator Group Double-Trouble.

All sampling procedures, laboratory treatments and measurements necessary to estimate the sampled parameters will follow the SOPs developed by the WOBEC consortium in line with international standards and based on previously established SOPs for investigations of sea-ice influenced ecosystems, including the preceding EWOS and MOSAiC expeditions, and the Nansen Legacy.

Expected results

We expect to obtain a comprehensive dataset of the distribution and diversity of pelagic and under-ice fauna in the research area. Trophic marker, lipid, pollutant and diet samples will be analysed in the home laboratories and will contribute to a more quantitative understanding of the role of ice algal production and sea ice associated zooplankton in the Antarctic food web, and the trophic pathways of contaminants.

2.3 BENTHIC HABITAT, BIODIVERSITY AND FUNCTIONS

Jan Clemens Abraham[1], Enrique Isla[2], Heike Link*[1], Autun Purser*[3]; Sergio Rossi[4,5], Katharina Teschke[3], Werna Werna[1], Melina Werner[3],

*heike.link@uni-rostock.de

*Autun.purser@awi.de

[1]DE.UNI-Rostock

[2]ES.ICM-CSIC

[3]DE.AWI

[4]IT.USAL

[4]BR.UFC

Grant-No. AWI_PS152_03 and AWI_PS152_09

Outline

The work on benthic habitat, biodiversity and functions will combine non-invasive approaches assessing epifauna, bathymetry and topography of the seafloor (Purser et al. chapter 2.3.2,_09) and the underling infauna as well as sediment biogeochemistry and processes (Link et al. chapter 2.3.1, _03).

2.3.1 Biodiversity and function in sediment habitats in relation to their biogeochemistry

Objectives

Primary production at the euphotic zone generates a sinking flux of biogenic particles such as organic matter (e.g., organic carbon) and biogenic silica, which ultimately settle onto the sea floor, where they accumulate. The accumulation of these particles has climatic implications because this process contributes to immobilize atmospheric carbon in the sediment column for long-term periods (e.g., centuries). Interactions between infauna communities and their environment, ecological processes driving the benthic ecosystem and processes driven by infauna communities in the Southern Ocean remain poorly understood (Gutt et al. 2019). Ongoing alterations in the input from surface primary production with changes in sea-ice dynamics stress the need to understand fauna-environment interactions now. Understanding these relations will allow to quantify the productivity (biomass) and functions of seafloor habitats along the Antarctic continental shelves. Repeatedly sampled sites from PS129 and/or PS96 subject to a changing environment allow us to disentangle biotic and abiotic effects (Link et al. 2023).

The project "benthic soft-bottom habitat, biodiversity and function" will work with the project Carbon dynamics in the High-latitude Weddell SeA continental shelf SEdiment at the onset of ecosystem change (CHASE, Isla and Rossi) during the WOBEC expedition. We will investigate estimate the organic carbon accumulation and degradation rates in the sea floor, community composition of meio- and macrofuna, fluxes at the sediment-water interface, carbon stored in biomass of epibenthic suspension feeders, as well as bioturbation and bioirrigation patterns on Maud Rise as well as along two transects off Kapp Norvegia We will thus contribute to setting a baseline on the ongoing status of the organic carbon dynamics, including long-term retention (e.g., centuries) in the eastern Weddell Sea continental shelf ecosystem.

The objectives are:

- Estimate the organic carbon accumulation and degradation rates in the sea floor.
- Identify biodiversity patterns of benthic ecosystems to investigate how micro-, meio- and macrofauna communities differ in their composition (abundances, taxa and functional groups) with environmental conditions (e.g., sea ice)
- Assess ecosystem functions: investigate the influence of ice cover vs shelf-to-slope habitat on the benthic ecosystem functions of oxygen and nutrient fluxes at the sediment-water interface.
- Quantify sediment mixing processes: analyze the benthic bioturbation and biorrigation in shelf and slope habitats and the effect of infauna communities on these processes.
- quantify how climate change may impact on the capability of epibenthic suspension feeders to immobilize carbon during long time periods

Work at sea

Environmental sediment parameters including Chl*a* and grain size will be collected for a better ecological understanding of the pelagic-benthic coupling. At all possible stations on Maud Rise and Kapp Norvegia we will deploy the TV-guided multicorer (TV-MUC10) to collect sediment cores for incubation and bioturbation studies on board. CTD casts (water temperature, salinity) will be necessary at each MUC deployment to collect bottom water data and characteristics. Macrofauna (in particular infauna) will be sampled by a giant box corer (GKG) at selected stations for additional fauna classification.

Experimental approaches including incubations for flux measurements and luminophore tracer studies will be performed on board in temperature-controlled laboratory containers (2°C).

Replicated TV-MUC10 cores, taken at each of the stations, are used to determine short-term oxygen consumption and nutrient fluxes at the sediment-water interface. For this purpose, nutrient and oxygen concentrations in the water layer above the sediments are determined in onboard dark incubation measurements for 48–96 h (2°C). A Fibox-LCD optical sensor is used to determine oxygen concentration non-invasively. Bioirrigation will further be determined using bromide tracers and extracting pore water using rhizones at the end of incubation. Additionally, subsamples for Chl*a*, TOC, C/N and grain size are taken from sediment cores to enable interpretation of the effects of particle reworking on benthic mineralization. Then, cores are sliced and sediments including macro- and meiofauna are preserved in 96% Ethanol (alternatively 4% formaldehyde solution) for further analyses of biodiversity patterns in the labs in Germany (Link et al. 2013; Säring et al. 2022).

In addition, three sediment cores each are sliced and frozen directly into subsamples for later analysis in grain size, organic carbon, biogenic silica, ^{210}Pb and ^{14}C, Chl*a* concentration as well as genetic diversity. Different suspension feeders and deposit feeders will be collected with the AGT. Several representative species will be selected to calculate its biovolume, and a piece of the animal will be stored at -20C pending analysis (e.g. C/N, Stable Isotopes, biochemical balance, etc.). With previously recorded images and some of the OFOBS images taken in this cruise, we will make an extrapolation of the density and size class of these representative species. Such data will be used to calculate the total biomass and the carbon associated to the studied population.

At four stations, eight additional cores will be obtained from another TV-MUC10 deployment for experimental work (carried out in a temperature-controlled laboratory container, 2°C). The experiments will test the role of the important macrofauna taxa on particle transport (using luminophores) in the area.

We plan to carry out TV-MUC10 and GKG deployments at stations where bottom topography will allow safe use of the gear. We will collect information on sediment composition and bottom

topography by following the OFOBS deployment (Ocean Floor Observing and Bathymetry System). This will also allow for later combined analysis of epifauna and infauna.

2.3.2 Biodiversity and habitat structure of the seafloor

Objectives

The Ocean Floor Observation and Bathymetry System (OFOBS; Fig. 2.1) is a towed camera platform, capable of imaging (in still image and video) seafloor communities and structure from a height of 1.5 m above the seafloor (Purser et al. 2019). The device is also equipped with forward sonar, sidescan sonar, a new sampling net, 22 l of water sampling capability and a CTD system. The device was used to discover the *Neopagetopsis ionah* colony of Weddell Sea icefish in 2021 (Purser et al. 2022a), and generate collections of regional, publically accessible data from ice covered regions (Purser et al. 2022b). The device is the latest iteration of camera sled employed in Antarctica (and elsewhere) by AWI, replacing the more basic Ocean Floor Observation System (OFOS), which was used extensively in the collection of regional data used to determine habitat and fauna distributions across the Weddell Sea (Piepenburg et al. 2017). During the PS152 expedition the system will be used to characterise the seafloor habitats and communities across the WOBEC stations.

Work at sea

Work at sea will comprise:

1. The OFOBS system will be deployed to visually and acoustically image and map the focus stations of the WOBEC project.
2. The OFOBS will be equipped with a sampling net and used to directly sample benthic and epibenthic fauna, as requested by onboard collaborators. This sampling will be carried out by gently lowering the OFOBS and under camera net to the seafloor under slow speed, to directly scoop up the target fauna.
3. The new 22l water sampler system will be available on all dives to supplement the water sample requirements of onboard participants.

Fig. 2.1: The Ocean Floor Observation and Bathymetry System OFOBS of the Alfred Wegener Institute

Expected results

By combining faunal size classes (micro-, meio- and macrofauna) and different benthic processes synchronously, it will be possible to evaluate, how changes in habitat conditions and topography may affect benthic ecosystems, including their structure, function, and potential for carbon sequestration. The expectation is further to produce the first full image and sidescan data sets from each of the WOBEC stations of interest. The fauna within the data will after the expedition be quantified, and allow changes in distributions between 2026 and subsequent cruises gauged. Data collected may well be used to support the ongoing development of a Weddell Sea Marine Protected Area (WSMPA) (Teschke et al. 2021).

2.4 DEMERSAL FISH PHYSIOLOGY AND PHYLOGEOGRAPHY INCLUDING CRYOBENTHOS

Felix C. Mark*[1], Nils Koschnick[1], Christian Bock[1], Katharina Schienbein[1], Chiara Papetti*[2], Jacob Reed[3], David K. A. Barnes[4], Christoph Held[1], Christopher D. Jones*[5], Rose Leeger[6]

Not on board: Lisa Chakrabarti[3]

*felix.christopher.mark@awi.de,
*chiara.papetti@unipd.it,
*chris.d.jones@noaa.gov

[1]DE.AWI
[2]IT.UNIPD
[3]UK.NOTTING
[4]UK.BAS
[5]GOV.NOAA
[6]EDU.CU

Grant-No. AWI_PS152_04 and AWI_PS152_10 and AWI_PS152_11

Outline

The Weddell Sea (WS) features complex sea-ice dynamics and rich and diverse ecosystems. It plays an important role for global ocean circulation, sea-level dynamics, and carbon sequestration, that will change with its response to climate change. Benthic community shifts in response to climate change are already underway in the Southern Ocean (SO, Pineda-Metz et al. 2020), which also affect biodiversity and biogeography of demersal fish species but have not been documented systematically in the WS. To assess ecosystem diversity and functionality under a changing climate with coordinated and systematic observations of the benthic realm on the shelf of the ecosystem, WOBEC will act as a nucleus for the international research and monitoring activities to be carried out under the proposed Weddell Sea Marine Protected Area (WSMPA). This chapter will study the biodiversity as well as resilience, adaptation and acclimation capacities of demersal and bentho-pelagic fish, and cryobenthos. From a conservation perspective, we also aim to fathom direct and global human impacts on the ecosystem. Two work areas are foreseen: (i) the shelf and inflow region off Kapp Norvegia, and (ii) stations around Maud Rise.

Objectives

We will determine the abundance, biomass, and diversity of demersal fish fauna on the shelf and the shelf break in relation to organic carbon availability, seafloor substrate, and bottom topography as a baseline to compare future change against. We aim to assess and explain taxonomic and functional biodiversity and composition of ice-associated, pelagic and benthic macrobiota, such as fish and invertebrates.

We will identify key species for monitoring (ecologically important, all trophic levels), observe their stress response and assess their adaptive scope: genetic diversity, gene flow, and ecophysiological plasticity, adaptive strategies and capacities. This will result in an assessment of the robustness or sensitivity of Weddell Sea ecosystems with respect to changes in biodiversity and energy flow.

We will collect information to understand life history characteristics, movement, and habitat preferences of Antarctic toothfish (*Dissostichus mawsoni*), as well as initiate research and monitoring within the proposed Weddell Sea Marine Protected Area (WSMPA) through satellite tagging of Antarctic toothfish. We will collect otoliths of Antarctic notothenioid finfish species to

undertake age, growth, and microchemistry research to address key gaps in relation to the Weddell Sea notothenioid life histories and relationships to the proposed WSMPA. This objective will further address whether Antarctic notothenioid finfish occurring in the southern Weddell Sea contribute to other aggregations over the northern regions of the Weddell Sea, and whether ecosystem services could be provided in the form of fish exported from the proposed WSMPA to habitats downstream. In addition, population dynamics in the form of shared or divergent spawning grounds, will be assessed by comparing trace element compositions of material laid down during species' early life stages in the otolith nucleus.

Another objective involves the collection of tissue samples for genomic, transcriptomic and phylogenetic studies currently being undertaken at AWI, University of Padova, University of Nottingham, Yale University, the University of Chicago, and the Institute Pierre-Simon Laplace. Here, we will assess genetic variation among species of Southern Ocean fishes that are distributed in the Scotia Arc, Weddell Sea, and Ross Sea. This research targets 25 species to assess the role of life history on population connectivity. We will construct a DNA sequence dataset from ~1,000 ultraconserved elements (UCEs) to investigate the phylogenetic relationships of notothenioids and the timing of their evolutionary diversification. In addition, samples of Antarctic toothfish, in particular, will be used to assess the extent to which adaptive genomic change is linked to environmental features and thus can be used as an index of climate change vulnerability.

We also aim to characterize the diet of Antarctic toothfish and other notothenioid finfish species to study the variation in food intake. This analysis will address ecosystem condition gaps and provide baseline data for this region as well as foraging ecology variations between sub-adult and adult populations of notothenioids, aiding to the proposed WSMPA. This baseline information could be used to address the impacts of fishing within the region and document changes in trophic interconnections between understudied fish species.

The cryobenthos team will focus on organisms inhabiting the marine cavities underneath the floating shelf ice tongues are almost entirely unknown, mostly due to the extreme difficulties in accessing this unique Antarctic habitat. The cryobenthic fauna will be investigated through the collection of video transects with a remotely operated vehicle (ROV), which is also capable of collecting individual organisms. The PS152 expedition is expected to complement the species inventory of the cryobenthic fauna of the Eastern Weddell Sea and adjacent seas thus continuing similar efforts from previous expeditions (SEAROSE, PS129, SEAEIS, SEAEIS II).

Work at sea

Information on key taxa will be collected by means of various methodological approaches. According to hydrographic, sonar and OFOBS observations (see 2.3.) along the transect from the ice edge to deep water, we will deploy benthic landers equipped with a small CTD device and carrying baited traps for benthopelagic fish and invertebrates between 250 and 1,000 m depth. We will also carry out up to 8 Agassiz trawls (AGT) and up to four pelagic trawls in areas of suitable biological diversity outside of the 'Special Protection Zone' identified in the WSMPA Phase 1 proposal. Direct sampling will provide data for comparison with analysis of fish populations sampled during EWOS PS129. In addition, OFOBS will be equipped with a net system to collect adult fish and a suction sampler to collect eggs from fish nests to test the hypothesis that notothenioid interspecific hybridization is driven by similarity of nesting setup (Schiavon et al. 2021). Adult specimens of the Antarctic toothfish *D. mawsoni* will be caught with long-lines deployed in depths of 500, 1,000 and 1,200 m in clusters of 2 at Maud Rise and in the Kapp Norvegia area. Caught specimens will be measured according to CCAMLR specifications and selected individuals will be kept alive onboard for ecophysiological experiments. Up to 10 individuals will be tagged with pop-off satellite tags (PSAT) and released to study their migration and reproductive behaviour. The PSAT objective provides insight into movements between various regions of the Weddell Sea, potentially including different zones of the proposed WSMPA, habitat preferences, environmental characteristics, and vertical

movements of Antarctic toothfish in the water column. All remaining living individuals will be tagged with CCAMLR standard tags and released for eventual recapture in the commercial fishery areas.

We will assess connectivity among fish populations by analysing genetic variability and ecological parameters of specimens obtained via direct sampling (fishery by AGTs, PT, LL and Landers at KN and LL at Maud Rise, and investigating genetic variability of environmental DNA (eDNA) samples obtained by water filtering. Direct fish sampling will be guided by results obtained from less-invasive techniques (e.g. EK80, OFOBS), and allow to collect tissue samples and ecological data for population structure analysis (to be performed at home institutes of participants). Onboard assessment of fish physiological performance at different temperatures will occur by isolating cells and mitochondria from fish (larval and adult individuals) and measurement via high-resolution respirometry techniques. Further individual fish species will be transported alive in the aquarium container onboard *Polarstern* to the home institutes for further physiological experiments.

The cryobenthos team will launch a remotely operated vehicle (BlueROV, heavy configuration) from the working deck of *Polarstern*, that can dive down to 300 m water depth and transmits video data via its tether cable to the command center on the surface. The cryobenthic fauna will be investigated through the collection of video transects. Organisms can be collected using a bespoke suction device (slurp gun). One water sample of up to one litre per dive can be collected. The collected organisms, if any, will be preserved and eDNA from the water samples will be extracted under a portable sterile bench.

Depending on favourable conditions, the ROV team will fly out by helicopter and launch the ROV independently from the ship from a suitable patch of sea ice in the vicinity of shelf ice or icebergs.

Expected results

We expect to obtain a comprehensive dataset of the distribution and diversity of demersal and pelagic fish fauna, epibenthos as well as cryobenthos in the different areas of investigation. We will gauge the limits of the acclimation capacities of selected species in climate change scenarios from the molecular to the whole animal level. Molecular barcodes from the collected organisms will be added to the growing list of species known to populate the Antarctic cryobenthos. Sequencing of the extracted eDNA serves as an independent data source documenting the presence of known cryobenthic species and basis for a phylogenetic analysis to resolve which taxonomic groups may be expected to occur but have not yet been discovered in the cryobenthos.

Our results shall help establish insight into population connectivity and protect the benthic and cryopelagic ecosystems as potential refugia for benthic fish and invertebrates as well as ice-associated species, in order to maintain and/or enhance their resilience and ability to adapt to the effects of climate change. We will further contribute to identify scientific reference areas to monitor the effects of climate change, human activities (fishing, pollution) in representative Antarctic ecosystems and thereby support the establishment and implementation of the WSMPA.

2.5 TOP PREDATOR DISTRIBUTION AND BIODIVERSITY

Susanne Kühn*[1], Bram Feij[1]; Hauke Flores[2]
[1]NL.WUR
not on board: Fokje Schaafsma[1] , Jan Andries van Franeker [1]
[2]DE_AWI
*susanne.kuehn@wur.nl

Grant-No. AWI_PS152_05

Outline

Top Predator Surveys are part of the inter-disciplinary field study focussing on the inter-connection of sea ice physics, sea ice biology, biological oceanography and top predator ecology. Pelagic food webs in the Antarctic sea ice zone can depend significantly on carbon produced by ice-associated microalgae. Future changes in Antarctic sea ice habitats will affect sea ice primary production and habitat structure, with unknown consequences for Antarctic ecosystems. Species feeding in the ice-water interface layer may play a key role in transferring carbon from sea ice into the pelagic food web, up to the trophic level of birds and mammals. To investigate the role of sea ice in structuring Antarctic marine ecosystems, distribution and density of marine mammals and birds will be studied. In the Southern Ocean, the exploitation of marine living resources and the conservation of ecosystem health are tightly linked to each other in the management framework of the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). Antarctic krill is important in this context, both as a major fisheries resource, and as a key carbon source for Antarctic fishes, birds, and mammals. Similar to Antarctic krill, several abundant endothermic top predators have been shown to concentrate in pack ice habitats in spite of low water column productivity. Investigations on the association of krill and other key species with under-ice habitats will be complemented by systematic top predator censuses in order to develop robust statements on the impact of changing sea ice habitats on polar marine resource management and conservation objectives.

Objectives

The distribution and abundance of top predators in the Southern Ocean are an essential part of the pelagic ecosystem. We want to better understand the role of top predators in fluxes of organic matter and carbon. We want to be able to indicate changes in space and time of the surrounding environment, and how this influences top predator density, abundance and behaviour. We want to describe ecological specialization of each species and how this affects the use of the environment. Finally, we want to provide population estimates (including non-breeders) in addition to seabird colony work on land.

Work at sea

During steaming, surveys of top predator densities will be conducted from observation posts installed on the flying bridge. Standard band transect methods are used, with snapshot methodology for birds in flight, and line-transect methods for marine mammals. In addition, helicopter transect surveys will be conducted to cover larger areas. The helicopter counts are band transects only, normally set on 250 meters bandwidth.

Expected results

We expect to obtain a comprehensive dataset of the distribution and diversity of marine top predators in the Weddell Sea, improving our understanding of the role of sea-ice on Antarctic top predators. In combination with SUIT and RMT data we will map food web relationships with sea-ice associated fauna and gain knowledge on carbon fluxes in the Southern Ocean.

2.6 ASSESSMENT OF MULTINATIONAL AND INTERDISCIPLINARY COLLABORATION PATHWAYS AND PROCESSES IN THE FIELD

Susa Niiranen[1*]; [1]SE.SU
not on board: Eleanor Campbell[1], Juan Rocha[1], Ingo Fetzer[1]
*susa.niiranen@su.se

Grant-No. AWI_PS152_06

Objectives

To suggest a multinational monitoring network for the EWS that is co-designed together with key stakeholders to ensure its social relevance, legitimacy and legacy is one of the main objectives of the WOBEC project. As first steps towards fullfilling this objective, stakeholder priorities were scoped by sending out a questionnaire on research and monitoring priorities to selected WOBEC stakeholders in early 2025. This questionnaire was followed by an online WS that was focused on scoping for key research questions, data needs and spatial priorities.

How these stakeholder preferences can shape monitoring priorities, and what are the feasibility, barriers and enablers for integrating such co-produced knowledge in a monitoring programme in practice, will be studied during the planning phase and onboard the WOBEC expedition.

Work at sea

Susa Niiranen from the Stockholm Resilience Centre (Stockholm University) will combine interviews (carried out with onboard scientific staff) with text (planning and report documents) and network analysis (based on interviews and questionnaires onboard, and written documents) to (1) study how researcher priorities align with stakeholder priorities and (2) how are the collaboration and communication processes and information flow between teams of different disciplines and national institutes onboard, as well as (3) to identify the organisational/procedural practices onoard that either hinder or facilitate the operationalization of co-produced monitoring schemes.

The main research methods used onboard will be questionnaires and interviews. Both, structured (e.g. multiple choice and Likert scale) and unstructured (open-ended questions) questionnaires are planned, and largely prepared prior the cruise. However, when necessary, the questionnaires will be revised onboard. Interviews will be mainly semi-structured, i.e., with predefined open-ended questions with the flexibility to include additional more indepth questions based on interviewee's responses. Both questionnairs and interviews will be carried out with the research staff of the cruise who are responsible for defining which measurements are carried out at different stations (Primarily PIs, but also other researchers can be included). All participants are asked to sign a consent form, where it is also explained how the collected data will be stored and used. If not otherwise agreed, anonymity of the participants and their responses will be safeguarded. No questionnaire or interview results are distributed outside

the core research team (listed at the beginning of this chapter) without consent from participants. The participants can withdraw from the process at any time.

Expected results

The key expected outcome is increased knowledge on how stakeholder priorities can be included in monitoring programmes/plans of such research cruises that require extensive resources, long-term planning and close coordination between multiple research teams, each with their specific research focus. More concretely, the results from this study will identify timelines and practices that allow inclusion of stakeholder priorities in environmental monitoring programmes, particularly in regions that are challenging to access and as such infrequently sampled. Recommendations to update SOPs will be made accordingly.

2.7 ICELIGHT

Gaëlle Veyssière*[1], Jeremy P Wilkinson[1], Ante Medic[2]
not on board: Lovro Valcic[3]
*gaevey@bas.ac.uk

[1]UK.BAS
[2]EU.pulsarlab
[3]CR.BRUNCIN

Grant-No. AWI_PS152_12

Outline

This secondary user project proposes to enhance our understanding of how snow and sea ice properties affect the Antarctic under-ice light environment and how this, in turn, structures ecosystem functioning. By combining sea ice tethered autonomous assets with local in situ measurements during ice stations, we will address knowledge gaps on the seasonal and spatial variability of light transmission and its potential impacts on primary production and zooplankton dynamics. The proposal is designed to complement and extend the WOBEC main user project, providing a seasonal dimension to the spatially focused observations conducted during the cruise.

Objectives

The overall objective is to assess the linkages between snow and sea ice variability, light availability, and ecosystem response across the Eastern Weddell Sea. Specifically, we aim to:

- Quantify the temporal and spatial variability in snow, sea ice, and upper-ocean properties and their role in modulating solar partitioning and light transmission.
- Evaluate how the under-ice lightscape shapes ecosystem function by assessing phytoplankton and zooplankton responses across an annual cycle using the autonomous assets throughout a year-round monitoring plan.

Work at sea

Field activities will be conducted during the *Polarstern* PS152 expedition in close coordination with the WOBEC main user team. Our work programme includes:

- At each station, local observations of snowpack and sea ice physical and optical properties will be carried out. Measurements will include snow temperature, density, salinity and depth, ice thickness and temperature/salinity profiles, as well as solar partitioning at the air–snow and ice–water interfaces. Chlorophyll a sampling will further support estimates of primary production.
- Deployment of the sea ice tethered assets: Several ice-tethered buoy systems will be deployed on selected floes during the ice stations planned in the original. The buoys will jointly monitor solar radiation, snow and ice mass balance, under-ice light spectral composition, water-column structure, fluorescence, acoustic backscatter and meteorological parameters. Cameras mounted above and below the ice will provide visual context for the physical measurements.

- Collaboration with WOBEC: Work will be closely integrated with the WOBEC main programme, including the joint use of nets for zooplankton ground-truthing of acoustic backscatter, and the combined analysis of local station data and year-round observatory datasets.

Expected results

This project will deliver a unique dataset capturing the coupled dynamics of snow, sea ice, light availability, and ecosystem response across both seasonal and spatial scales. We expect to:

- Improve parameterisations of light transmission through snow and sea ice for radiative transfer models, allowing better scaling of local processes to regional levels.
- Acquire new year-round records of under-ice light and ecosystem response from the drifting autonomous assets, complementing the cruise-based observations and meant to obtain a better understanding of the role of snow and sea ice variability in influencing primary production and zooplankton dynamics in the Weddell Sea.
- Strengthen synergies between this project and WOBEC, ensuring an efficient use of ship time, resources, and data sharing to maximise scientific return.

The results will end up contributing to a more robust understanding of how Antarctic sea ice ecosystems may respond to ongoing environmental change.

2.8 SEASONALITY OF CARBON TURNOVER IN THE WEDDELL SEA (SEACAT)

Jakob Barz[1], Henning Schröder[1], Miriam Seifert[1], [1]DE.AWI
not on board: Matthias Wietz[1,2*], Andreas Rogge[1], [2]DE.UOL
Moritz Holtappels[1]
*matthias.wietz@awi.de

Grant-No. AWI_PS152_13

Objectives

The seasonal dynamics of the biological carbon pump in the Weddell Sea, including the spatiotemporal distribution and diversity of its microbial drivers, are poorly resolved. SeaCaT combines year-round and shipboard sampling to study microbial composition and functions over time and space, establishing a spatiotemporal eDNA archive of the WOBEC area and the Weddell Gyre. The project concentrates on (i) continuous records of biodiversity, biogeochemistry and oceanography from moored sensors and samplers, and (ii) eDNA sampling along PS152 followed by molecular diversity studies. Similar endeavors have successfully elucidated annual and biogeographical ecosystem structuring in the Arctic (von Appen et al. 2021; Wietz et al. 2024; Priest et al. 2025) and Antarctic Oceans (Hellmer & Holtappels 2021; also see current DFG project by M. Wietz).

On PS152, SeaCaT will recover three moorings which have sampled microbial and environmental parameters since their deployment on PS146. Moorings carry autonomous water samplers, particle imagers, sensors, and sediment traps for a detailed seasonal picture of the biological carbon pump. In addition, water and sea-ice sampled during PS152 will be analyzed via eDNA metabarcoding to elucidate biogeographic and hydrographic drivers of microbial diversity.

In summary, SeaCaT establishes a comprehensive portrait of:

- Microbial diversity throughout the Weddell Sea, across water masses and sea-ice
- Seasonal primary production, particle export, and carbon sequestration
- Keystone microbial taxa and genes that drive seasonal and spatial ecosystem structuring and biogeochemical processes

Work at sea

Moorings

As detailed in Table 2.1, we aim to recover three moorings. BGC-25-1 is a mixed-layer-extension, reaching from the terminal upper end (approx. 250 m depth) of a HAFOS mooring into surface waters (approx. 40 m depth). The extension carries a package of sensors that measured conductivity, temperature, depth, O_2, pH, pCO_2, and chlorophyll since deployment on PS146. A releaser allows separate recovery of the extension, while the HAFOS “mooring base” remains on site. BGC-25-2 and BGC-25-4 are standalone moorings, where sensor packages are complemented by autonomous Remote Access Samplers (RAS; collecting water), camera systems (Underwater Vision Profiler; particle imaging), and sediment traps

(collection of sinking particles). Biological samples have been preserved and will be stored at 4°C for later analysis in the home lab.

Tab. 2.1: BGC moorings to be recovered on PS152

SeaCaT Mooring-ID	HAFOS Mooring-ID	Latitude / Longitude	Comment
BGC-25-1	AWI227-17	59° 04,490' S 0° 06,058' E	Mixed Layer Extension
BGC-25-2	AWI231-15	66° 28,910' S 0° 02,884' E	stand-alone
BGC-25-4	AWI208-11	65° 43,100' S 36° 37,749' W	stand-alone

Water column and sea-ice sampling

Aligned with the WOBEC CTD program, SeaCaT samples all major water masses for later eDNA sequencing of biological communities. As a continuation of CTD sampling during PS146, this will establish a multiannual biodiversity inventory of the WOBEC area. Samples will be frozen on Sterivex cartridges for eDNA metabarcoding in the home lab. While SeaCaT focuses on bacterial and microeukaryotic diversity, the resulting DNA will be shared in collaborative studies across trophic levels, for instance fish (in cooperation with Chiara Papetti) and zooplankton (in cooperation with Hauke Flores). In addition, the AUTOFIM system (Metfies et al. 2016) will autonomously filter water underway, increasing the spatial dimension of biodiversity records without extra station time.

Furthermore, SeaCaT will perform eDNA sequencing of sea-ice samples, in cooperation with Jacqueline Stefels and Maria van Leeuwe. Moreover, SeaCaT closely cooperates with Heike Link regarding eDNA in sediments. Together, these efforts establish a comprehensive molecular portrait from surface to seafloor.

Expected results

We expect detailed insights into the biological carbon pump over time and space, expanding upon a current project in the Southern Ocean showing marked seasonality of bacteria and particles (Fig. 2.2). The seasonal and biogeographic eDNA archive establishes a spatiotemporal microbial understanding of the WOBEC area, representing a strong foundation for long-term insights into molecular biodiversity and its changes.

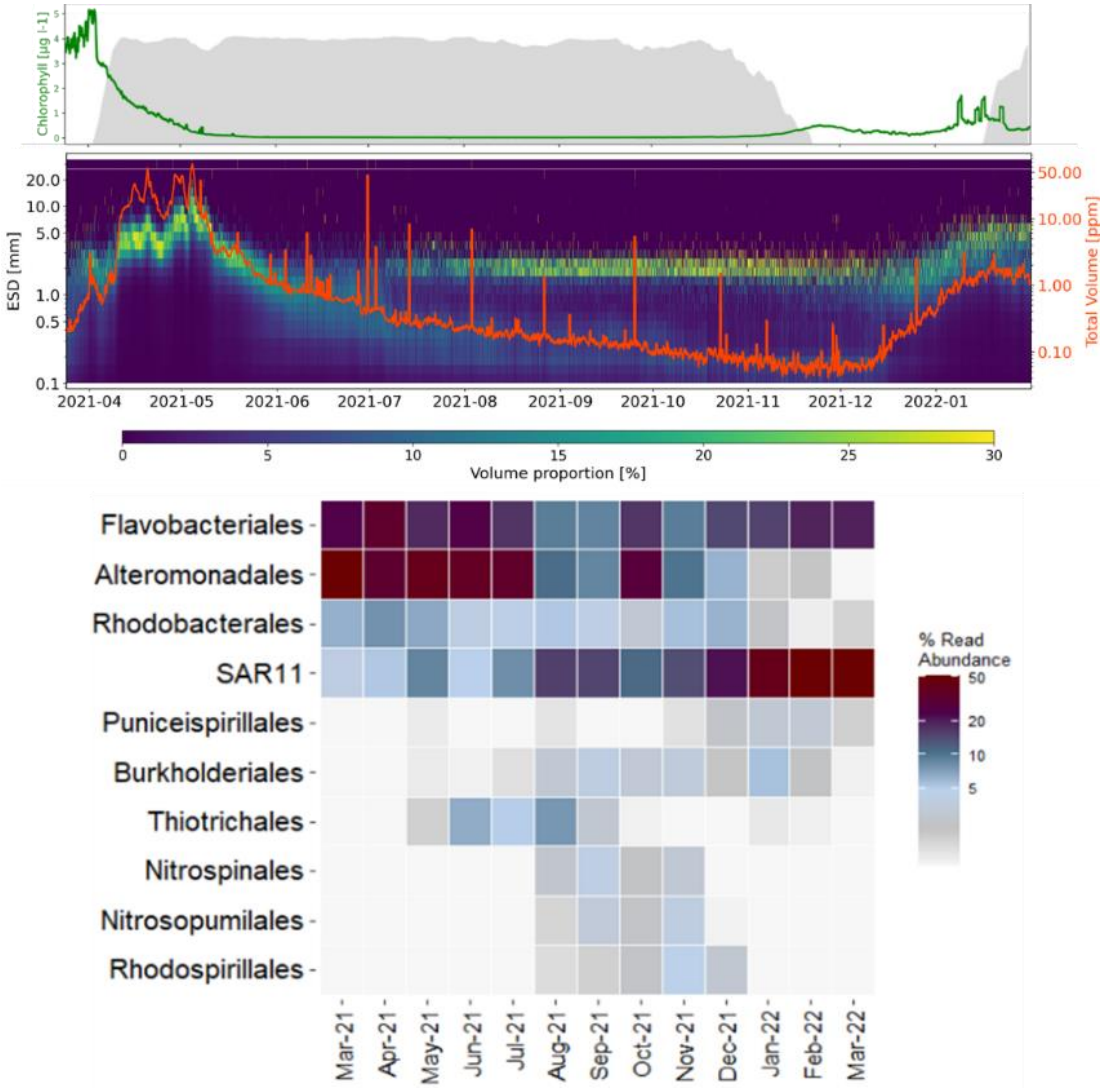


Fig. 2.2: Seasonal dynamics in the central Weddell Gyre as revealed by moored autonomous samplers. Top: Annual sea-ice (grey) and chlorophyll concentrations at 50 m depth. Middle: total particle volume (red) and size distribution (color: % of the respective size class on total volume) at 250 m depth. Bottom: Bacterial composition over the annual cycle.

3. DATA MANAGEMENT

Environmental data will be archived, published and disseminated according to international standards by the World Data Center PANGAEA Data Publisher for Earth & Environmental Science (https://www.pangaea.de) within two years after the end of the expedition at the latest. By default, the CC-BY license will be applied.

Environmental data and their corresponding metadata will be archived, published and disseminated according to the FAIR principle and international standards, such as DarwinCore, by the World Data Center PANGAEA Data Publisher for Earth & Environmental Science (https://www.pangaea.de) and similar national data centres within two years after the end of the expedition. By default, the CC-BY license will be applied.

All data belonging to the WOBEC project will be structured, stored and published according to the **WOBEC data management plan**, which builds on the principles set forth in "Alignment of Polar Data Policies – Recommended Principles" (2021), the SCAR data Policy (2022) and the MOSAIC data policy.

Molecular data (DNA and RNA data) will be archived, published and disseminated within one of the repositories of the International Nucleotide Sequence Data Collaboration (INSDC, www.insdc.org) comprising of EMBL-EBI/ENA, GenBank and DDBJ).

Any other data will be submitted to an appropriate long-term archive that provides unique and stable identifiers for the datasets and allows open online access to the data and FAIR data sharing.

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Sustaining our Future" Topic 6, Subtopics 6.1, 6.2, 6.3, 6.4.

In all publications based on this expedition, the **Grant No. AWI_PS152_XX** will be quoted and the following publication will be cited:

Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (2017) Polar Research and Supply Vessel POLARSTERN Operated by the Alfred-Wegener-Institute. Journal of large-scale research facilities, 3, A119. http://dx.doi.org/10.17815/jlsrf-3-163.

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APPENDIX

A.1 TEILNEHMENDE INSTITUTE / PARTICIPATING INSTITUTES

A.2 FAHRTTEILNEHMER:INNEN / CRUISE PARTICIPANTS

A.3 SCHIFFSBESATZUNG / SHIP‘S CREW

A.1 TEILNEHMENDE INSTITUTE / PARTICIPATING INSTITUTES

Affiliation	Address
On board / In the field	
BE.IRSNB	Institut Royal des Sciences Naturelles de Belgique Rue Vautier, 29 1000 Brussels Belgium
BE.ULB	Université Libre de Bruxelles Avenue F.D. Roosevelt, 50 1050 Brussels Belgium
BR.UFC	Labomar-Universidade Federal do Ceará Av Abolicao 3207 60165-081, Fortaleza Brasil
CR.BRUNCIN	BRUNCIN Lastovska 4 10000 Zagreb Croatia
DE.AWI	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung Postfach 120161 27515 Bremerhaven Germany
DE.DRF	DRF Luftrettung gAG Laval Avenue E312 77836 Rheinmünster Germany
DE.DWD	Deutscher Wetterdienst Seewetteramt Bernhard Nocht Str. 76 20359 Hamburg Germany
DE.NHC	Northern HeliCopter GmbH Gorch-Fock-Str., 103 26721 Emden Germany

Affiliation	Address
DE.UNI-Bremen	Universität Bremen Leobener Straße, NW2a 28359 Bremen Germany
DE.UOL	Carl von Ossietzky Universität Oldenburg Carl-von-Ossietzky-Strasse 9-13 26132 Oldenburg Germany
DE.UNI-Potsdam	Universität Potsdam Am Neuen Palais 10 14469 Potsdam Germany
DE.UNI-Rostock	Universität Rostock Albert-Einstein-Str. 21 18059 Rostock Germany
EDU.CU	University of Colorado 4001 Discovery Dr 80303 Boulder, CO United States
ES.ICM-CSIC	Institut de Ciències del Mar-CSIC Passeig Marítim de la Barceloneta, 37-49 8003 Barcelona Spain
EU.pulsarlab	Pulsar Laboratories d.o.o. Zagrebačka cesta 130 10000 Zagreb Croatia
GOV.NOAA	National Oceanic and Atmospheric Administration (NOAA) 8901 La Jolla Shores Dr. 92037 La Jolla, CA United States
IT.UNIPD	Universita Degli Studi Di Padova Via U. Bassi 58/b 35131 Padova Italy
IT.USAL	Università del Salento Via Monteroni s/n 73100 Lecce Italy
NL.DORSSEN	M van Dorssen Metaalbewerking Schilderend 113 1791 BE Den Burg Netherlands
NL.Pagodroma	Pagodroma Muyweg 23 1795 KA De Cocksdorp- Texel Netherlands

Affiliation	Address
NL.RUG	Rijksuniversiteit Groningen Postbox 716 9700 AS Groningen Netherlands
NL.WUR	Wageningen Marine Research Droevendaalsesteeg 4 6708 PB Wageningen Netherlands
NO.NPOLAR	Norsk Polarinstitutt Framsenteret Hjalmar Johansens gt. 14 9296 Tromsø Norway
NO.NTNU	Norges teksnisk-naturvitenskapelige universitet (NTNU) Høgskoleringen 1 7491 Trondheim Norway
NO.UiT	UiT The Arctic University of Norway Muninbakken 21, PO Box 6050 Langnes, N-9037 Tromsø Norway
PL.PAS	Polish Academy of Sciences Powstańców Warszawy 55 81-712 Sopot Poland
SE.SU	Stockholms Universitet Albanovägen 28 10691 Stockholm Sweden
UK.BAS	British Antarctic Survey High Cross, Madingley Rd. CB3 0ET Cambridge United Kingdom
UK.NOTTING	University of Nottingham Sutton Bonington Campus, LE12 5RD Nottingham United Kingdom
US.KnopfDoubledayRights	Knopf Doubleday Publishing Group 1631 Amelia Ln V0N1G2 Bowen Island Canada

A.2 FAHRTTEILNEHMER:INNEN / CRUISE PARTICIPANTS

Name/ Last name	Vorname/ First name	Institut/ Institute	Beruf/ Profession	Fachrichtung/ Discipline
Abraham	Jan Clemens	DE.UNI-Rostock	Student (Master)	Biology
Barnes	David	UK.BAS	Scientist	Biology
Barz	Jakob	DE.AWI	Technician	Chemistry
Bock	Christian	DE.AWI	Scientist	Biology
Dalman	Laura	BE.ULB	Scientist	Biology
Feij	Bram	NL.Pagodroma	Other (e.g. freelancer or pupil)	Biology
Flores	Hauke	DE.AWI	Scientist	Biology
Freer	Jennifer	UK.BAS	Scientist	Biology
Gischler	Michael	DE.NHC	Pilot	Helicopter Service
Gottschalk	Milena	DE.UNI-Potsdam	Student (Master)	other geo sciences
Harding	Jack	DE.NHC	Pilot	Helicopter Service
Held	Christoph	DE.AWI	Scientist	Biology
Isla	Enrique	ES.ICM-CSIC	Scientist	Geochemistry/Geosciences
Jones	Christopher	GOV.NOAA	Scientist	Biology
Kaphegyi	Insa	DE.UNI-Oldenburg	Student (Master)	Biology
Koschnick	Nils	DE.AWI	Engineer	Biology
Kremer	Kira Izabela	DE.AWI	PhD student	Biology
Kühn	Susanne	NL.WUR	Scientist	Biology
Leeger	Rose	EDU.CU	PhD student	Biology
Lenss	Megan	NO.NPOLAR	PhD student	Biology
Link	Heike	DE.UNI-Rostock	Scientist	Biology
Mark	Felix Christopher	DE.AWI	Scientist	Biology
McOscar	Dwayne	DE.DRF	Technician	Helicopter Service
Medić	Ante	EU.pulsarlab	Technician	Engineering Sciences
Meiburg	Jonathan	US.KnopfDoubledayRights	Journalist	Public Outreach
Moreau	Sebastien	NO.NPOLAR	Scientist	Oceanography
Niiranen	Susa	SE.SU	Scientist	Biology

Name/ Last name	Vorname/ First name	Institut/ Institute	Beruf/ Profession	Fachrichtung/ Discipline
Osanen	Janina Emilia	NO.NTNU	PhD student	Biology
Papetti	Chiara	IT.UNIPD	Scientist	Biology
Pohling	Mareike	DE.DWD	Other (e.g. freelancer or pupil)	Meteorology
Purser	Autun	DE.AWI	Scientist	Biology
Reed	Jacob	UK.NOTTING	Scientist	Biology
Rode	Jörg	DE.DRF	Engineer	Helicopter Service
Rossi	Sergio	IT.unisalento; BR UFC	Scientist	Biology
Różańska-Pluta	Magdalena	PL.PAS	Scientist	Biology
Sakinan	Serdar	NL.WUR	Scientist	Biology
Schienbein	Katharina	DE.UNI-Bremen	PhD student	Biology
Schröder	Henning	DE.AWI	Engineer	Biology
Seifert	Miriam	DE.UNI-Bremen	Scientist	Biology
Spiegl	Tamara	DE.UNI-Rostock	Scientist	Public Outreach
Stefels	Jacqueline	NL.RUG	Scientist	Biology
Teschke	Katharina	DE.AWI	Scientist	Biology
Van de Putte	Anton	BE.IRSNB	Scientist	Biology
van Dorssen	Michiel	NL.DORSSEN	Technician	Biology
van Leeuwe	Maria	NL.RUG	Scientist	Biology
Veyssiere	Gaelle	UK.BAS	Scientist	Oceanography
Vortkamp	Martina	DE.AWI	Technician	Biology
Werna	Werna	DE.UNI-Rostock	Scientist	Biology
Werner	Melina	DE.AWI	PhD student	Biology
Wilkinson	Jeremy	UK.BAS	Scientist	Oceanography
Wold	Anette	NO.NPOLAR	Scientist	Biology

A.3 SCHIFFSBESATZUNG / SHIP'S CREW

No	Position	Rank	Nachname / Name	Name / First Name
1	Kapitän	Master	Kentges	Felix
2	1. Offizier	Chief Mate	Langhinrichs	Jacob
3	1. Offizier	Chief Mate	Grundmann	Uwe
4	1. Offizier Ladung	Chief Mate Cargo	Janik	Michael
5	2. Offizier	2nd Mate	Stelljes	Daniel
6	2. Offizier	2nd Mate	Peine	Lutz
7	Schiffsärztin	Doctor	Gößmann-Lange	Petra
8	Leitender Ingenieur	Chief Engineer	Grafe	Jens
9	2. Ingenieur	2nd Engineer	Farysch	Tim
10	2. Ingenieur	2nd Engineer	Krinfeld	Oleksandr
11	2. Ingenieur	2nd Engineer	Domann	Franz
12	Schiffselektrotechniker Maschine	Ship Electrotechnical Officer Engine	Zivanov	Stefan
13	Elektroniker Winden	Electrotechnical Engineer Winches	Kliemann	Olaf
14	Elektroniker Netzwerk/Brücke	Electrotechnical Engineer Network/Bridge	Hofmann	Jörg Walter
15	Elektroniker Labor	Electrotechnical Engineer Labor	Hüttebräucker	Olaf
16	Elektroniker System	Electrotechnical Engineer System	Pliet	Johannes Oliver
17	Bootsmann	Bosun	Sedlak	Andreas Enrico
18	Zimmermann	Carpenter	Neisner	Winfried Wolfgang

No	Position	Rank	Nachname / Name	Name / First Name
19	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Klee	Philipp
20	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Burzan	Gerd-Ekkehard
21	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Fischer	Sascha
22	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Klähn	Anton
23	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Kryszkiewicz	Maciej Waldemar
24	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Ackenhausen	Hendrik
25	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Bäcker	Andreas
26	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Röth	Benedikt Konrad
27	Schiffsmechaniker Deck	Multi Purpose Rating Deck	Kespelher	Ole Johan
28	Matrose/Decksmann	Able Seaman	Niebuhr	Tim
29	Lagerhalter	Storekeeper	Preußner	Jörg
30	Schiffsmechaniker Maschine	Multi Purpose Rating Engine	Rolofs	Nils Christian Timo
31	Schiffsmechaniker Maschine	Multi Purpose Rating Engine	Hänert	Ove
32	Schiffsmechanikerin Maschine	Multi Purpose Rating Engine	Klinger	Dana
33	Schiffsmechanikerin Maschine	Multi Purpose Rating Engine	Schneider	Denise
34	Schiffsmechaniker Maschine	Multi Purpose Rating Engine	Dethloff	Michael
35	1. Koch	1st Cook	Hofmann	Werner
36	2. Köchin	2nd Cook	Hammelmann	Louisa
37	2. Köchin	2nd Cook	Fabian	Laura
38	1. Steward	1st Steward	Pieper	Daniel
39	2. Stewardess	2nd Stewardess	Hinz	Nina Irene
40	2. Steward	2nd Steward	Dibenau	Torsten
41	2. Stewardess	2nd Stewardess	Möhle	Steffi

No	Position	Rank	Nachname / Name	Name / First Name
42	2. Stewardess / Krankenschwester	2nd Stewardess / Nurse	Schwantes	Andrea
43	2. Steward / Wäscherei	2nd Steward / Laundry	Arendt	Rene
44	2. Steward / Wäscherei	2nd Steward / Laundry	Cheng	Qi
45	2. Steward / Wäscherei	2nd Steward / Laundry	Chen	Dansheng