



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



# German Arctic Expeditions 2014 - 2015

FARO/ASSW, 2015, Toyama

Dirk Mengedoht (Alfred Wegener Institute, Germany)



# Polarstern Arctic Expeditions 2014



Leg	Start	End	Mission
<b>PS84</b>	cancelled		
<b>PS85</b>	06.06.2014 Bremerhaven	03.07.2014 Tromsø	Oceanography / biology Fram Strait / Hausgarten
<b>PS86</b>	07.07.2014 Tromsø	03.08.2014 Tromsø	Geo sciences / biology / Arctic Ocean
<b>PS87</b>	05.08.2014 Tromsø	09.10.2014 Bremerhaven	Geo sciences / Central Arctic Ocean

# Polarstern Arctic Expeditions 2015



Leg	Start	End	Mission
<b>PS92</b>	19.05.2015 Bremerhaven	28.06.2015 Longyearbyen	Biology / ice physics / oceanography / Arctic Eurasian Margin
<b>PS93.1</b>	29.06.2015 Longyearbyen	18.07.2015 Tromsø	Geo sciences / Greenland Sea
<b>PS93.2</b>	21.07.2015 Tromsø	15.08.2015 Tromsø	Biology / Fram Strait / Hausgarten
<b>PS94</b>	17.08.2015 Tromsø	15.10.2015 Bremerhaven	Oceanography / geo sciences / biology / Central Arctic Ocean



# Heincke Arctic Expeditions 2015

Leg	Start	End	Mission
<b>HE449</b>	01.08.2015 Trondheim	22.08.2015 Tromsø	Geo sciences / Svalbard
<b>HE450</b>	25.08.2015 Tromsø	08.09.2015 Tromsø	Geo sciences / Svalbard / Norwegian Sea
<b>HE450.1</b>	11.09.2015 Tromsø	29.09.2015 Longyearbyen	Biology / Svalbard
<b>HE450.2</b>	30.09.2015 Longyearbyen	11.10.2015 Bremerhaven	Oceanography / Fram Strait / Svalbard



# POLAR 5/6 2014 (2015)



Leg	Start	End	Pers. Days	Institutions	Programme name	Mission
LEAST	March 01	March 30	120	Uni Trier, Uni Hamburg	Lead and ABL Study in the Transpolar System	Structure of the ABL and leads in sea ice, satellite validation
<b>RACEPAC</b>	April 19	May 26	380	Uni Leipzig, AWI, Uni Aubière, FZ Jülich, KIT, MPI Mainz	RAdiative Closure ExPeriment for Arctic Clouds	Analyzing the interaction of Arctic mixed-phase clouds by investigating microphysical and radiative properties and atmospheric conditions.
<b>NETCARE</b>	June 13	July 12	120	Uni Toronto, EC, AWI, MPI Mainz	NETwork on Climate and Aero-sols: Addressing Key Uncertainties in Remote Canadian Environments	Characterization of aerosol sources, properties and climate impacts, Sea ice thickness CryoSat Cal/Val
<b>MELTEX</b>	July 01	Aug 04	165	AWI, Uni Kiel	Impact of melt ponds on energy and momentum fluxes between atmosphere and sea ice	Sea ice thickness and roughness and radiation above SMOS, CryoSat Cal/Val
MRI Test	Aug 07	Aug 31	70	AWI, Uni Kansas	Multi channel Radar Imager	Test of new ice penetrating multichannel radar system.

# “NETwork on Climate and Aerosols: Addressing Key Uncertainties in Remote Canadian Environments”



UNIVERSITY OF TORONTO Environment Canada Environnement Canada AWI ALFRED WEGENER INSTITUT GEWISSES ZUSAMMENARBEITEN MIT POLAR UND TREIBHAUSFORSCHUNG JCU JOHNS DUNSTON UNIVERSITY OF CALGARY

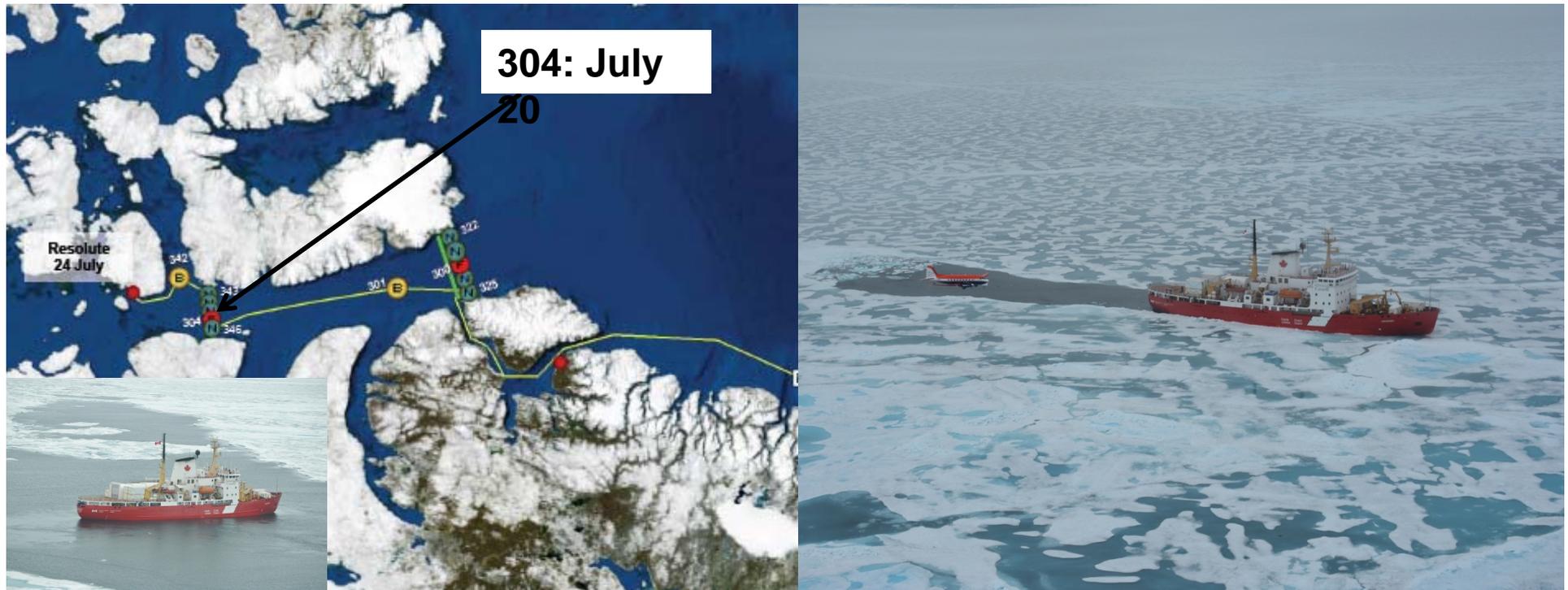
**NETCARE**  
www.netcare-project.ca

**POLAR  
FLIGHT CAMPAIGNS**

University of Victoria DALHOUSIE UNIVERSITY WATERLOO UNIVERSITE DE SHERBROOKE Fisheries and Oceans Canada UQAR UNIVERSITE LAVAL LATMOS NSERC CRSG UQAM UNIVERSITY OF CALGARY

NETCARE – Summer (June 30, 2014 – July 25, 2014  
operation from Resolute Bay (Nunavut) with Polar 6  
(86 flight hours, including Ferry from/to Muskoka)

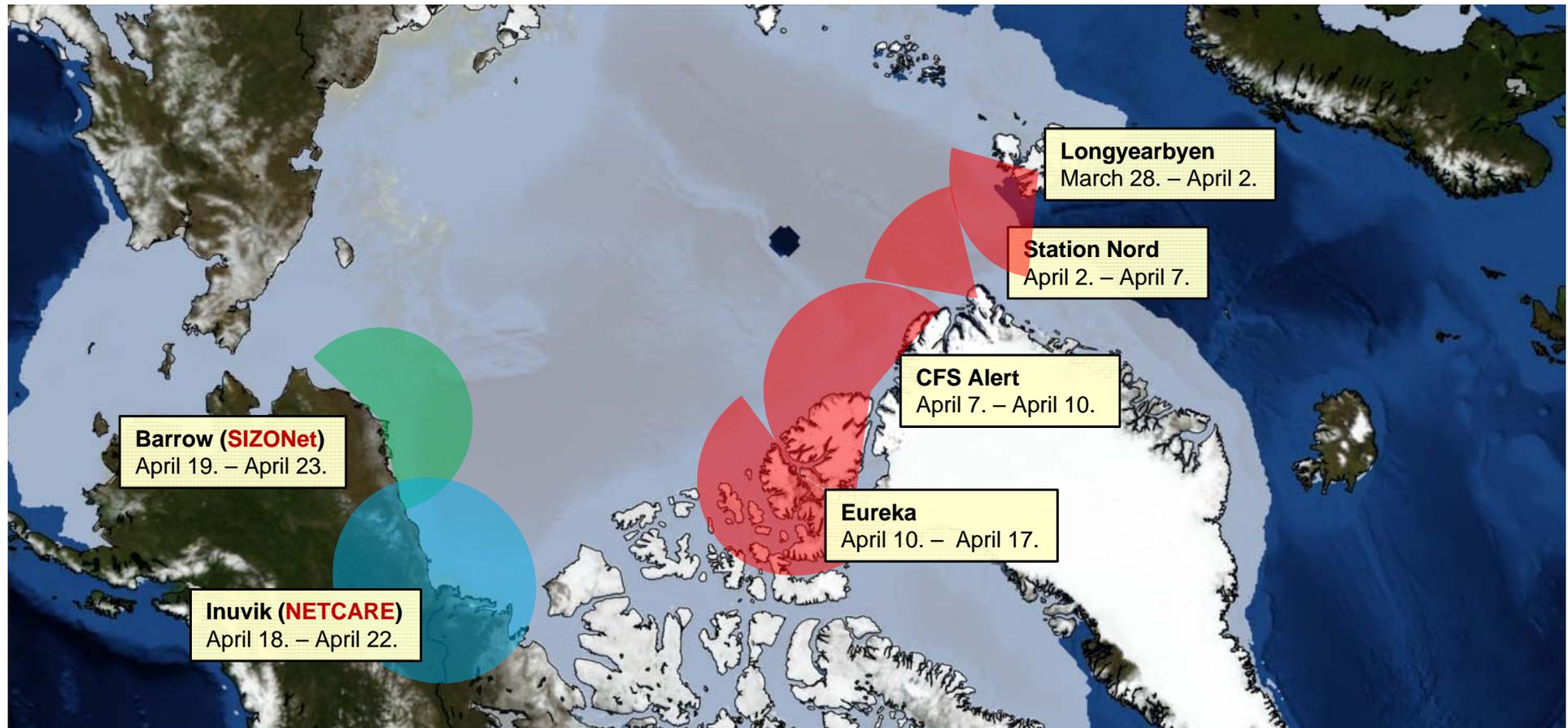
# Ship emission measurements during NETCARE (POLAR 6 met CCGS Amundsen)



CCGS Amundsen track along the Lancaster Sound during NETCARE (left side)  
and  
Polar 6 met CCGS Amundsen on July 20, **2014** (right side, photo: Maurice Levasseur – NAVAL)

- Measurements of SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, CO, BC, Particle, O<sub>3</sub>
- Detection of the ship plume and their extension
- Using a WRF forecast model to optimize the flight patten

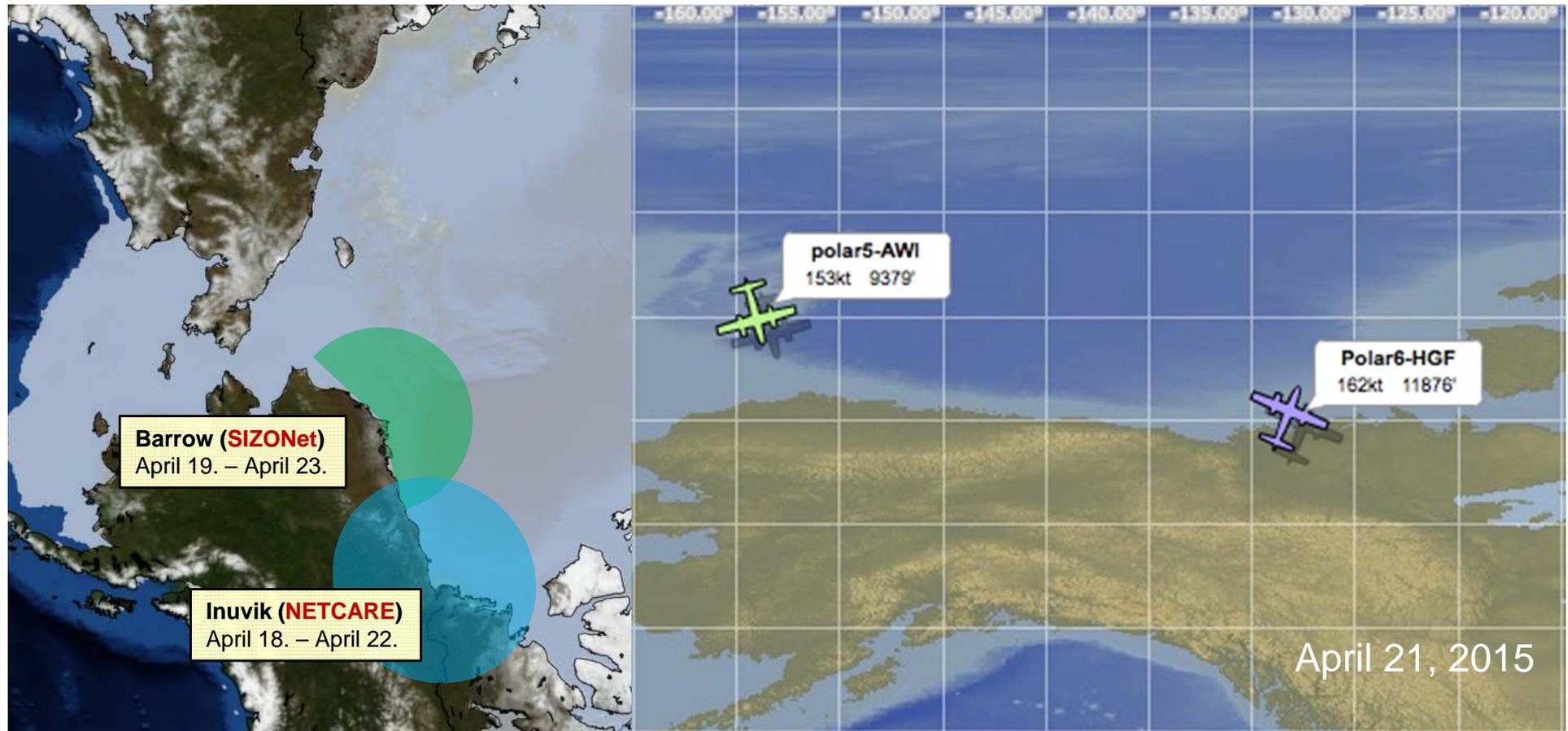
# Campaign locations & schedule for NETCARE Spring / PAMARCMIP 2015



**Polar-5 + Polar-6**  
**Polar-5**  
**Polar-6**

Sea Ice + Atmospheric Chemistry  
Sea Ice only  
Atmospheric Chemistry only

# Campaign locations & schedule for NETCARE Spring / PAMARCMIP 2015



**Polar-5 + Polar-6**

**Polar-5**

**Polar-6**

Sea Ice + Atmospheric Chemistry

Sea Ice only

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# Land based and other Arctic activities 2014



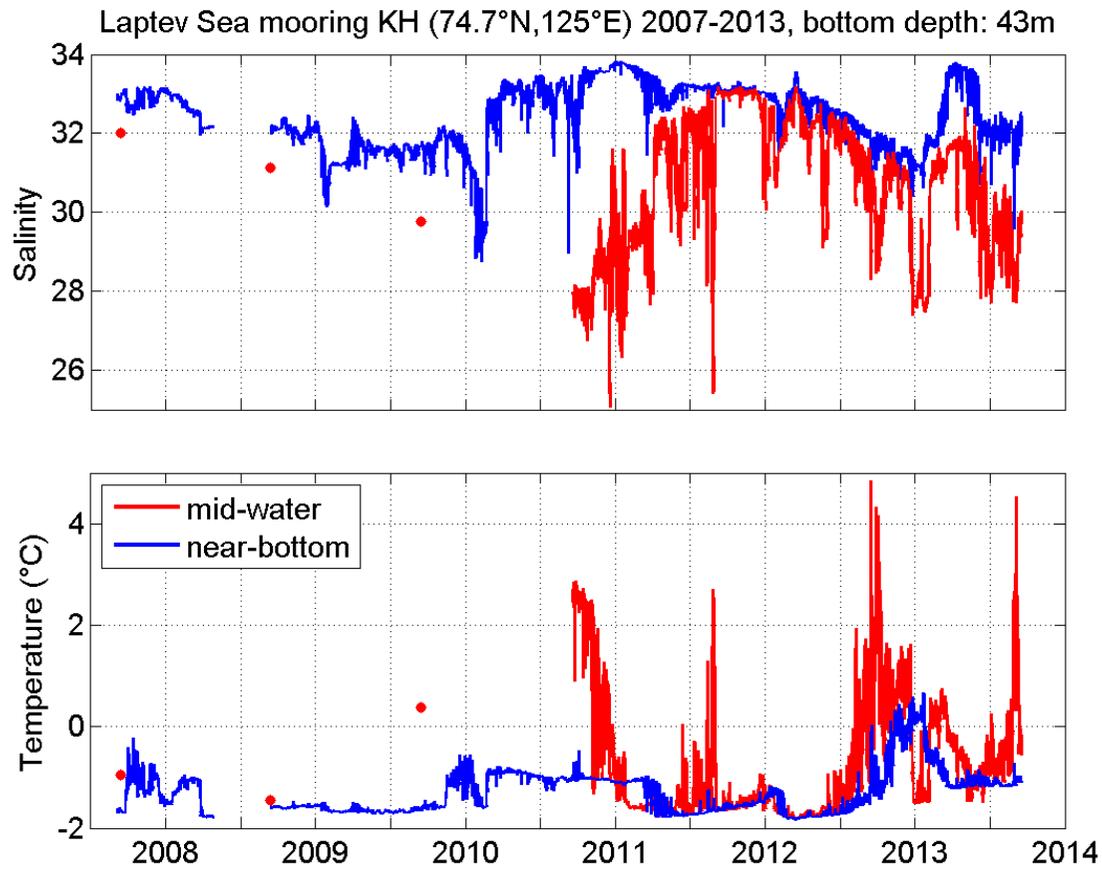
Leg	Start	End	Pers. Days	Nations	Mission
LENA 2014	April 08	Sep 15	1617	Russia Germany	- Long-term studies of energy and water balance, carbon turnover, greenhouse gas emissions in permafrost ; - hydrological, geomorphological and biological dynamics of permafrost landscapes ; - geocryological and palaeoecological investigations for reconstruction of permafrost, climate and landscape evolution
TRANSDRIFT XXII	August	Sep		Russia Germany	studies of the Siberian Shelf Polynya in response to oceanic, sea-ice and atmospheric forcings as well as feedbacks from the Laptev Sea polynya to the Arctic system
PETA-CARB 2014	April	August	222	USA, Russia, Germany	Collecting lake and permafrost cores, Soil carbon inventory in permafrost landscapes, Carbon quality analyses of Yedoma exposures, Survey and monitoring subsidence in permafrost, installing temperature loggers, Establishing digital elevation model
Yukon Coast 2014	July 16	Aug 24	386	Canada, Germany, UK USA	Coastal erosion and permafrost geomorphology Onshore and offshore sediment, carbon and nutrient fluxes; Permafrost cores → reconstruct paleogeography; Vegetation / land cover change

# Land based and other Arctic activities 2015



Leg	Start	End	Pers. Days	Nations	Mission
LENA 2015	April 01	Sep 03	1750	Russia Germany	Long term studies of energy and water balance, carbon turn over, greenhouse gas emission in permafrost, landform analysis, hydrological, sedimentological and biological studies in lake and soil samples
TRANSDRIFT XXIII	Sep	Sep		Russia Germany	Recovery of 7 marine moorings from the Laptev Sea by RV Viktor Buinitsky
PETA-CARB 2015	March + July	August	178	USA, Russia, Germany	Collecting lake and permafrost cores, Soil carbon inventory in permafrost landscapes, Carbon quality analyses of Yedoma exposures, Survey and monitoring subsidence in permafrost, installing temperature loggers, Establishing digital elevation model
Yukon Coast 2015	July 15	Aug 23	610	Canada, Germany, UK Sweden Finland	Coastal erosion and permafrost geomorphology Onshore and offshore sediment, carbon and nutrient fluxes Permafrost cores → reconstruct paleogeography Vegetation / land cover change

# Russian-German Cooperation: System Laptev Sea TRANSDRIFT XXIII, NW Laptev Sea, Sept. 2015





# Svalbard activities 2014



Projects	Start	End	Pers. Days	Nations	Mission
12	April	Sept.	In total	France	Atmospheric sciences
38	Jan.	Dec.	2973	Germany	Seismology, Gravity
3	April	Aug.	(w/o station personnel)	Netherlands	Glaciology, Marine Biology



# Svalbard activities 2015 (planned)



Projects	Start	End	Pers. Days	Nations	Mission
9	April	Sept.	In total ca. 2600 (w/o station personnel)	France Germany Netherlands	Atmospheric sciences Seismology, Gravity Glaciology, Marine Biology
33	Jan.	Dec.			
2	April	Aug.			



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Thank you!



MOSAiC

Multidisciplinary drifting Observatory for the Study of Arctic Climate



Update about MOSAiC,  
the  
**Multidisciplinary drifting  
Observatory  
for the Study of Arctic Climate**

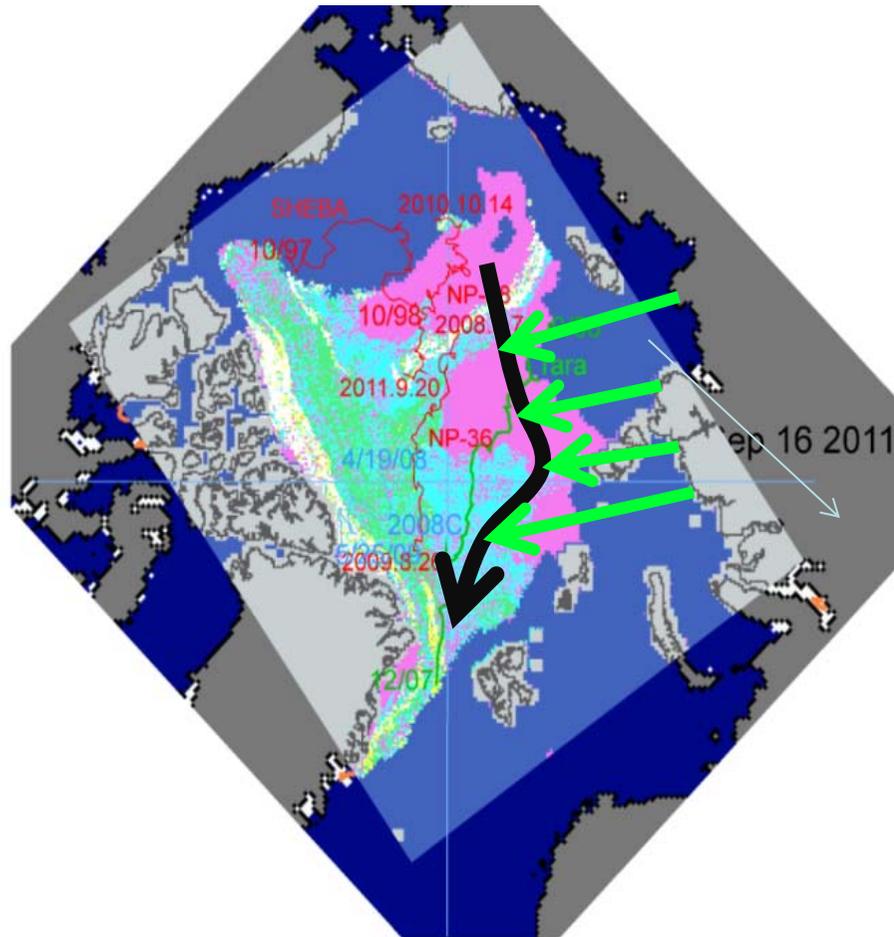
# MOSAiC

Multidisciplinary drifting Observatory for the Study of Arctic Climate



- MOSAiC project was introduced at last FARO meeting by H. Miller, see [http://faro-arctic.org/fileadmin/Resources/DMU/GEM/faro/2014\\_Miller\\_MOSAIC\\_PLANS.pdf](http://faro-arctic.org/fileadmin/Resources/DMU/GEM/faro/2014_Miller_MOSAIC_PLANS.pdf)
- Project preparation is ongoing:
  - Closed workshop on Sunday at ASSW
  - Preparation of Implementation workshop
- Remaining issue: Who can provide support icebreaking vessel(s) during winter 2018/19 ?

# MOSAiC ice flow drift



September 2011 sea ice extent  
and ice age NSIDC

Annual cycle with Polarstern

October 2018-October 2019

Second Russian icebreaker

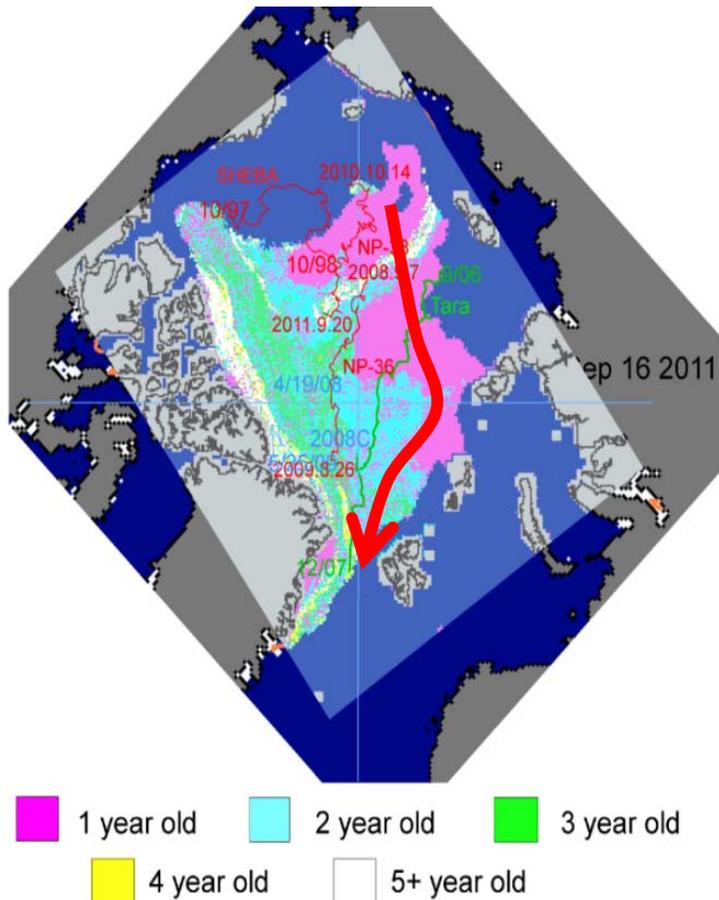
Fuel, food supply and staff  
exchange 4 times

- December
- February
- April
- June

Transect measurements  
(biology, ocean, atmosphere)  
during cruises

Charter costs 10-15 Mill. Euro

# MOSAiC Drift → Next steps



- AWI logistical feasibility study for MOSAIC drift was made
- Second RV for maintenance required
- Submission of MOSAIC\_Polarstern proposal in September 2014 Dethloff et al.
- AWI decision expected in May 2015
- MOSAIC science plan
  - Shupe et al. under review 2015
  - Array of RVs including MIRAI
- Linkages ICARPIII, YOPP, CLiC
- Funding EU HORIZON 2020 Call in 2016?
- Proposals to NSF → Shupe et al 2014
- Polar Research Progress through Optimal Integration of Science with European Society (EU\_POLARNet) coordinated by N. Biebow, AWI