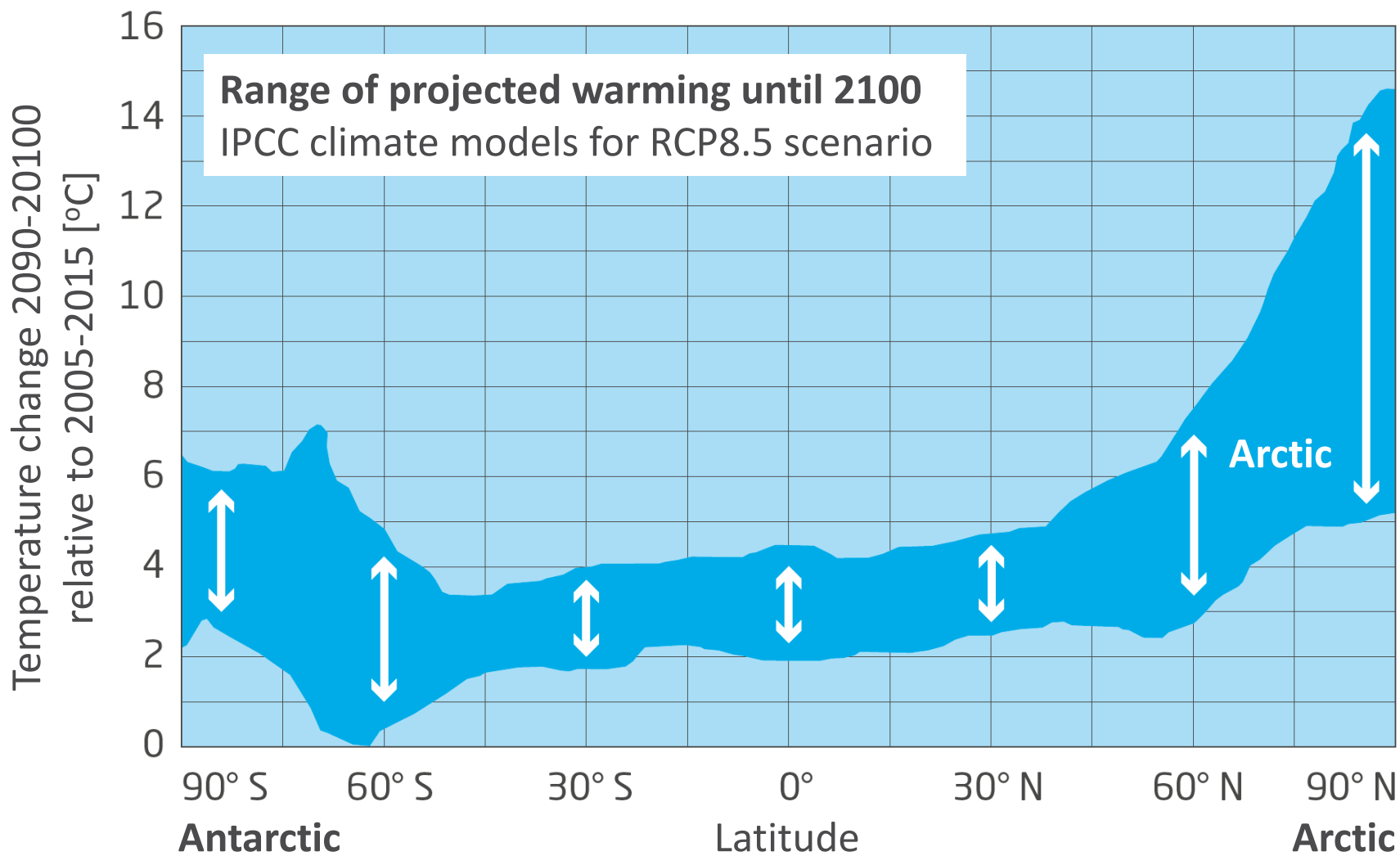


-4,0 -2,0 -1,0 -0,5 -0,2 0,2 0,5 1,0 2,0 4,0

Observed change of temperature 1970 – 2017 [°C]

Largest uncertainties of climate projections



Many processes in the Arctic climate system only roughly represented in Climate Models

Understanding of key climate processes in the Arctic is limited by lack of observations!

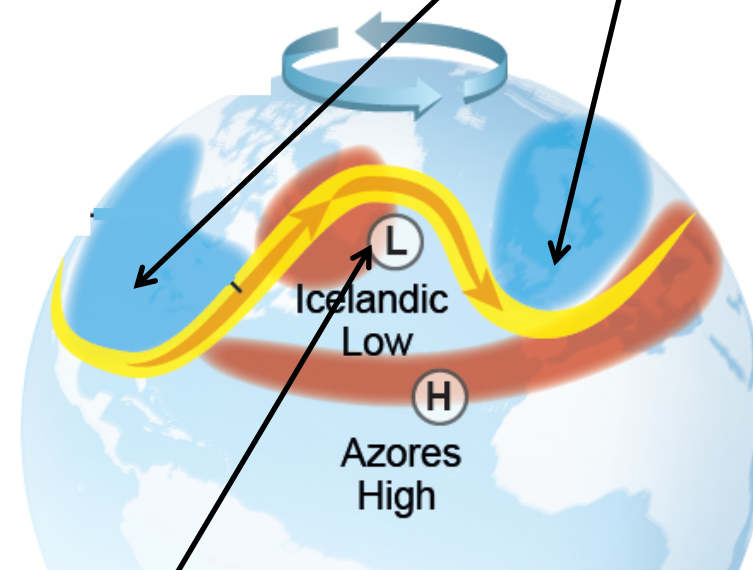
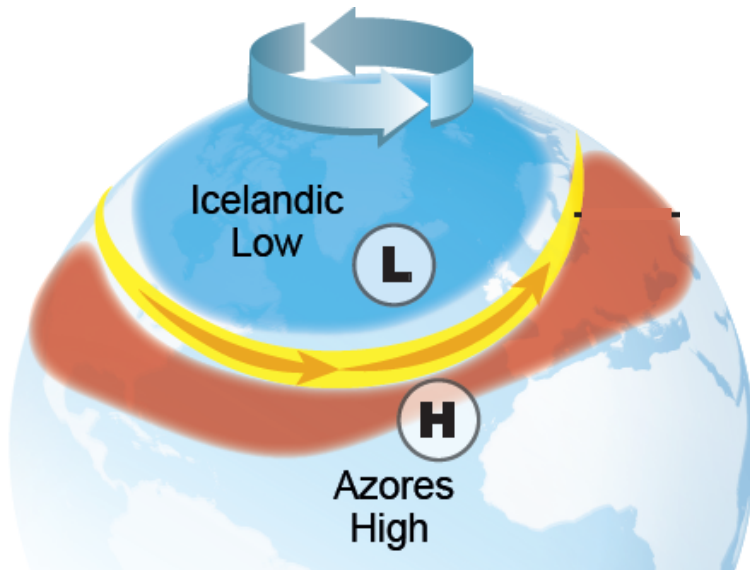
What happens in the Arctic does not stay in the Arctic

Arctic climate change & decreasing sea ice

stable
jet stream



meandering
jet stream



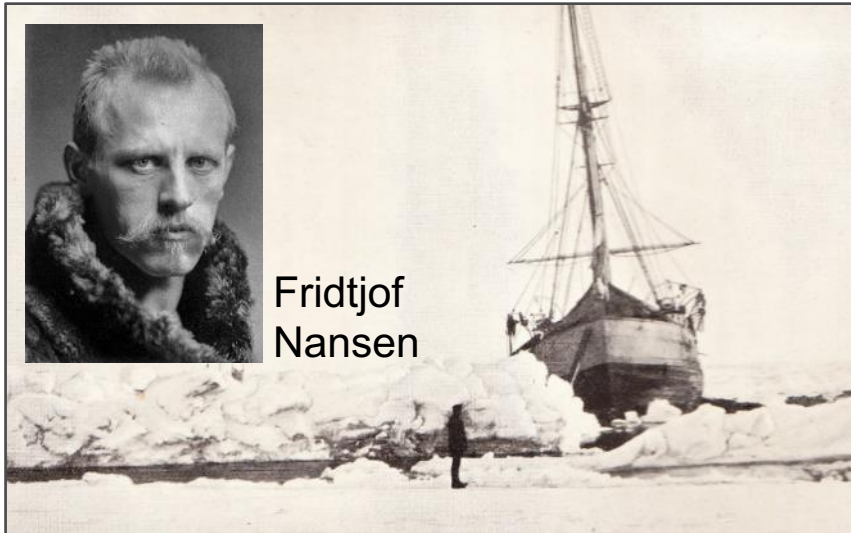
Potential for cold air outbreaks
→ Cold spells in Europe and US

Advection of warm and humid air into the Atlantic sector of the Arctic



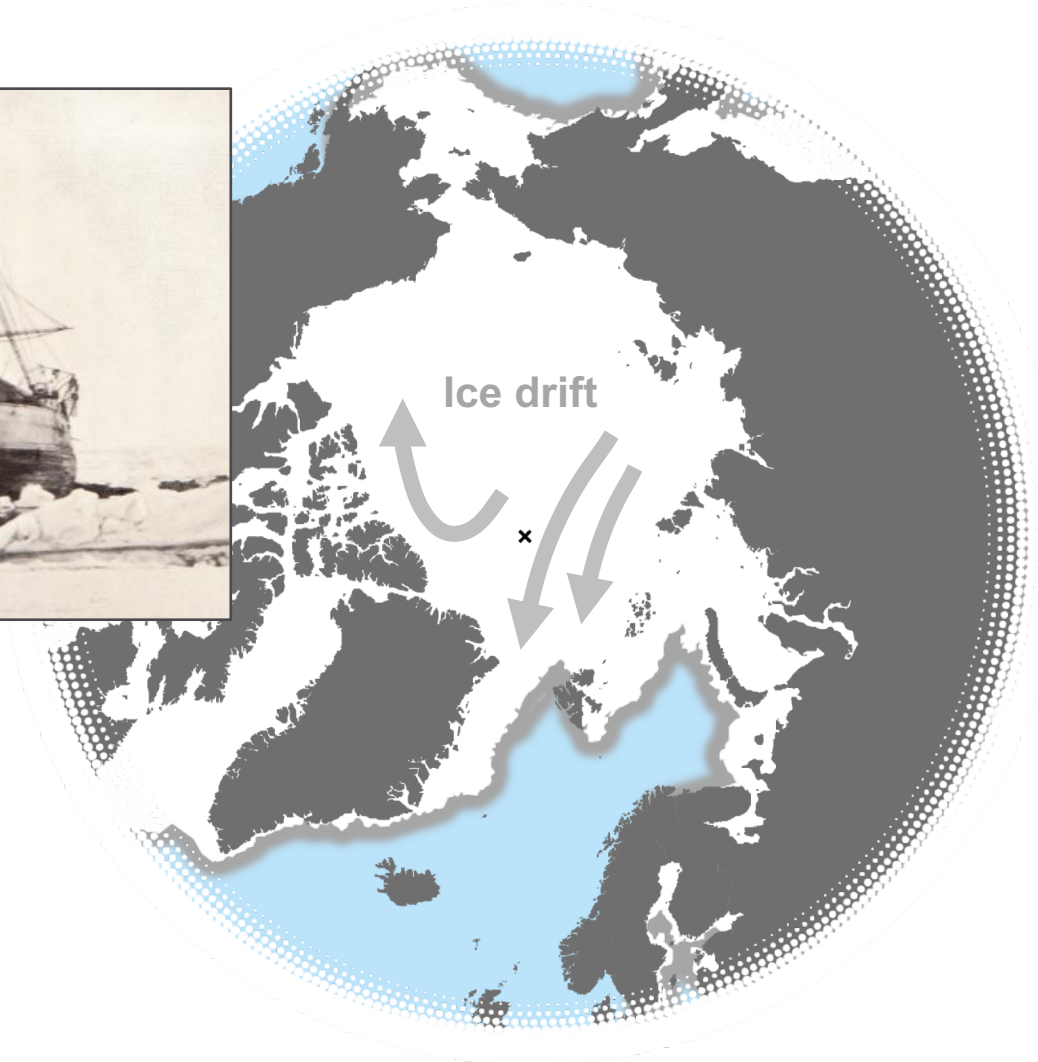
Largest Arctic research expedition ever

- First year round operation of research icebreaker near north pole
- 5 icebreakers
- Polar 5 & 6 research aircraft
+ support helicopters
+ support aircraft
- More than 60 institutions
- 17 nations
- A total of ~600 people will operate in the central Arctic
- >140 Mio€ budget

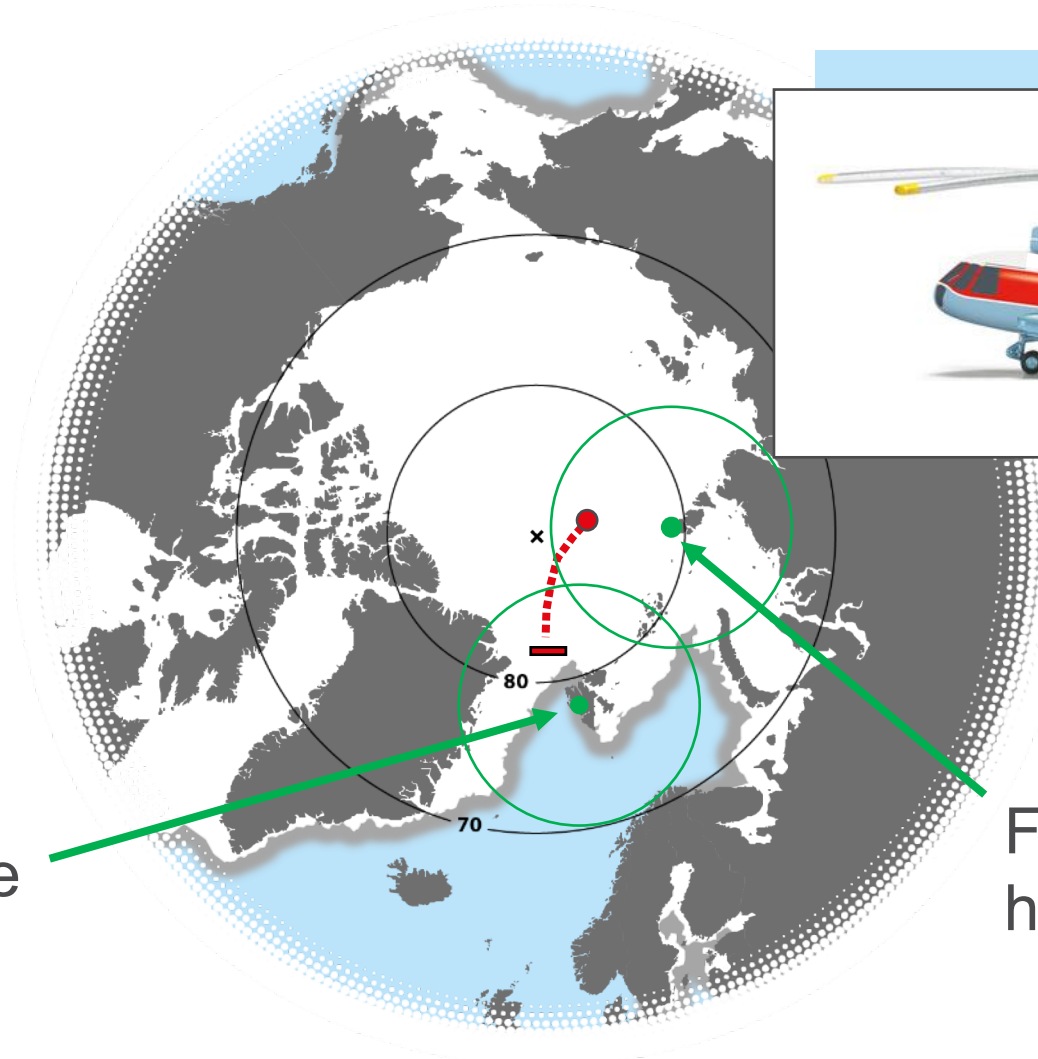


Fridtjof
Nansen

1893-1896: Fram-Expedition



September 2019 ● **Drift** ■ September 2020

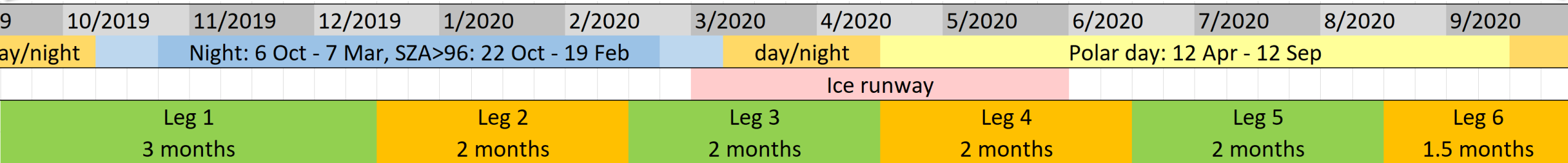


Helicopter base
Longyearbyen

Fuel depot for emergency
helicopter operations

Start: 20 September 2019

End: 14 October 2020



Until mid Oct
Fedorov



Mid December
Makarov



Mid February
Makarov



Mid April
Antonov AN-74
=> Ice runway

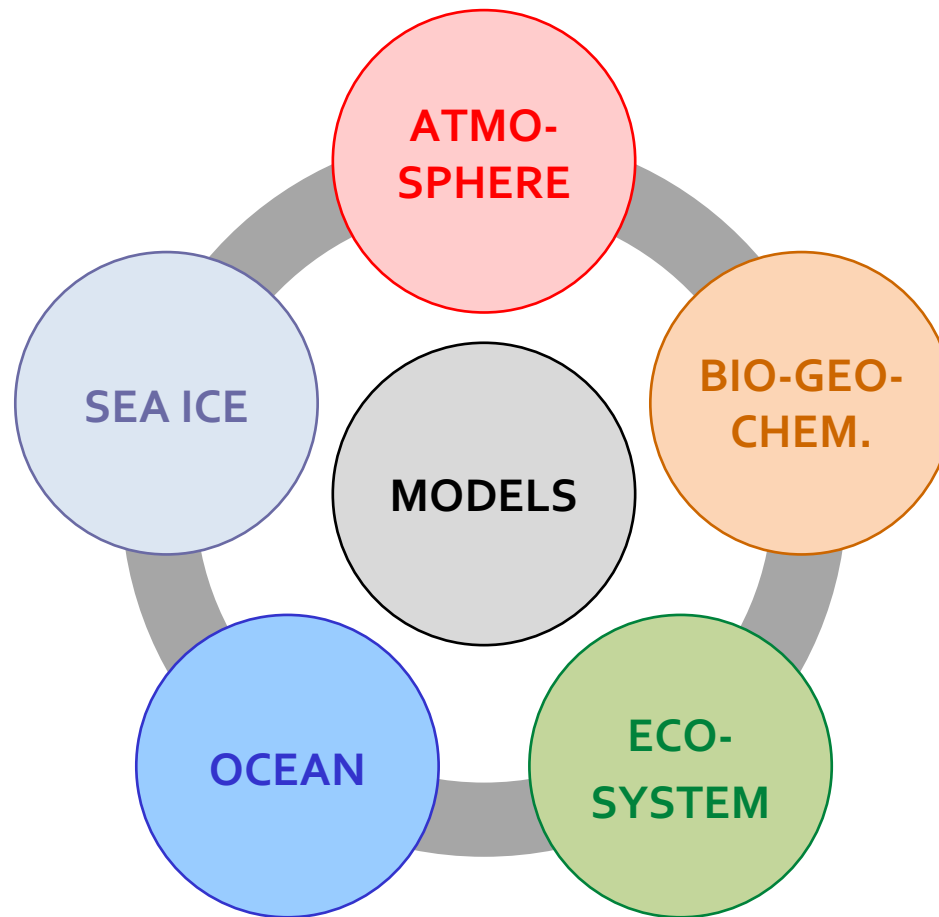


Mid June
& mid July
Oden



Mid August
Xuelong II

- **MOSAiC "summer" school for Master & PhD students on Fedorov**
 - *250 students have applied*
 - *All applications were independently reviewed by 2 reviewers*
 - *20 Students have been selected based on ranking, gender balance and international balance*
- **School teachers on Fedorov**
 - *4 school teachers for outreach to schools (2 US, 2 German)*
 - *=> Development of educational material*
- **Media team**
 - *Team of ~10 Media representatives on Fedorov*
 - *Film team plus additional media representatives year round*



Cross cutting working groups:

- Aircraft operations
- Helicopter & Drones operations
- Remote Sensing
- Communication & Outreach
- Data science
- Logistics
- etc.

- Data policy refined
- Media concept refined
- Negotiations with logistic partners ongoing
 - AARI
 - Rosmoport
 - UTair
 - Ken Borek
 - Swedish Arctic Office
 - CAA
- Negotiations for scientific partner contracts ongoing

	Leg 1	Leg 2	Leg 3	Leg 4	Leg 5	Leg 6
Atmosphere	Matthew Shupe (NOAA)	Taneil Uttal (NOAA)	Ian Brooks (U Leeds)	Ola Persson (U Colorado)	Heike Kalesse (LIM)	Matthew Shupe (U Colorado)
Sea Ice	Jari Haapala (FMI)	Polona Itkin (NERSC)	Stephanie Arndt (AWI)	Chris Polashenski (U Dartmouth)	Don Perovich (U Dartmouth)	Nikolai Kolabutin (AARI)
Ocean	Ying-Chih Fang (AWI)	Ivan Kuznetsov (AWI)	Sandra Tippenhauer (AWI)	Yusuke Kawaguchi (UTokyo)	Kirstin Schulz (AWI)	Celine Heuze (U Gotheburg)
BGC	Katharina Abrahamson (U Gothenburg)	Ellen Damm (AWI)	Jacqueline Stefels (AWI)	Brice Loose (URI)	Daiki Nomura (U Hokkaido)	Bruno Delille (U Liege)
Ecosystem	Allison Fong (AWI)	Sinhue Torres-Valdes (AWI)	Clara Hoppe (AWI)	Allison Fong (AWI)	Barbara Niehoff (AWI)	Katja Metfies (AWI)

Cruise lead Fedorov: Thomas Krumpfen

	Leg 1	Leg 2	Leg 3	Leg 4	Leg 5	Leg 6	Summe
Occupied	41	38	43	42	42	37	243
Names registered	40	36	41	37	36	34	224
NN	1	2	2	5	6	3	19
% registered	97,6	94,7	95,3	88,1	85,7	91,9	92,2

- The MOSAiC Handbook
- EIS revisited
- Freight
- Polarclothing
- Safety Equipment
- Training: STCW, Shooting
- Logistic Equipment
- Environmental issues

Polarstern – Wiki



The screenshot shows the ANI website interface. The top navigation bar includes 'Bereiche', 'Personen', 'Erstellen', and a search icon. The main content area is titled 'Polarstern - Wiki' and includes a star icon, a creation date of Feb 19, 2019, and a list of sub-pages under 'SEITENHIERARCHIE'. The sub-pages list includes 'General Information about RV P...', 'Scientific Coordination', 'Logistic Coordination', 'Scientific Devices', 'Emergencies, incidents and acc...', 'Contact persons', and 'PS122 - MOSAiC - Information'. The main text area contains the title 'RV POLARSTERN', a subtitle 'Guideline for planning and realization of expeditions with RV Polarstern', and two paragraphs of introductory text. A technical drawing of the RV Polarstern is visible in the bottom right corner.

ANI Bereiche Personen Erstellen ...

Polarstern - Wiki ☆

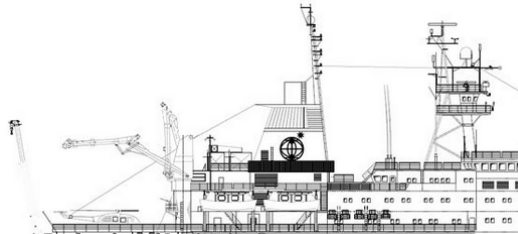
Erstellt von Lukas Minnemann, zuletzt geändert von Marius Hirsekorn am Feb 19, 2019

RV POLARSTERN

Guideline for planning and realization of expeditions with RV Polarstern

This Wiki addresses participants of expeditions with RV Polarstern, especially those who wish to work and to do research on board for the first time. Experienced participants may also use the Wiki as a reference for information and questions about Polarstern expeditions.

It is advised to read the Wiki to ensure smooth planning and realization of the expedition before



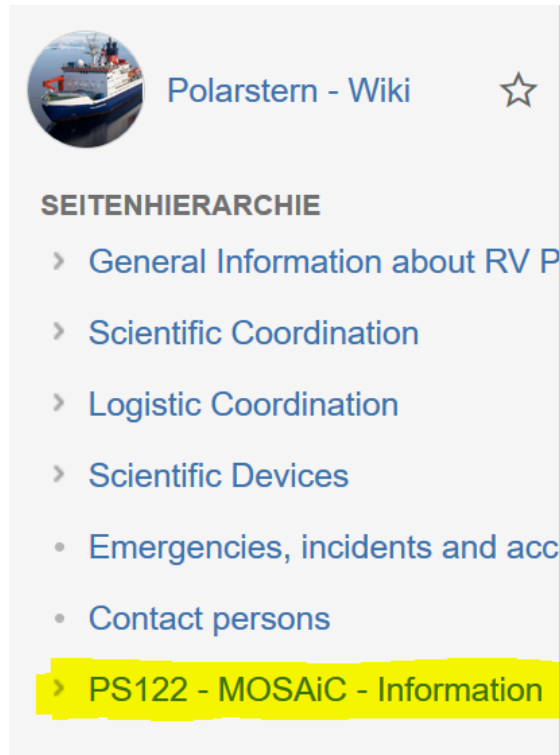
Polarstern – Wiki

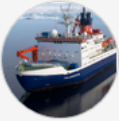



PS122 – MOSAiC – Information

do not refer to other chapters

Information above is for all other expeditions before PS122



 Polarstern - Wiki 

SEITENHIERARCHIE

- > General Information about RV P
- > Scientific Coordination
- > Logistic Coordination
- > Scientific Devices
- Emergencies, incidents and acc
- Contact persons
- > PS122 - MOSAiC - Information

▼ PS122 - MOSAiC - Information

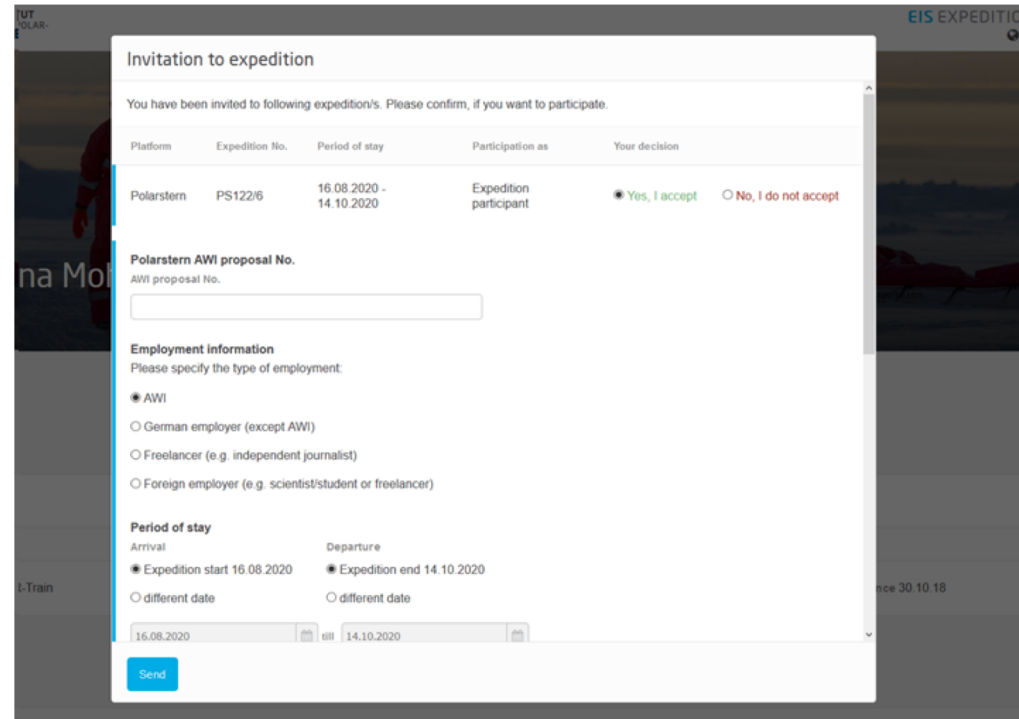
- › General
- › Expedition Planning
- Polarstern
- Infrastructure Setup
- Organizational Matters
- › Safety on the ice
- › Communication on the ice
- › Health Management
- › Environmental Aspects
- Mobility & Travel on ice
- › Navigation & tracking
- › Data management MOSAiC
- › Code of Conduct
- › Media
- Terms & Definitions



▼ Expedition Planning

- Guidance for Expedition Interface System
- Freight
- Dangerous goods
- Installations on ice
- Installations on Polarstern
- Lab & workspace planning
- Use of radioactive material
- Use of UAVs
- Clothing for onboard & ice work
- Trainings
- Medical check
- Insurance for participants
- Responsibilities
- Data preparation
- Staging in Tromsø
- Supply cruises

- All Polarstern participants have to register in **EIS**
- Within EIS: passport, medical check, freight, visa, dietary needs, travel arrangements
- Invitations will be sent out after the group leader have registered their members



Invitation to expedition

You have been invited to following expedition/s. Please confirm, if you want to participate.

Platform	Expedition No.	Period of stay	Participation as	Your decision
Polarstern	PS122/6	16.08.2020 - 14.10.2020	Expedition participant	<input checked="" type="radio"/> Yes, I accept <input type="radio"/> No, I do not accept

Polarstern AWI proposal No.
AWI proposal No.

Employment information
Please specify the type of employment:

AWI
 German employer (except AWI)
 Freelancer (e.g. independent journalist)
 Foreign employer (e.g. scientist/student or freelancer)

Period of stay
Arrival: Expedition start 16.08.2020 different date
Departure: Expedition end 14.10.2020 different date

16.08.2020 14.10.2020

Freight list:

Cruise No: number of expedition ; use PS_RET for return freight
Cruise Leg: In case of repeated usage during another another journey fill in number of expedition. Field stays empty in case of return freight.

Fill in your contact details!

FREIGHT LIST									
NO OF CRUISE:	RV POLARSTERN	PARTICIPANT:	Mandy Müller	KIND OF FREIGHT:	NORMAL				
PS_RET:		E-MAIL ADDRESS:	Mandy.Mueller@AWI.de	DATE:	10.01.2016				
CRUISE LEG NO.:		PHONE NO.:	0160-123123	CONTAINER:					
COLOR CODE:	RED	BLUE	INSTITUTION:	Alfred Wegener Institut, Am alten Handelshafen 15, 08150 Bremerhaven, Germany	REQUISITION N°:				
IDENT. NO.	KIND OF PACKING	STOWAGE (ONLY FILLED BY AWI-LOGISTICS)	ITEM (CONTENT - KEYWORDS)	MEASUREMENT (LxWxH (CM))					
MM958	ALUBOX		clothes and office supply	80,0	60,0				
MM973	ALUBOX		Photometer (123544), pH-Meter (AWI 68609, Ser.Nr.: 12060962; AWI 69593, Ser.Nr.: 12240749; AWI 69593, Ser.Nr.: 12240747)	80,0	60,0	40,0	5000,00	43,10	0,192
MM930	ALUBOX		magnetic stirrer (AWI 61068, Ser.Nr.: 07.170079), Lab- consumables	80,0	60,0	40,0	2000,00	35,20	0,192
MM928	ALUBOX		lab-consumables, syringes for samples	80,0	60,0	40,0	2500,00	33,30	0,192
MM954	ALUBOX		label-printer (AWI 60899), hand sealer (AWI 37.276), lab-consumables	80,0	60,0	40,0	2500,00	37,60	0,192
MM981	ALUBOX		lab-consumables (tape)	80,0	60,0	40,0	800,00	36,60	0,192
MM893	ALUBOX		lab-consumables (Küvetten)	60,0	40,0	50,0	500,00	18,80	0,120
MM978	ALUBOX		GoFlo bottles (Inv.Nr. 11.026329, 11.026330, 11.026331)	80,0	60,0	40,0	3000,00	48,00	0,192
									0,000
									0,000
									0,000
									0,000
									0,000
									0,000
									0,000
									0,000
Signature:				TOTAL:		18300,00	296,2	1,464	
Date:									

Fill in ident numbers: Ident numbers have to correspond to labels on the packages.

Use entries from the drop down menu.

Fill in a line for every single item. If you have more packages than lines, you need to add lines.

Choose "normal" in the drop down menu.

deadline	for	to/via
08.05.19	Freightpapers for freight via AWI	EIS
29.05.19	delivery of individual freight	Hafenlager
03.06.19	Clothing list PS122/1	Martina.Kniemeyer-Schulze@awi.de
15.07.19	try out of clothes PS122/1	AWI clothing store
Tba.	Delivery of Dangerous Goods via AWI	AWI
29.07.19	delivery of containers via AWI	Hafenlager
08.08.19	medical questionnaire & examination results PS122/1	AWI medical officer
Tba.	freight papers for direct freight to Tromsø	EIS
02.09.19	direct freight to Tromsø	Tromsø



Complete list will be published!

Safety Equipment – by AWI

per person:

- IcePicks
- IR Tag (polar night)
- Signal flares
- Whistle
- Knife

per group:

- VHF & spare batteries
- Iridium (outside CO)
- throw ropes
- Floe navi

per task & type of work:

- Safety harness, rope, ice screw
- Safety helmet
- Survival suit
- Life vest
- Weapons & signal flares
- binoculars
- Night vision (polar night)



Safety Equipment – by participants

per person:

- Head lamp
(remember to bring **red** light)

per group:

- GPS handheld



per type of work:

- Cut protection clothing

Emergency/Survival Equipment

small survival backpack:

- for travel in Area II
- one backpack for two persons



big survival box:

- for travel in Area III
- one box for two persons



emergency equipment inside shelters:

- first aid kit
- Fire extinguishers
- blanket
- Pyro
- Bear cracker / pepper spray

<http://www.marikom-elsfleth.de/schiffsmechaniker/Inhalt-STCW-Lehrgaenge-Basic-Safety/>



The screenshot shows the website for Marikom, a maritime training center. The main navigation menu includes: MariKom, Berufsschule, Weiterbildung, STCW-Lehrgänge (highlighted), Weitere Lehrgänge, and Nachrichten. Below the menu, there are links for 'Kontakt' and various training courses: Basic Safety, Advanced Firefighting, Rescue Boat, Fast Rescue Boat, Refr. STCW, SRT, Refr. Medical Care (5 Tg.), and Refr. Medical Care (2 Tg.). A blue banner at the top lists specific STCW courses with dates: STCW Refresher Woche 01. - 05.04.2019, Refresher Kurs Medical Care 11. - 15.03.2019, STCW Erstausbildung AFF 18. - 22.03.2019, and STCW Erstausbildung SCARB 08. - 12.04.2019. A call to action says 'Jetzt anmelden. Plätze verfügbar! Mehr Informationen anzeigen'. The website also features a search bar and a logo for 'MARITIMES KOMPETENZZENTRUM SCHIFFSMECHANIKER'.

Costs 790 € per person,
Plus medical certificate

Medical certificate for seamen required

- Can be done anywhere in the world
- Only certified medical officers

Courses in German:

- 08.04.2019 – 18.04.2019 (free: 6)
- 13.05.2019 – 24.05.2019 (free: 15)
- 17.06.2019 – 28.06.2019 (free: 10)
- ...

Courses in English on request
May & August

Safety Training – Polar bear safety

- Polar bear safety training at AWI is mandatory for all persons that will handle a rifle for polar bear protection
- full day course containing theory about polar bears and polar bear watch, weapon handling, practical shooting training, exam (night shooting for Leg 1-3)
- Cours list will be sent with the Status Update
- Registrations to: uta.galemann@awi.de
- US participants can join course organized by NSF

- Bring spill equipment if necessary
 - Tray for refueling
 - Shovel
 - Bucket
 - Absorbant material (for slushy season, melt ponds, ...)

- Know what you bring in
- "Leave no trace"

Useful things

- Schiffskoord@awi.de
- Polarstern 3D: <http://digatwin.com/polarstern/>
- And to stay updated.....

Please read the MOSAiC Status Update! :)



Thank you