

APECS-ARICE Webinar

ARICE, the ice and the fish

An Arctic expedition from planning to first results

Moderation: Josefine Lenz (AWI, APECS & ARICE)



Speakers:

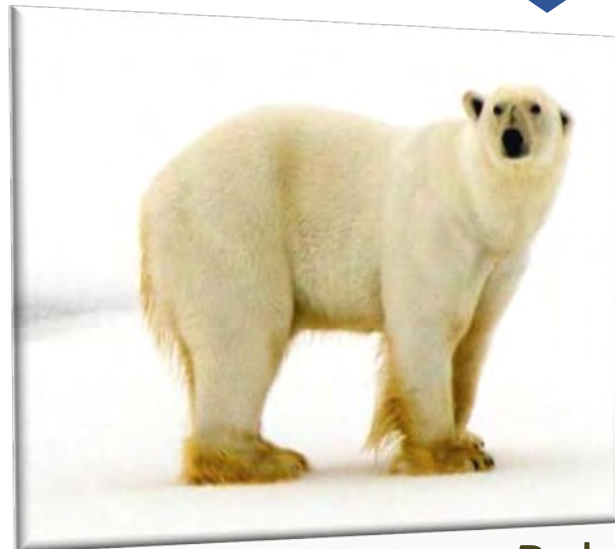
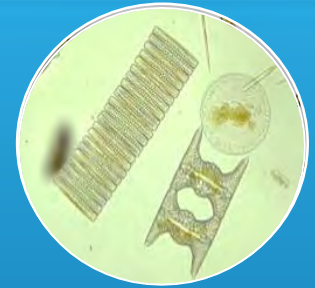
Hauke Flores (AWI Bremerhaven)

Mai Apasiri Klasmeier (Ruhr University Bochum)



Autumn - Winter

Sea-ice associated food web



www.arice.eu

Polar bear



Polar cod



Ice amphipod





Beroe sp.



Calanus glacialis



Clione limacina



Gammarus wilkitzkii



Beroe sp.



Boreogadus saida



Limacina helicina



Calanus hyperboreus



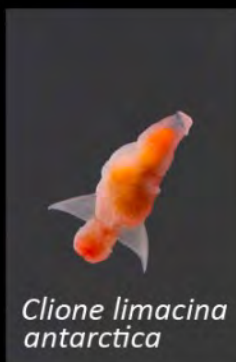
Aethotaxis mitopteryx



Mertensia sp.



Eusirus microps



Clione limacina antarctica



Euphausia superba



Salpa thompsoni



Tomopteris sp.

ARCTIC AND ANTARCTIC UNDER-ICE FAUNA

Photos: Carmen David, Christian Katlein, Jan Andries van Franeker, Julia Ehrlich, Hauke Flores

Polar cod



Food
Crustaceans



Predators
Seals & Seabirds

Human use
Minor fishery, Fishfeed
Traditional hunting

Special adaptations:

- Freezing temp.
- Sea ice

Distribution



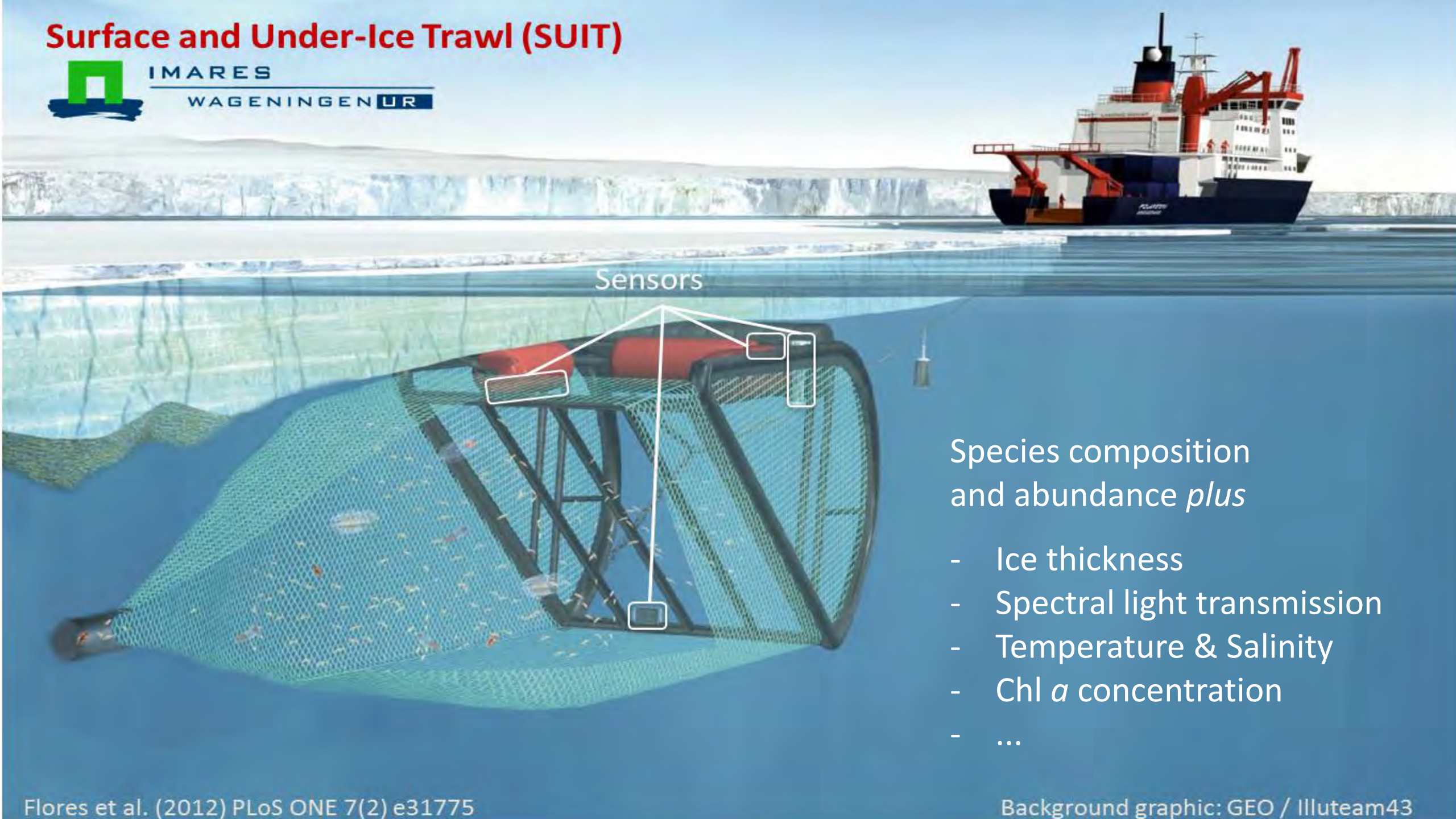
1 year-old polar cod
Boreogadus saida

Surface and Under-Ice Trawl (SUIT)



IMARES

WAGENINGEN UR



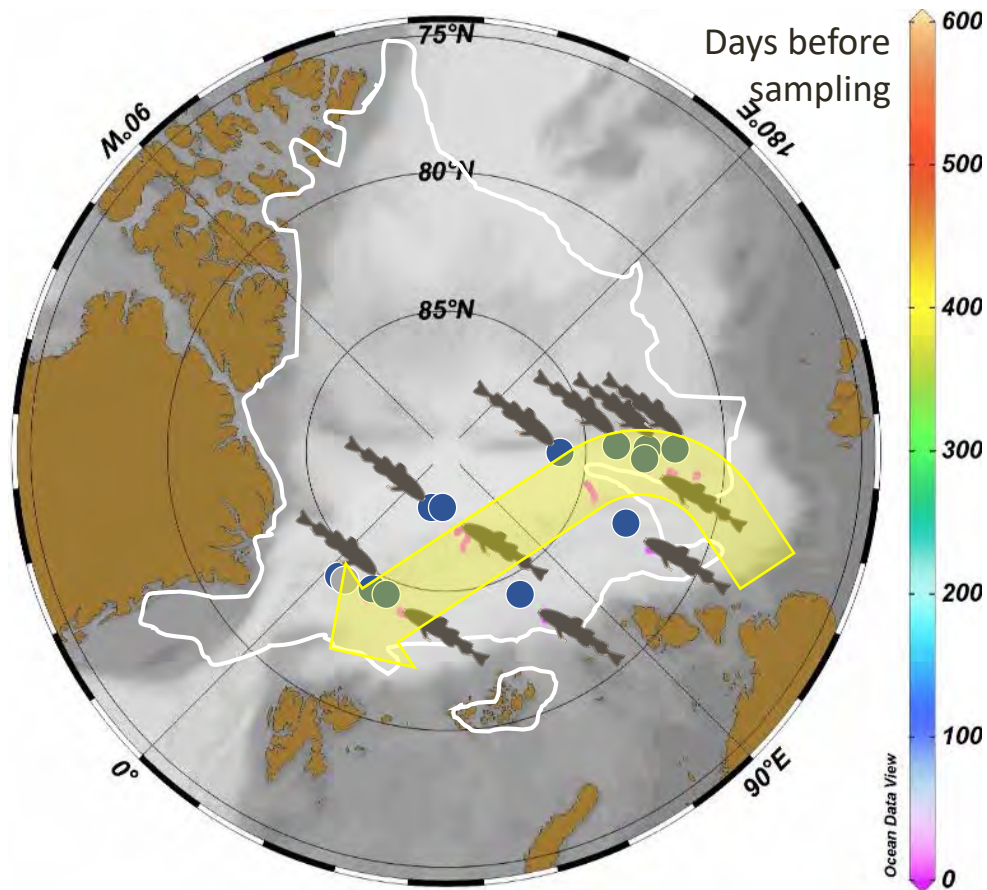
Sensors

Species composition
and abundance *plus*

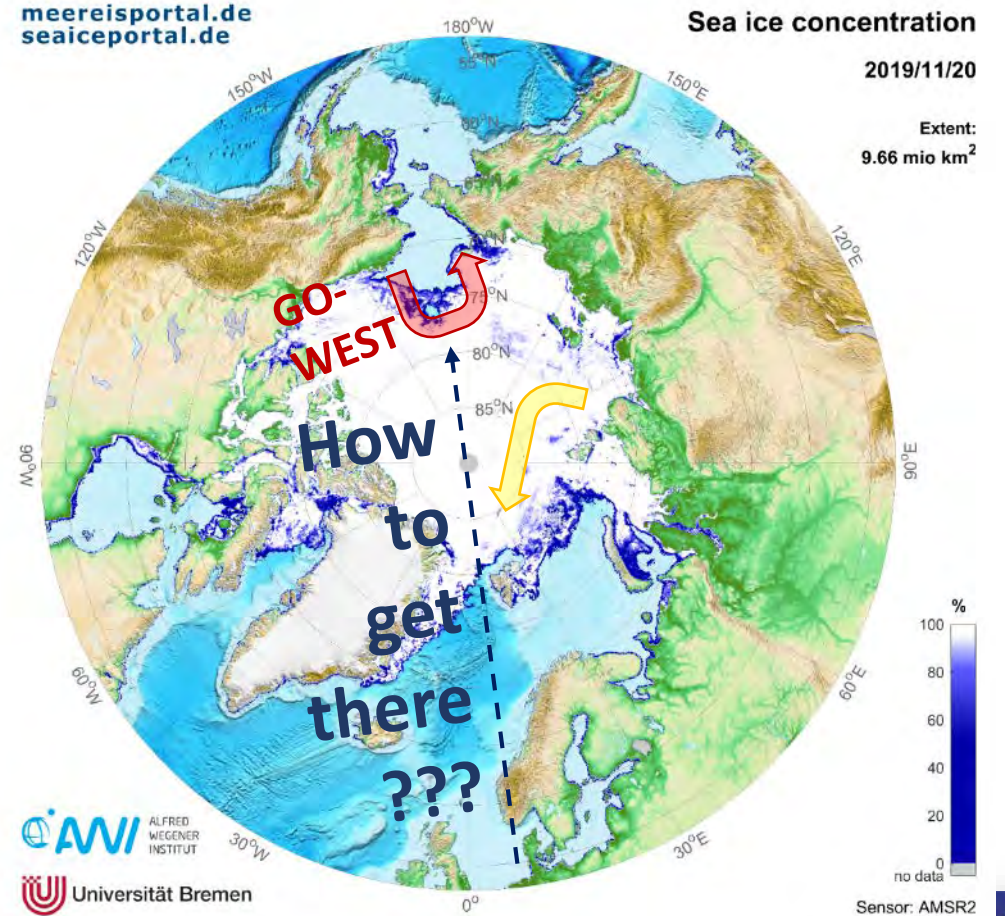
- Ice thickness
- Spectral light transmission
- Temperature & Salinity
- Chl *a* concentration
- ...

Sea-ice drift hypothesis

Sea-ice backtracking



meereisportal.de
seaiceportal.de



ARICE – What is it about?

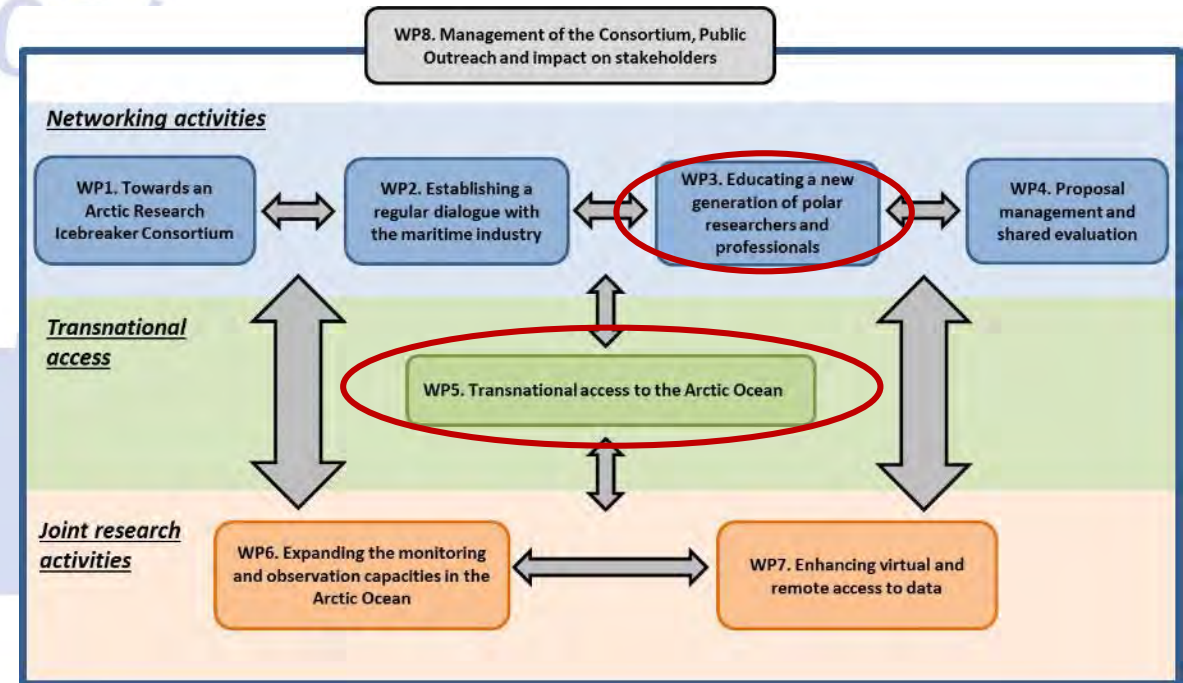
- ARICE = Arctic Research Icebreaker Consortium
- Funding: Horizon 2020 (EU)
- Coordination: AWI
- Budget: ~ 6 Mio €



ARICE – Objectives



- Providing Europe with better capacities for marine-based research in the ice-covered Arctic by:
- Networking
- Transnational access
- Joint research activities





PRV Polarstern, DE



IB Oden, SE



RV Kronprins Haakon, NO



CCGS Amundsen, CA



MSV Fennica, FI



RV Sikuliaq, USA



Proposal development

- First discussions with Franz Mueter in spring 2018
- Deadline of proposal submission 5 July 2018
- Review of proposals from July to November
- Final decision on 4 November 2018
- Start of expedition on 5 November 2019



Eligibility Criteria

- PI and most group members not from the country of the ship provider
- > 50% working for an EU(-associated) institution
- At least 3 different countries
- Training for early career scientists (or techs)
- Data archiving (ARICE data policy)



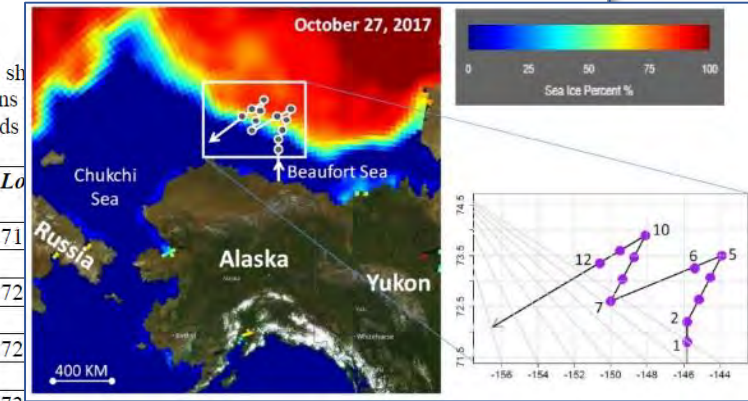
Evaluation Criteria

- Scientific and Technical Quality Impact on Society and Public Outreach
- Technical Capability and Scientific Qualification/Track Record
- Collaboration with International/National Partners/Industry
- Training of Early Career Scientists

Flores Sikuliaq GO-WEST

Table 1: SUIT station plan and sea ice conditions. Example locations 2017. Depth at all stations exceeds

Location No / Transit	Latitude	Longitude	Sea Ice Percent %	Depth (m)	Temperature (°C)
1 (test haul)	-145.8	71.5	0	0	3.5
Transit 1-2					
2	-145.8	72.5	0	0	3.5
Transit 2-3					
3	-145.17	72.5	0	0	3.5
Transit 3-4					
4	-144.53	73.07	0	0	3.5
Transit 4-5			3	30	10
5	-143.9	73.5	0	0	3.5
Transit 5-6			3	30	10
6	-145.4	73.25	0	0	3.5
Transit 6-7			5	90	18
7	-150	72.6	0	0	3.5
			5	30	6
	-149.37	73.03	0	0	3.5
			4	30	7.5
	-148.73	73.47	0	0	3.5
			3	30	10
	-148.1	73.9	0	0	3.5
			3	30	10
	-149.5	73.5	0	0	3.5
			0	24	6
			0	0	3.5
12	-150.6	73.5	0	0	3.5
Total				378 miles	136 (5.7 d)



Flores Sikuliaq GO-WEST

PART B – SCIENTIFIC PROJECT DESCRIPTION

1. SCIENTIFIC OBJECTIVES OF THE PROPOSED WORK

a) General scientific background

The rapid decrease in sea-ice extent and thickness in the Arctic Ocean will have major impacts on primary productivity, species composition, carbon export and other ecosystem processes (Arrigo et al. 2012, Boetius et al. 2013, Wassmann et al. 2011). However, the processes that drive interactions among the environmental compartments (i.e. atmosphere, sea ice, ocean) and biological components of Arctic marine ecosystems are still not fully identified and quantified.

Polar cod (*Boreogadus saida*), a key fish species in Arctic marine ecosystems, may be

Proposal
subm.

Approval

Expedition
start

May

Jul

Sep

Nov

Jan

Mar

May

Jul

Sep

Nov

2018

2019

Budget

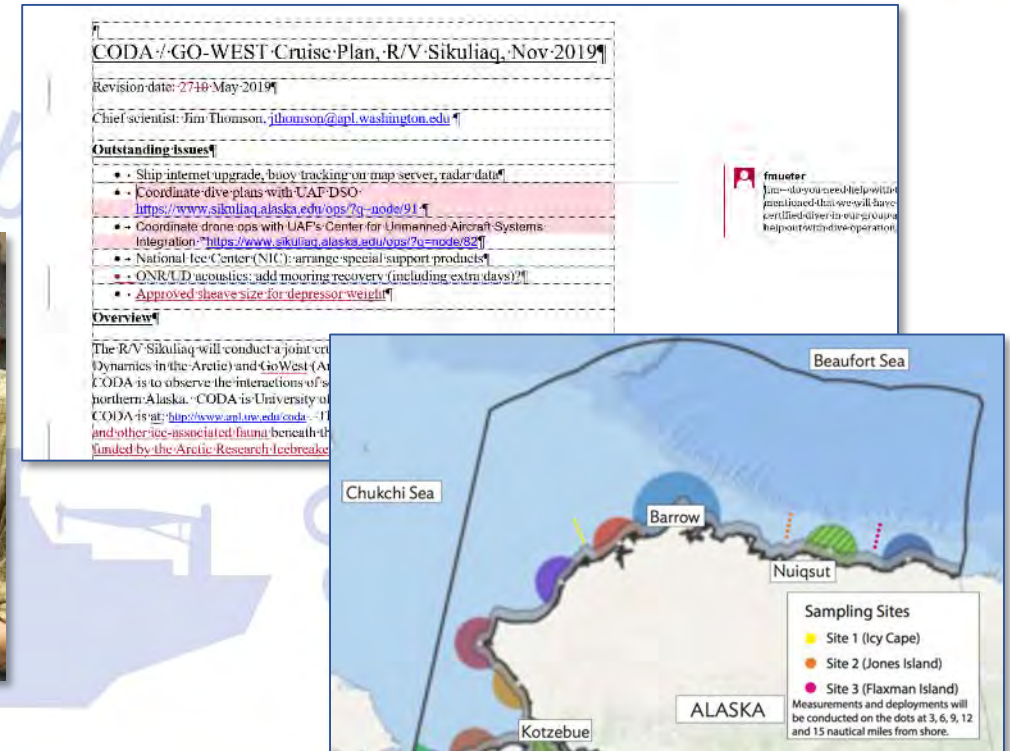
- ARICE
 - Shiptime (berth fee)
 - Travel
 - Transportation of equipment
- Additional funding (AWI, UAF, BOEM)

Cost category	Price	Quantity	Total
Travel			
Travelers: Hauke Flores, Sarah Maes, Kim Vane, 2 students (NN)			
RT from Europe to Nome, Alaska	€ 1,800.00	5	€ 9,000.00
Nome hotel - 3 nights	€ 480.00	5	€ 2,400.00
per diem - 4 days	€ 400.00	5	€ 2,000.00
ground transportation, misc.	€ 150.00	5	€ 750.00
Travelers: Franz Mueter, Alexei Pinchuk			
RT Juneau to Seward	€ 550.00	2	€ 1,100.00
Seward hotel - 3 nights	€ 480.00	2	€ 960.00
per diem - 4 days	€ 400.00	2	€ 800.00
ground transportation, misc.	€ 150.00	2	€ 300.00
Shipping			
Europe to Seward or Nome	€ 5,000.00	1	€ 5,000.00
Juneau to Seward	€ 400.00	1	€ 400.00
TOTAL			€ 21,850.00



Logistics - preparations

- Living Doc „Cruise plan“
 - Legal issues / EEZs
 - Gear specifications
 - „Rolling plan of day“
 - Mobilization and demobilization
- Getting the team together



Logistics – getting everyone over there

- Travel plans for all participants (D, NL, B, RUS, US)
- Visa
- Freight
- Database & Data sheets
- Packing

FREIGHT LIST																
KIND OF EXPEDITION:		OTHER		PARTICIPANT:		Hauke Flores			KIND OF FREIGHT:		NORMAL					
CRUISE NO.:				E-MAIL ADDRESS:		hauke.flores@awi.de			DATE:		23.09.2019					
CRUISE LEG / FLIGHT NO.:				PHONE NO.:					CONTAINER NO.:							
COLOUR CODE:		YELLOW		BLACK		YELLOW		INSTITUTION:		AWI		REQUISITIONER NO. (ONLY FILLED BY AWI-LOGISTICS)				
IDENT. NO.		KIND OF PACKING		STOWAGE (ONLY FILLED BY AWI-LOGISTICS)		ITEM (CONTENT - KEYWORDS)			MEASUREMENTS LxWxH (CM)		VALUE (€)		WEIGHT (KG)		VOLUME (CBM)	
HF-025		PLASTIC BOX				Sea&Sun CTD			80.0 60.0 20.0		15000.00		25.00		0.098	
GW-1		ALUBOX				Sensors I			60.0 40.0 40.0		11240.00		25.00		0.096	
GW-2		ALUBOX														



Proposal
subm.

Approval

Expedition
start



2018

2019



GO-WEST 2019

Hauke Flores, Franz Mueter,
Alexei Pinchuk, Sarah Maes,
Kristina Kunz, Jared Weems,
Lorena Edenfield, Ron ten Boer,
Nadezhda Zakarova,
Apasiri Klasmeier,
Michiel van Dorssen,
Fokje Schaafsma, Filip Volckaert

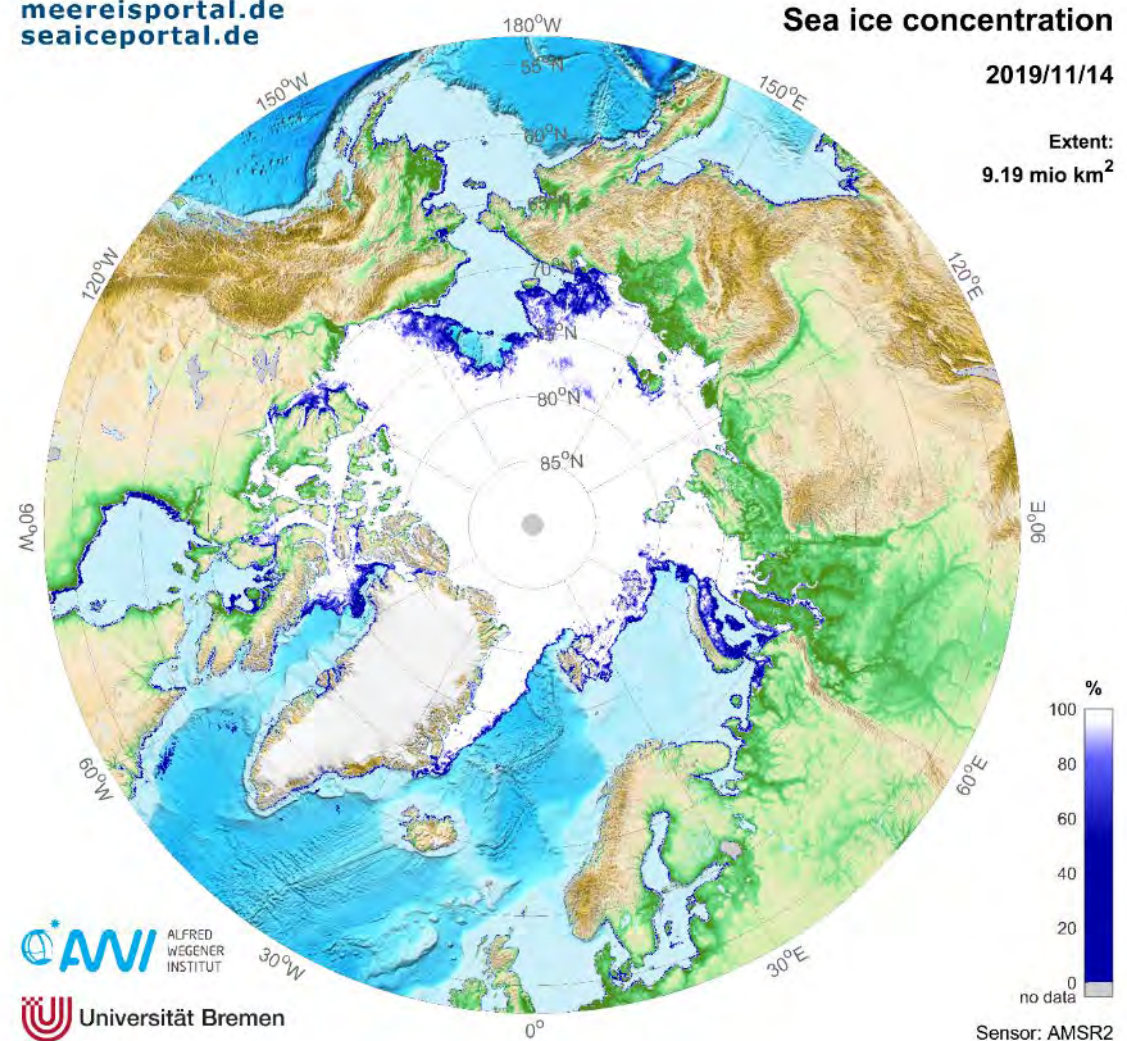
Course of the cruise

Change of plans:

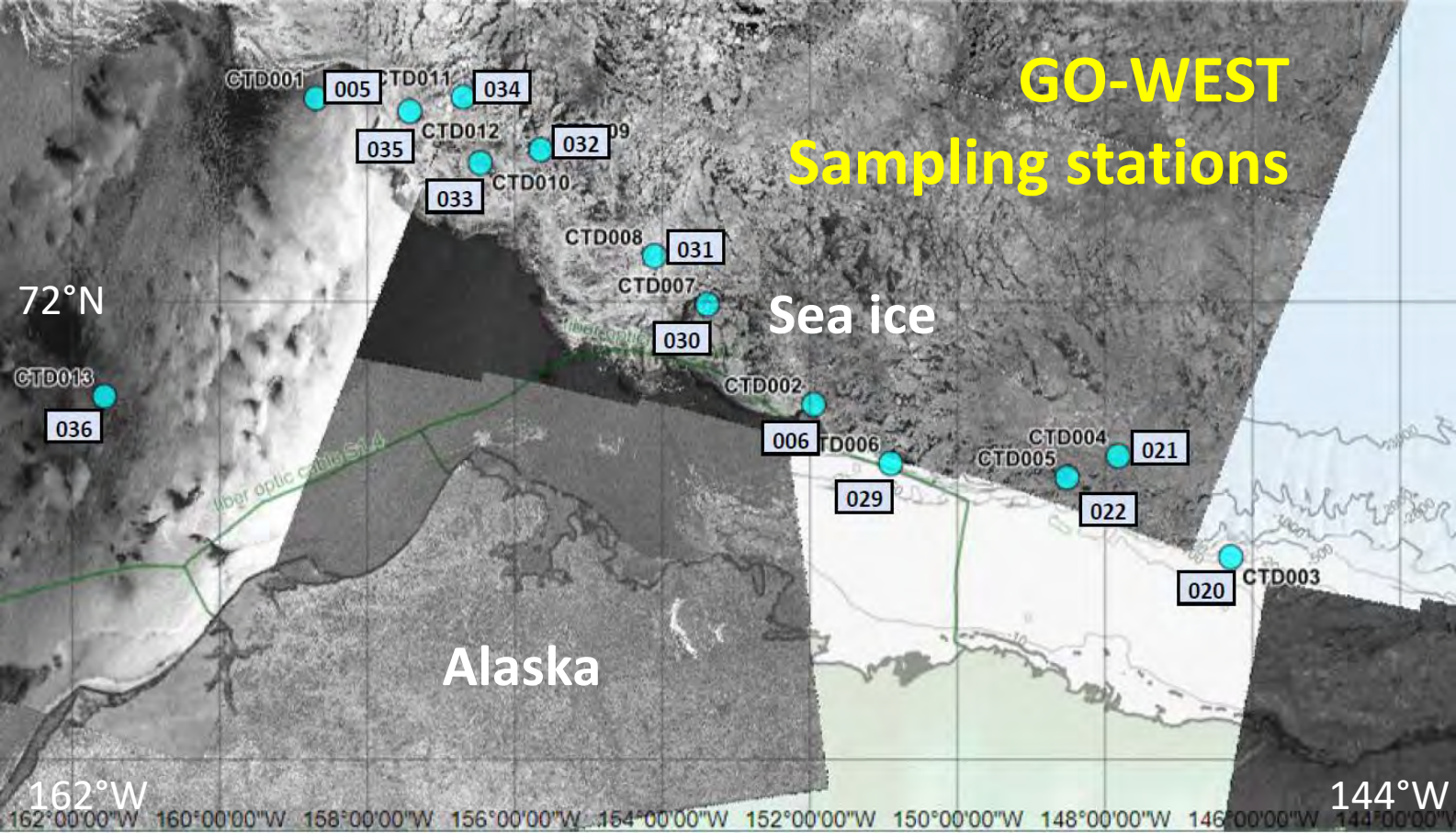
- Weather
- Whale Hunting Season
- Ice cover



meereisportal.de
seaiceportal.de



Sea ice concentration data obtained from meereisportal.de



Teamwork and cooperation



- Two research teams:
GO-WEST (AWI/UAF/BOEM), marine biology
CODA (APL/UW), physics/oceanography
 - What we wanted to do:
 - Work in ice-covered areas/calm waters
 - Observe under-ice fauna and midwater layers
 - Workflow: CTD/fishing, sample processing & transit
- => cruise days split between teams



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GO-WEST

- 11 people from 5 nationalities and 3 institutions
- 6 early career scientists (3 students)



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=> cruise days split between teams
- Science outreach team:
documentation of CODA
work through
social media posts
& live streams
www.iceinmotion.com
- Cooperation with local
communities in Nome
and Utqiagvik



What did I as a first-timer learn?

- Experience in practical work on a ship and organization of workdays, e.g.
 - Handling scientific instruments
 - dealing with seasickness
 - Co-operating with the ship's crew
 - Flexibility is key

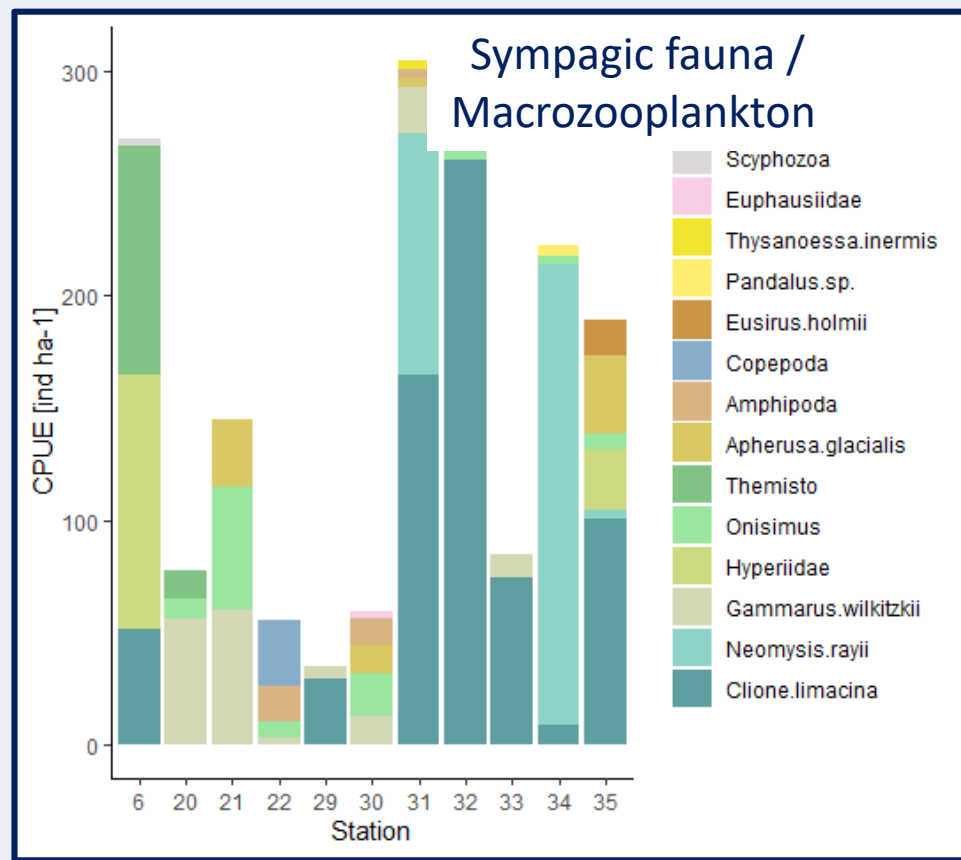
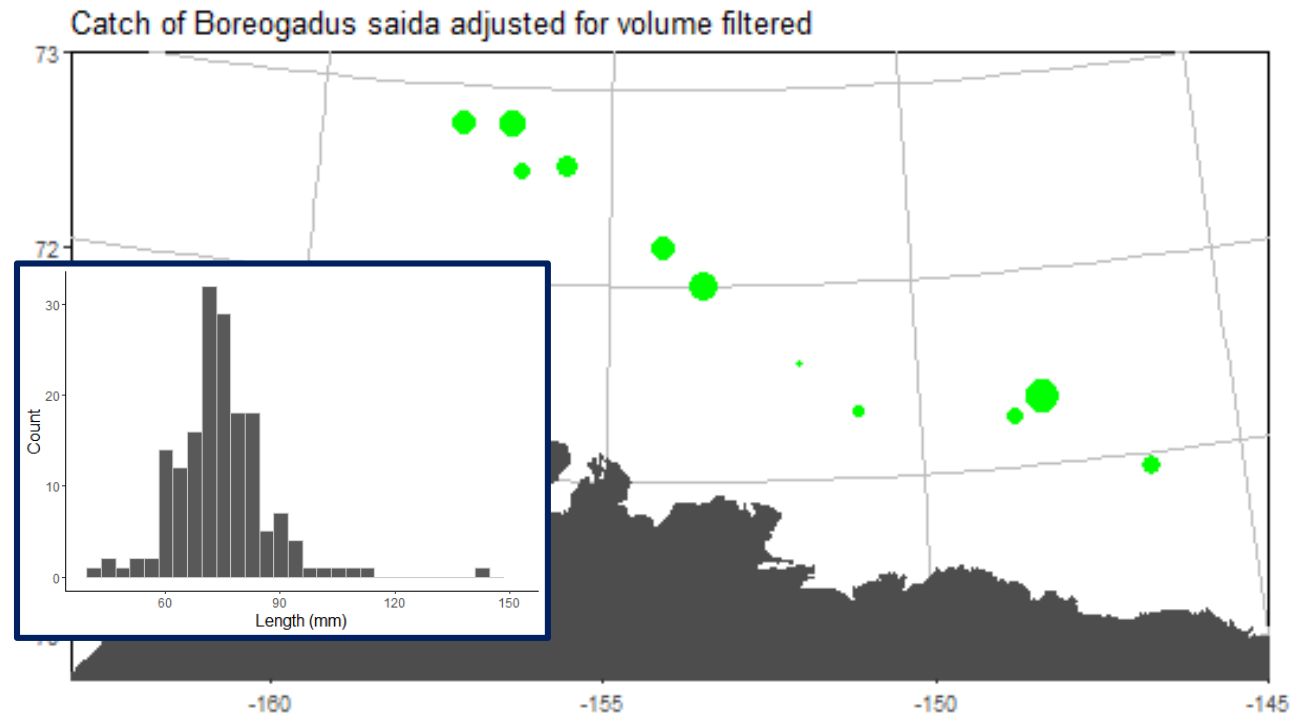


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- Good food is the most important aspect of a cruise



Preliminary results



Some surprises

- *Neomysis rayii*, a coastal species, found in high densities over basin (water column & under ice)
- *Calanus* where metabolically active on the shelf
- Three-spined stickleback, a coastal species, found over the slope
- Amphipods of family *Podiceridea* (benthic, tube-feeding amphipods) found under the ice



Gasterosteus aculeatus

Take home

- Polar cod used the under-ice habitat throughout the Beaufort & Chukchi Seas
- They can find food there
- Potential „ice highway“ in Beaufort Gyre
- Trans-national infrastructure sharing such as ARICE can enhance data collection potential in the Arctic Ocean



After the expedition...



- Cruise report:

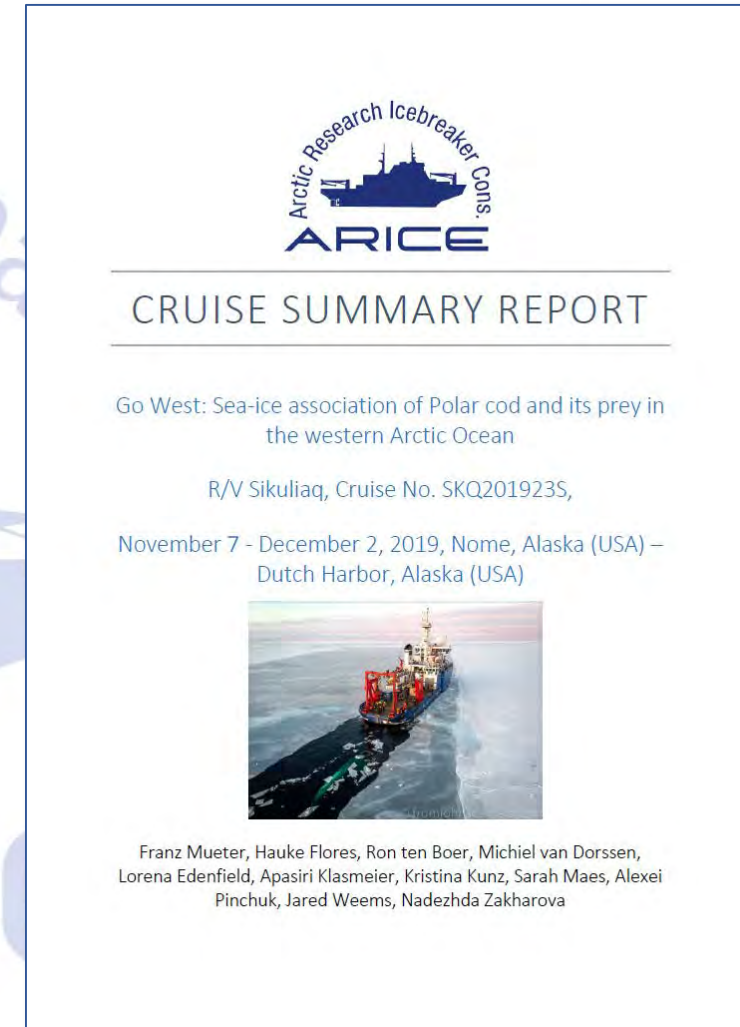
<https://epic.awi.de/id/eprint/51865/>

- Outreach

- Presentation to the EC
- Press interviews
- This lecture

- Scientific publications

- ...



APECS-ARICE Webinar

ARICE, the ice and the fish

Thank you very much!



An international collaboration strategy for meeting the needs of marine based research in the Arctic



Webinar recording will be available on arice.eu and on the APECS website

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