MOSAiC
The International Arctic Drift Expedition

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Current Update, ASSW-FARO 2017, Prague

IASC

First year-around expedition exploring the coupled climate system in the central Arctic

Multidisciplinary Drifting **O**bservatory for the **S**tudy of **A**rct**i**c **C**limate

Implementation

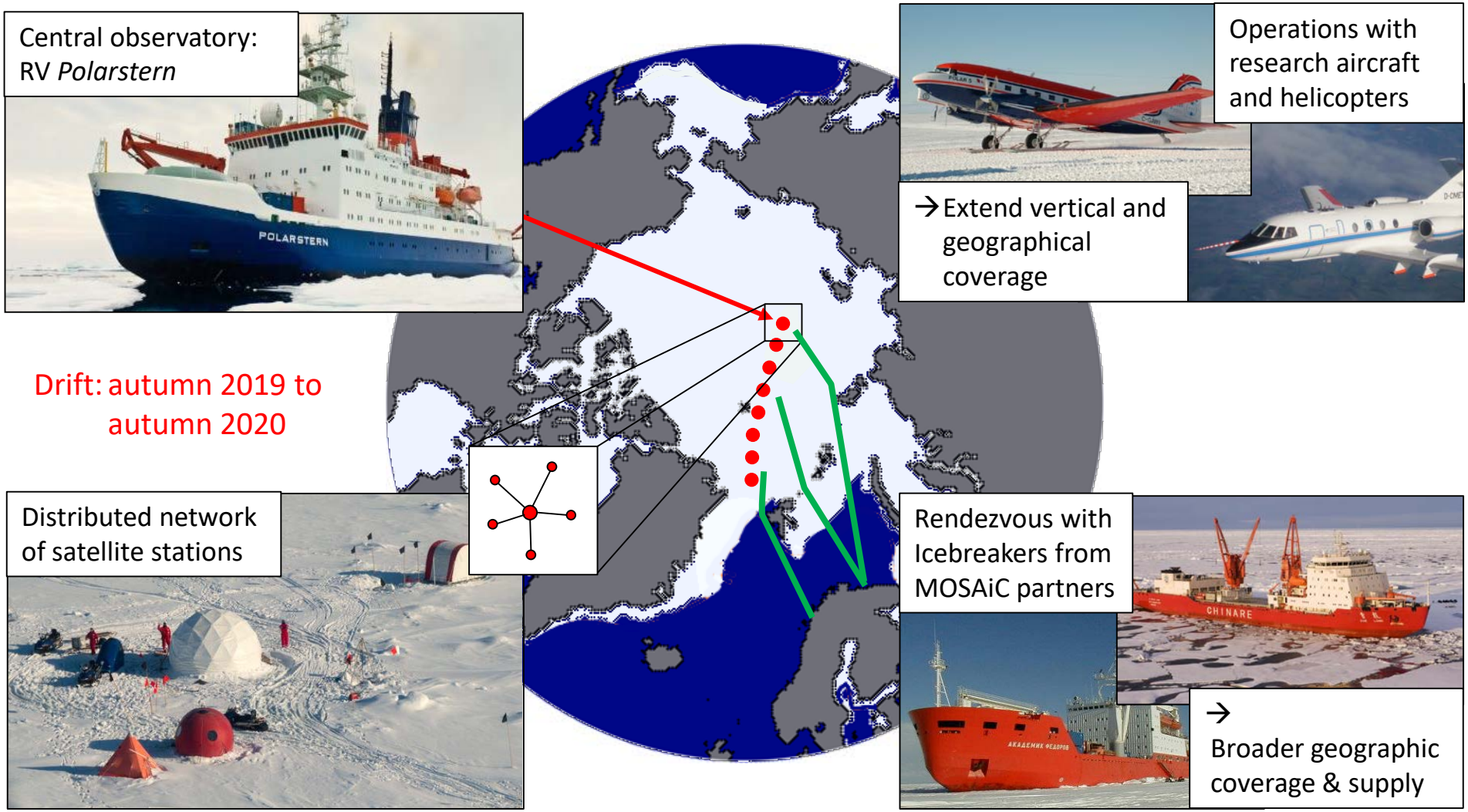
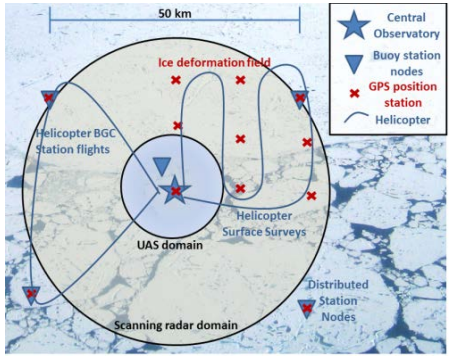
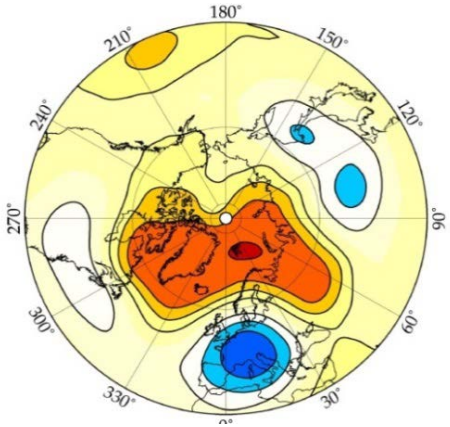


Fig. 3: Schematic overview of the basic components of the MOSAiC expedition

Scale coverage





Central Observatory
- Ship based
- Sea ice stations
- ➢ Process scale observations

< 5 km

Distributed Network
- Sea ice stations visited by helicopter
- UAV, ocean gliders
- Aircraft (Polar 5,6, Halo)
- Process & regional model
- ➢ Model grid cell

< 50 km

Large-scale linkages
- Collaborating research vessels (Academic Fedorov, Xue Long, Oden…) and supply cruises
- Aircraft (Polar 5,6, Halo), ocean gliders
- Satellites
- Data assimilation studies
- ➢ Arctic regional & global models

> 1000 km

Implementation

Date	Week	Comment
27.09.19		End TransArc
01.10.19		Depart TOS
		Install
10.10.19		Network
15.10.19		Supply @Floe
		Start time
18.10.19	0	ser.
25.10.19	1	Leg 1
[illegible]	[illegible]	[illegible]
15.11.19	4	
22.11.19	5	
29.11.19	6	
06.12.19	7	
13.12.19	8	Heli Exchange
20.12.19	9	Leg 2
27.12.19	10	
03.01.20	11	
10.01.20	12	
17.01.20	13	
24.01.20	14	
31.01.20	15	

Date	Week	Comment
07.02.20	16	
14.02.20	17	Resupply &
21.02.20	18	Exchange
28.02.20	19	Leg 3
03.04.20	24	
10.04.20	25	Heli Exchange
17.04.20	26	Leg 4
24.04.20	27	
01.05.20	28	
22.05.20	31	
29.05.20	32	
05.06.20	33	
12.06.20	34	Resupply &
19.06.20	35	Exchange

Date	Week	Comment
26.06.20	36	Leg 5
03.07.20	37	
10.07.20	38	
17.07.20	39	
[illegible]07.20	40	
[illegible]07.20	41	
[illegible]08.20	42	
[illegible]08.20	43	Resupply &
21.08.20	44	Exchange
28.08.20	45	Leg 6
04.09.20	46	
[illegible].09.20	49	
[illegible].10.20	50	
09.10.20	51	
16.10.20	52	
18.10.20	53	End time ser.
21.10.20		Leaving the ice
31.10.20		Arrive BHV

Russian nuclear ice breaker or new icebreaker Viktor Chernomyrdin

e.g. Academic Fedorov (Russia)

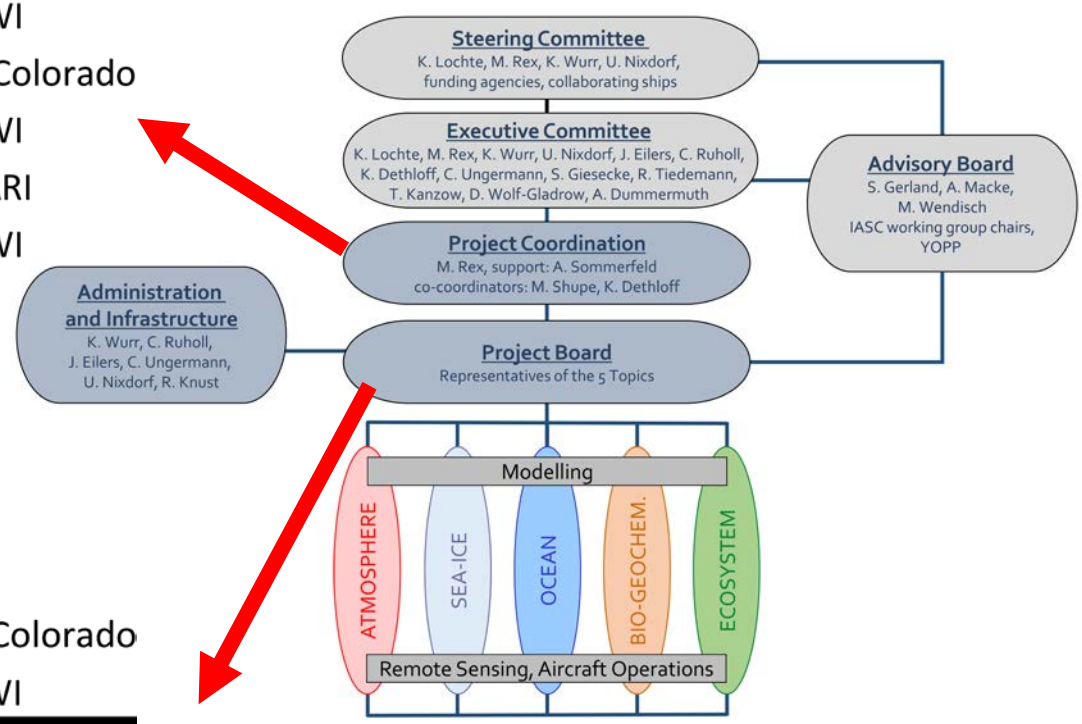
e.g. Oden (Sweden)

e.g. Xue Long (China)

MOSAiC Structure

- **Project Coordination:**

Lead, Co-Lead and Assistance	Markus Rex	AWI
	Matthew Shupe	U Colorado
	Klaus Dethloff	AWI
	Alexander Klepikov	AARI
	Anja Sommerfeld	AWI



- **Project Board:**

Atmosphere	Matthew Shupe	U Colorado
	Markus Rex	AWI
Ice	Donald Perovich	CRREL
	Marcel Nicolaus	AWI
Ocean	Christine Provost	UPMC
	Benjamin Rabe	AWI
Biogeochemestry	Brice Loose	URI
	Ellen Damm	AWI
Ecosystem	Rolf Gradinger	UiT
	Allison Fong	AWI

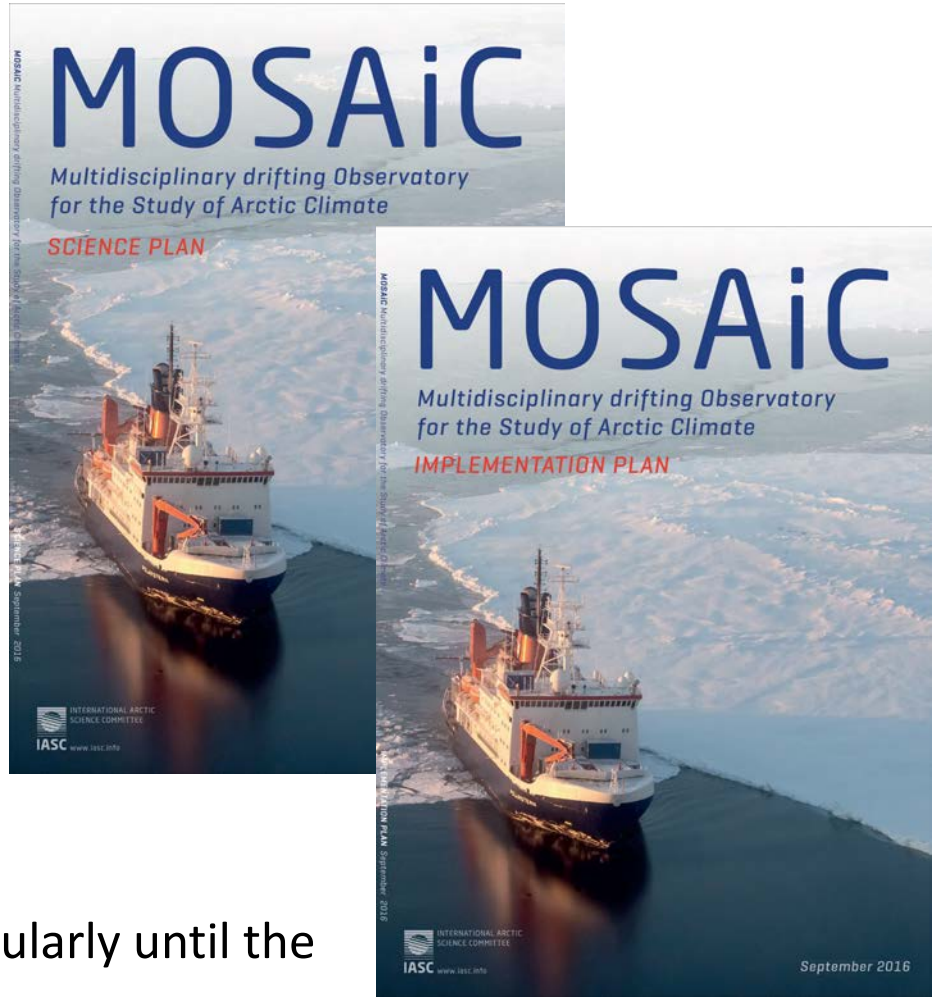
Science and Implementation Plans

- Science Plan 2.0 and Implementation Plan 1.0 published in September 2016

- Community Review via feedback from IASC working groups

  → both documents are very useful and challenging

  → MOSAiC science and implementation strategies are very promising



- Science Plan 2.0 is the final version

- Implementation Plan will be updated regularly until the expedition starts

  → version 2.0 will be developed after the MOSAiC workshop

Upcoming Activities

- 2-day MOSAiC workshop during the ASSW 2017

April 4th :

Invited talks
Poster session

April 5th:

Breakout sessions
Plenum discussion
General discussion
Action plan

- Implementation Workshop in November 2017 in St. Petersburg (AARI)

→ specification of the details during the MOSAiC workshop in Prague

	Discipline	Speaker	Topic
9:00 - 10:00	Opening		
		Uwe Nixdorf (AWI)	Welcome
		Susan Barr (IASC)	Welcome
		M	
		Al	
		sh	
10:00 - 17:35	Overview talks		
10:00 - 10:25	Atmosphere *(Chair: Thomas Spengler)*	M	
10:25 - 10:45			
10:45 - 11:10		M	
11:10 - 11:35		A	
11:35 - 12:00	Ocean *(Chair: Jari Haapala)*	Il	
12:00 - 12:25		M	
12:25 - 13:45			
13:45 - 14:10		W	
14:10 - 14:35	Sea ice *(Chair: Sebastian Gerland)*	D	
14:35 - 15:00		Y	
15:00 - 15:30			
15:30 - 15:55		Pi	
15:55 - 16:20	Bio-geochemistry *(Chair: Lee Cooper)*	El	
16:20 - 16:45		Ei	
16:45 - 17:10	Ecosystem *(Chair: Marit Reigstad)*	R	
17:10 - 17:35		In	
17:45 - 19:00	Poster Session		

	Discipline	Leader of Breakouts	Topics
9:00 - 12:30	Breakouts		
	I) Small Scale Processes	Matthew Shupe, Marcel Nicolaus, Klaus Dethloff	Atmosphere, Ocean, Sea ice, Logistics
	II) Regional Scale Processes	Benjamin Rabe, Pierre Rampal, Wieslaw Maslowski, Annette Rinke	Atmosphere, Ocean, Sea ice, Aircraft operations, Logistics
Coffee Break 10:30 - 11:00			
	III) Green Sea Ice	Donald Perovich, Ellen Damm, Marit Reigstad	Sea ice, Bio-geochemistry, Ecosystem, Logistics
	VI) Operational Aspects	Uwe Nixdorf, Jun Inoue, Alexander Klepikov	Logistics, Remote Sensing, Forecast, Sea ice prediction, Social dimension, Stakeholders
12:30 - 13:30	Lunch Break		
13:30 - 14:15	Plenum discussion		
	Summary of each Breakout Session		
14:15 - 15:00	General discussion		
		Markus Rex	
15:00 - 15:30	Coffee Break		
15:30 - 16:30	Action Plan		
		Markus Rex	special workshops for topics (breakouts), publications, follow up workshops (modelling, observations, YOPP), update of IP, social dimension, stakeholders
16:30 - 16:45	Round up		

MOSAiC
The International Arctic Drift Expedition

AWI

Thank you !

www.mosaic-expedition.org

Fig. 5: Schematic overview of all components of the MOSAiC experiment

AWI GRAPHIC
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HELMHOLTZ GEMEINSCHAFT

Drift und Resupply

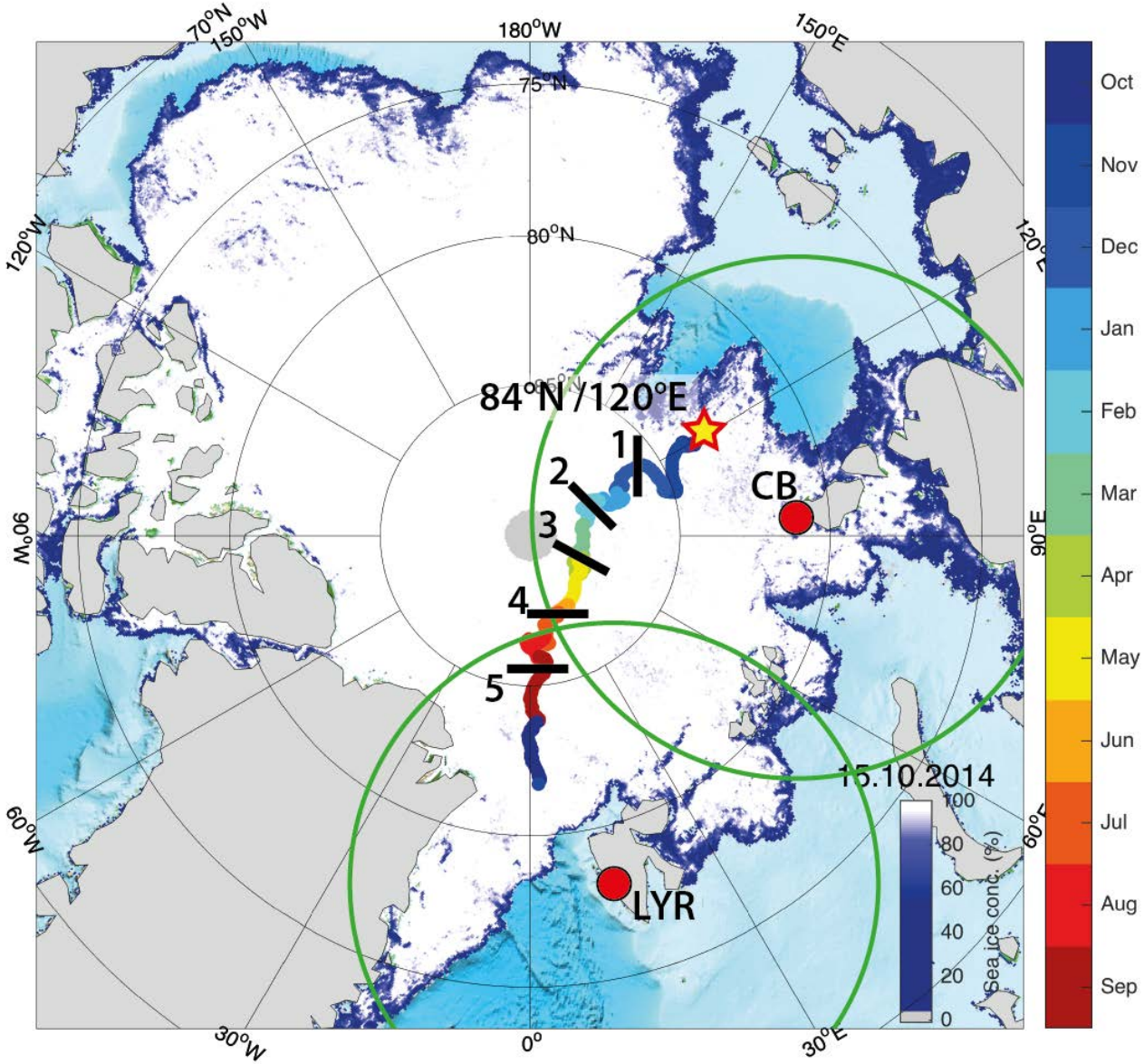

Fig. 6: Simulated drift trajectory for the starting position at 120° E and 84° N. Colors represent the month of the drift. Green circles show helicopter ranges from Cape Baranov and Longyearbyen. Numbers and black ticks indicate where the resupply would happed based on this trajectory. (Simulation: T. Krumpen (AWI), Graphic: M. Nicolaus (AWI))

Alternative Drift

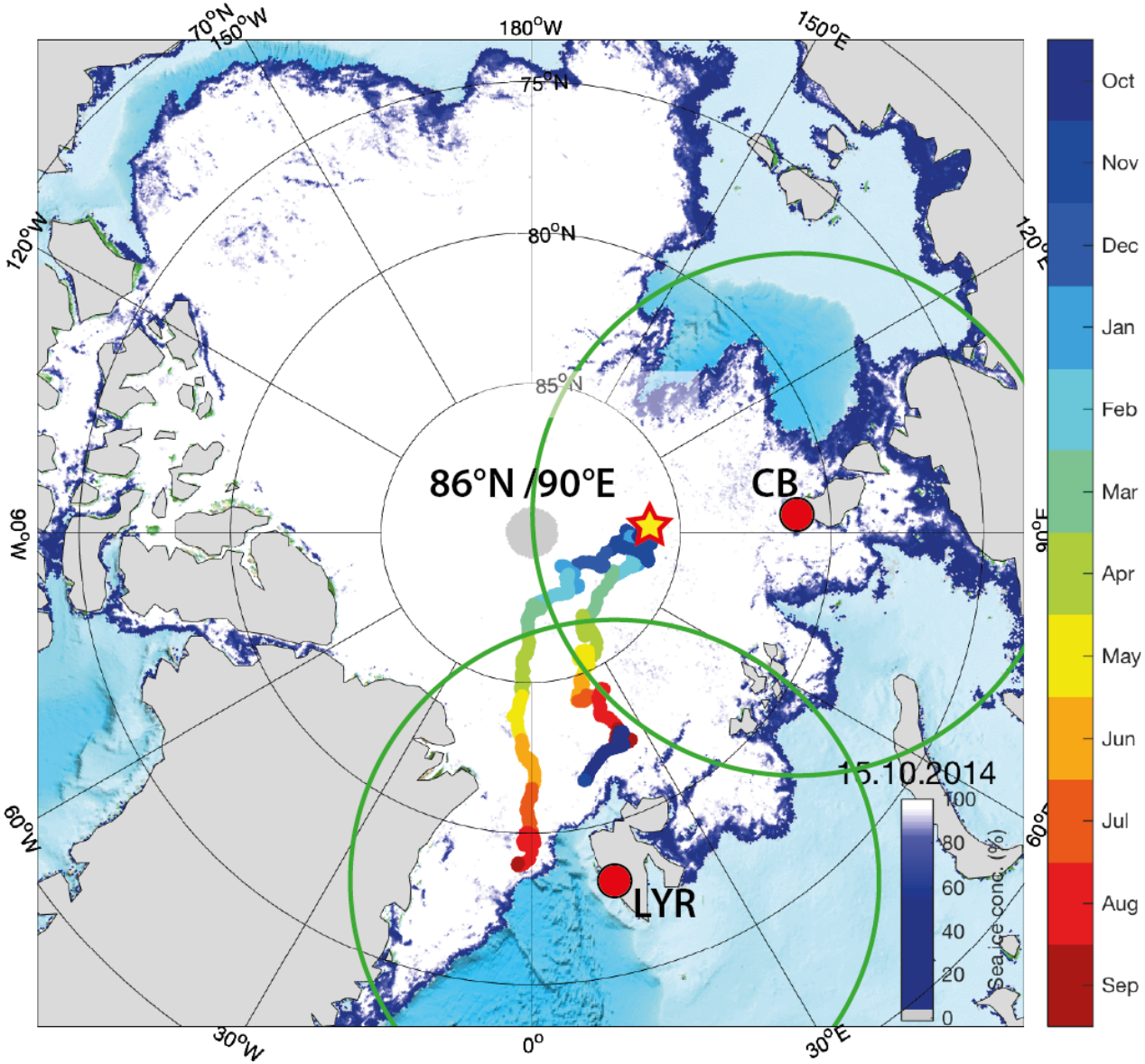

Fig. 7: Simulated drift trajectory for the starting position at 90° E and 86° N. Colors represent the month of the drift. Green circles show helicopter ranges from Cape Baranov and Longyearbyen. Numbers and black ticks indicate where the resupply would happed based on this trajectory. (Simulation: T. Krumpen (AWI), Graphic: M. Nicolaus (AWI))