

IABP Action Group Report

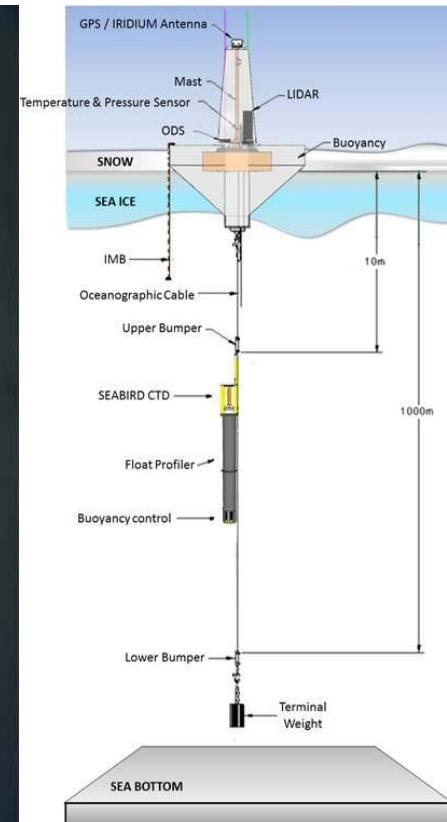
**Thirtieth Session of the Data Buoy Cooperation Panel
27 - 31 October 2014, Weihai, China**



NPEO

Webcam #2 with IA00S in view

NPEO/IAOOS 2014 camera#2 Sat May 24 16:45:48



USIABP: Beafort and Chukchi seas Observing Network (BeaCON)

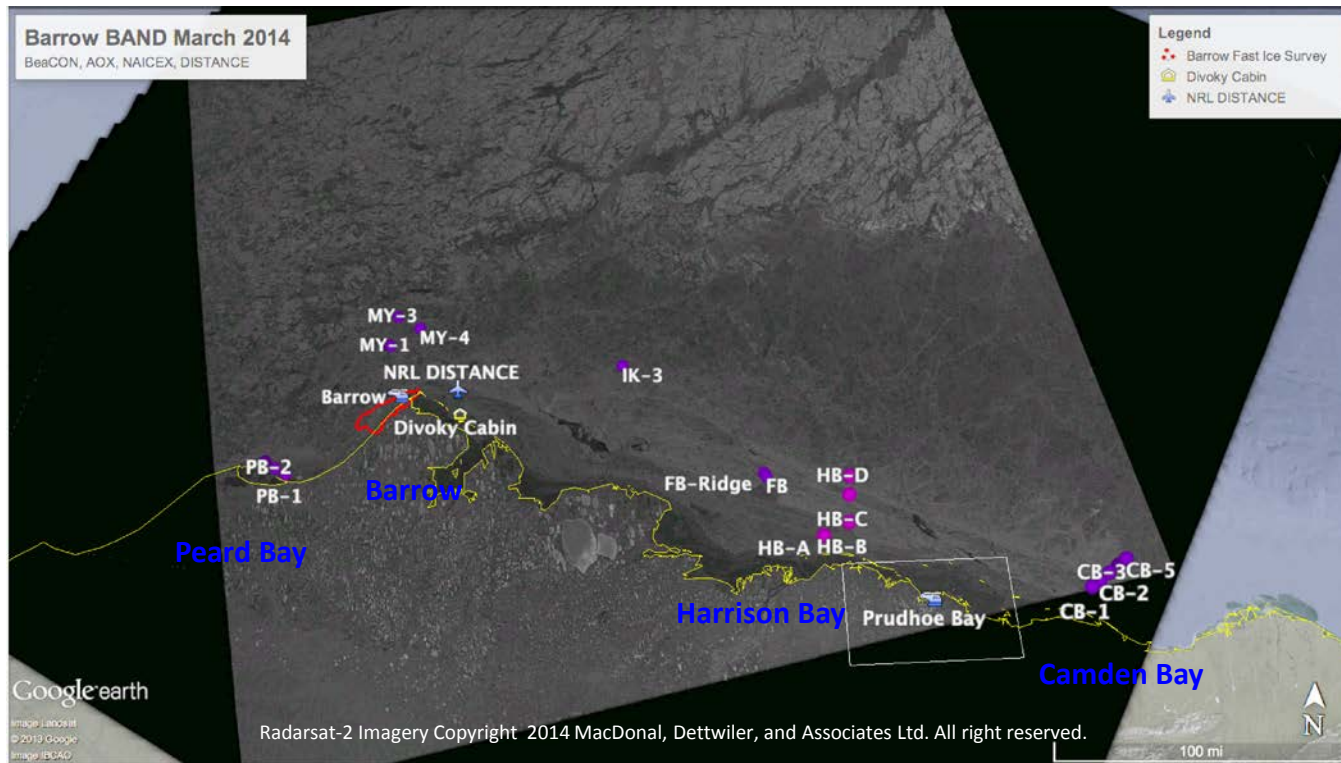
Shore-fast Sea Ice Lines



Navigation Hazards



USIABP BeaCON: 2014 Deployments



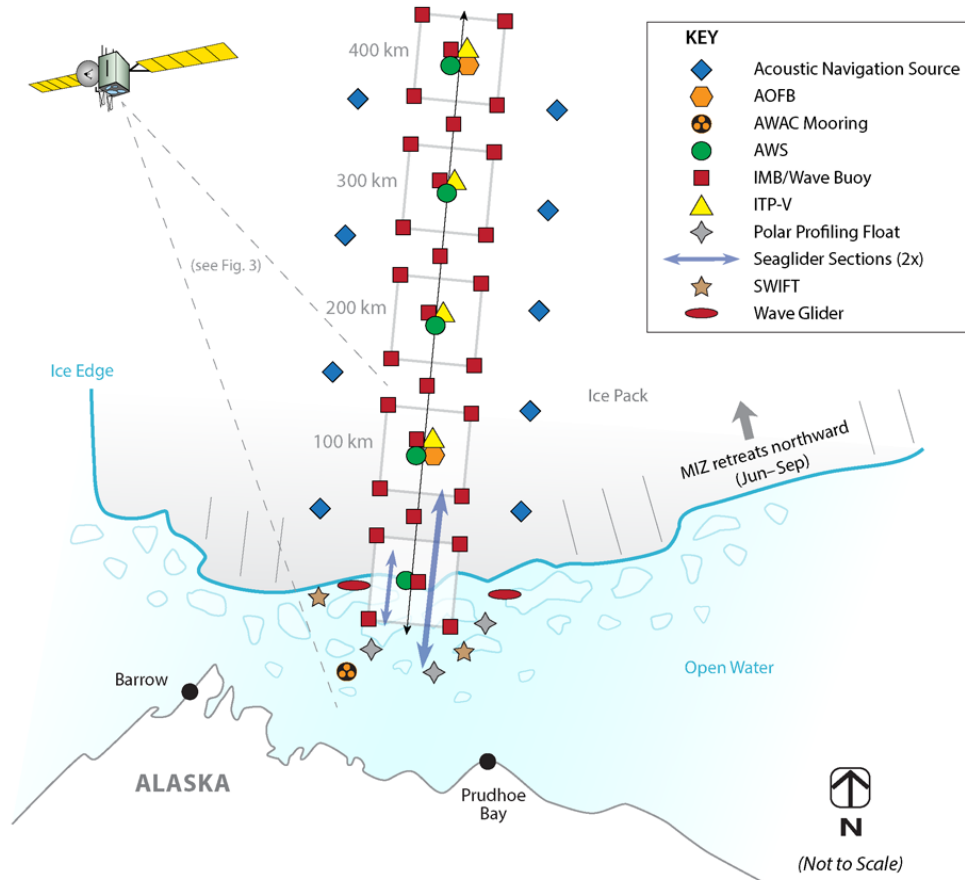
Map of USIABP BeaCON deployments during February and March 2014 overlaid on Radarsat-2 image from Naval Ice Center:

1. Peard Bay Fast Ice: **3 SVP buoys**
2. Barrow Multi-Year Sea Ice: **4 SVP buoys**
3. NRL Collaboration: **2 SVP buoys** marking the ends of the DISTANCE, and NASA OIB, etc. survey line.
4. Deployed IceKid 3 (IK-3) at IABP Cluster with WARM (Victoria Hill's), **SIMB, and SVP-B** buoys.
5. Harrison Bay "Floe Berg" (FB): **2 SVP buoys**
6. Harrison Bay (HB) Fast-Ice: **4 SVP buoys**
7. Camden Ban (CB) Fast-Ice: **5 SVP buoys**

A total of 22 buoys were deployed by BeaCON this year: 20 SVPs, 1 SIMB, and IceKid 3. We also performed an aerial survey of the Fast-Ice near Barrow for comparison with the sea-ice radar at Barrow, and the high resolution imagery that we are collecting from various sources (e.g. NIC RS2, World View, CosmoSkymed, etc.).

Marginal Ice Zone (MIZ) Program

US Office of Naval Research (ONR) Initiative



- Massive deployment in summer of 2014.
- Collaboration between APL/UW, Cambridge, NPS, NRL, SAMS, VLFR, WHOI, Yale

2014 Beaufort Sea deployments ONR MIZ programme

Massive array of instruments in 4 clusters:

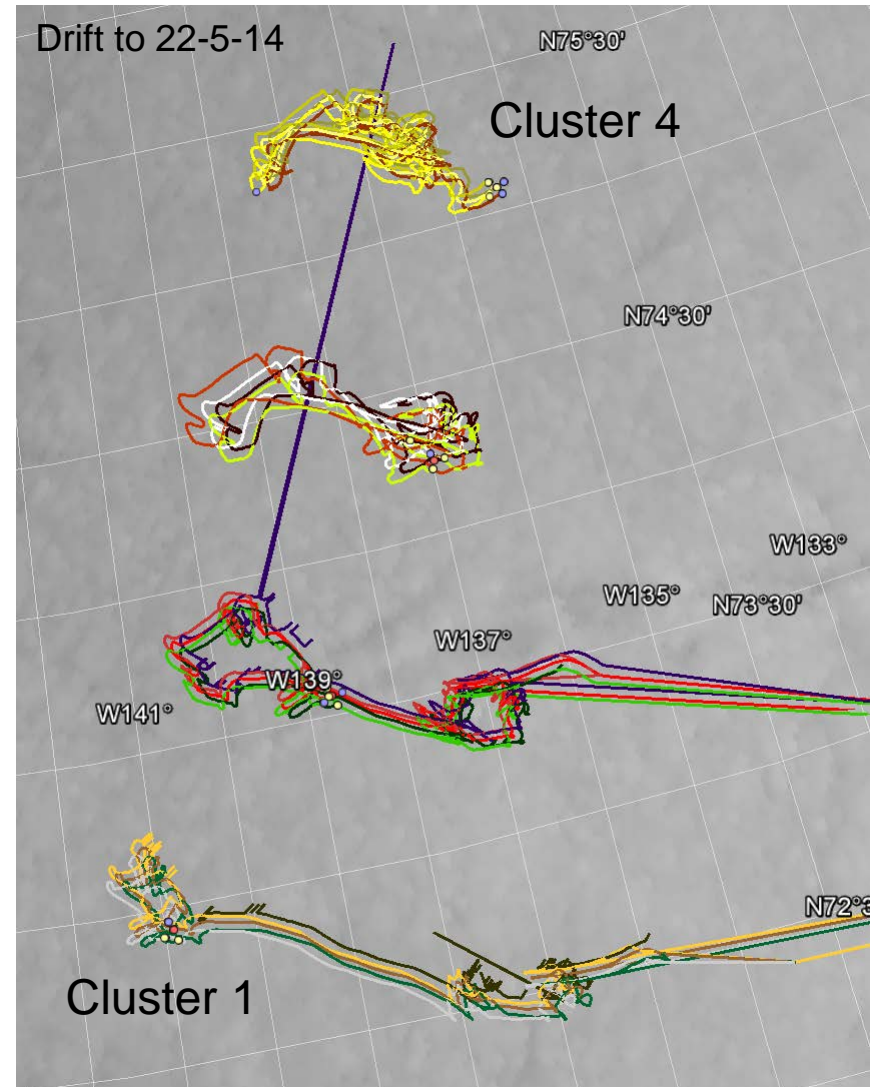
- 20x wavebuoys, 20x SAMS IMBs,
- 2x ITP-V, 2x AOFB, 4x AWS

Deployed mid-March from “fast and light” series of drifting ice camps

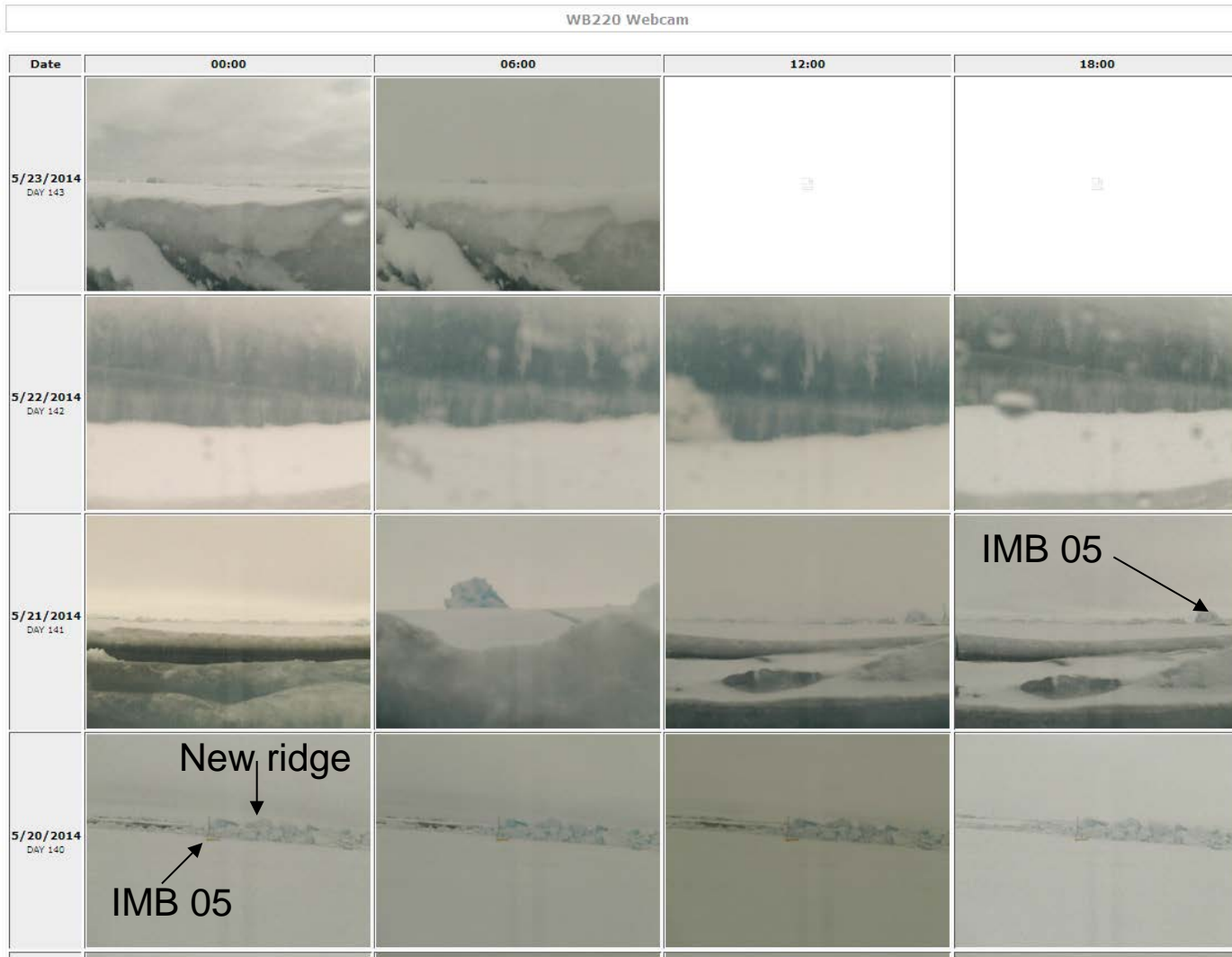
Drift currently alternating between circling and fast westwards movement



Wavebuoys at Cluster 1 ready for distribution by helo



Six-hourly webcam images from the wavebuoys tell a dynamic tale



Survivability currently good (1 wavebuoy and 1 IMB failed) to date
WB220 and IMB05 (these pictures) both still working at time of writing!
Protective dome concept seems to be doing its job

US Interagency Arctic Buoy Program

Russian North Pole Collaboration



- Akademik Federov will hopefully deploy a new North Pole Station.
- Plan to deploy 1 SVP-B, 8 SVP-GPS USIABP Buoys, 1 CRREL IMB, and 1 WHOI ITP.
- Probability that this will happen is low.

International Arctic Buoy Programme

Polar Science Center · Applied Physics Laboratory · University of Washington



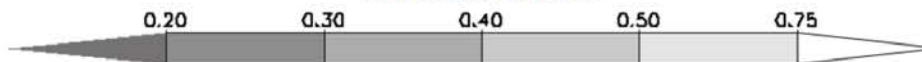
Overview **Maps** Data Publications Research News Links

- Maps
- Daily
- Table
- Map
- Ocean/Ice Buoys
- Monthly
- Table
- Bathymetry
- NSIDC Ice
- Deployment History
- Deployment Logistics
- Instrumentation
- Programme Participant
- Buoy Type
- Special

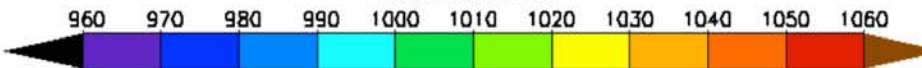
Maps · Daily · Map

Daily Map

Sea Ice Concentration



Sea Level Pressure



Change Displayed Quantity:



2014 Highlights - New Web Maps

International Arctic Buoy Programme

Polar Science Center · Applied Physics Laboratory · University of Washington

Overview Maps Data Publications Research News Links

Maps

Daily

Table

Map

Ocean/Ice
Buoys

Monthly

Table

Bathymetry

NSIDC Ice

Deployment
History

Deployment
Logistics

Instrumentation

Programme
Participant

Buoy Type

Special

Maps · Daily · Table

Daily Table

Please note that this page is still being developed. Date of last report is not 100% accurate, and the data may not be complete back to date of deployment. Missing values are represented by -999, but only the last report is showing, so this value does not mean that the buoy is not reporting that quantity at all. If BP, Ts, or Ta is not available for a buoy, this is indicated with "NA".

Data will pop open in a new window with the following header:
BuoyID, Year, Hour, Min, DOY, POS_DOY, Lat, Lon, (BP),(Ts),(Ta)

DOY = the day of the year to the decimal minute (1.0 to 365.999) of the reported data

POS_DOY = the day of the year to the decimal minute of the reported position

BP = Barometric Pressure, if available

Ts = Surface Temperature if available

Ta = Air Temperature if available

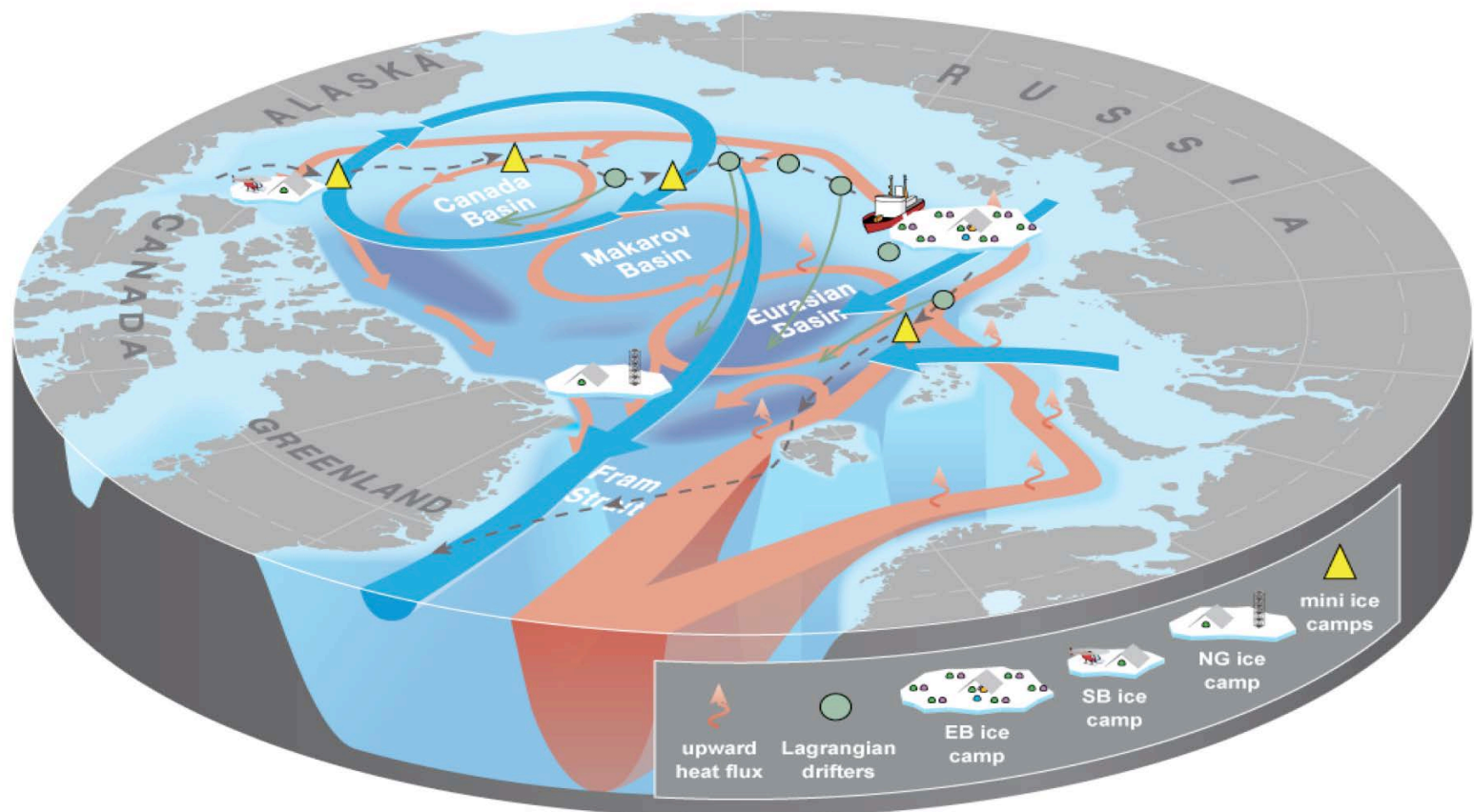
Note that "Surface Temperature (Ts)" is measured from the bottom of the buoy hull. If the buoy is floating, then the reported temperature is of the sea surface. If the buoy is frozen into the ice, or sitting on top of it, then the reported temperature is of the ground or ice. The freezing temperature of sea water is about -1.8C, so temperature readings below this indicate ground or ice temperatures.

Buoys Reporting Over the Last Week

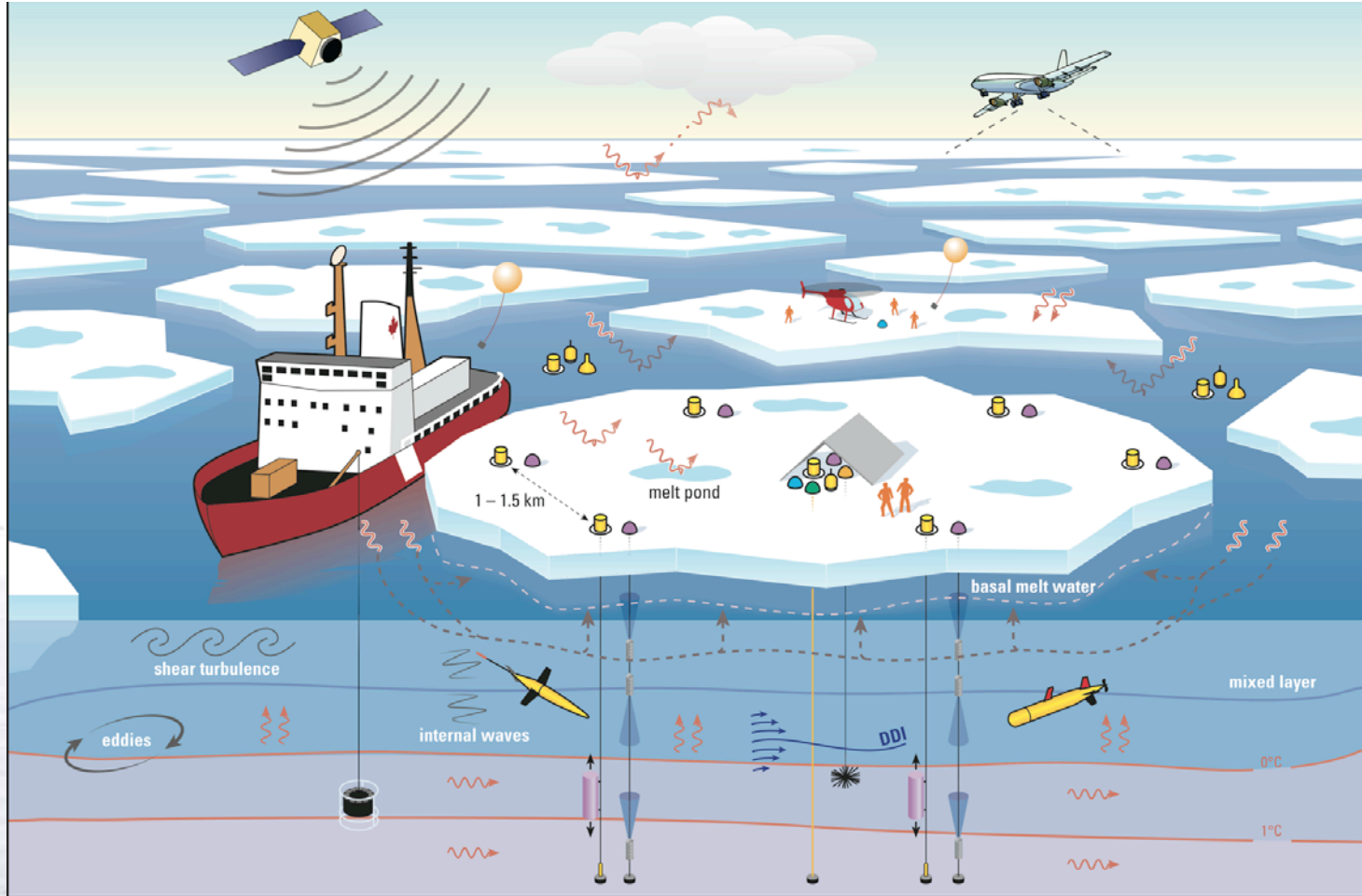
BuoyID	WMO	Description	Date of Last Report	Latitude	Longitude	BP	Ts	Ta	DATA
5300	48731	ICEBUOY	05/24/2014	75.78190	-168.73830	1018.53	-999.00	-4.41	DATA
5313	48732	ICEBUOY	05/24/2014	73.06390	-136.09250	1014.43	-999.00	-2.64	DATA
5315	48507	ICEBUOY	05/24/2014	73.44530	-147.45860	1016.21	-999.00	-8.72	DATA
5318	48508	ICEBUOY	05/24/2014	73.92560	-174.07310	1015.52	-999.00	-5.90	DATA
35094	48733	ICEBUOY	05/24/2014	74.76220	-169.59530	1017.85	-999.00	-6.87	DATA
46517	48520	ICEBUOY	05/24/2014	75.84110	-19.43750	1029.00	18.84	-0.65	DATA
83723	48600	ICEBUOY	05/24/2014	74.53690	169.15940	1014.50	-2.75	-29.60	DATA
83726	48536	ICEBUOY	05/24/2014	75.23470	148.54940	996.50	-999.00	-2.73	DATA
90048	NA	ITP_48	05/22/2014	83.96240	-61.38740	NA	NA	NA	DATA
90054	NA	ITP_54	05/22/2014	80.09330	-178.16240	NA	NA	NA	DATA
90058	NA	ITP_58	05/22/2014	74.00440	-3.69690	NA	NA	NA	DATA
90059	NA	ITP_59	05/22/2014	87.40520	-157.47300	NA	NA	NA	DATA
90061	NA	ITP_61	05/22/2014	56.79770	-46.35530	NA	NA	NA	DATA
90062	NA	ITP_62	05/22/2014	71.18500	-174.68000	NA	NA	NA	DATA
90063	NA	ITP_63	05/22/2014	81.00840	-157.61000	NA	NA	NA	DATA
90068	NA	ITP_68	05/22/2014	77.06000	-158.11030	NA	NA	NA	DATA
90069	NA	ITP_69	05/22/2014	77.07650	-168.34400	NA	NA	NA	DATA
90070	NA	ITP_70	05/22/2014	76.22840	-151.31120	NA	NA	NA	DATA
90071	NA	ITP_71	05/22/2014	76.65800	-149.92270	NA	NA	NA	DATA

2014 Highlights – New Web Tables

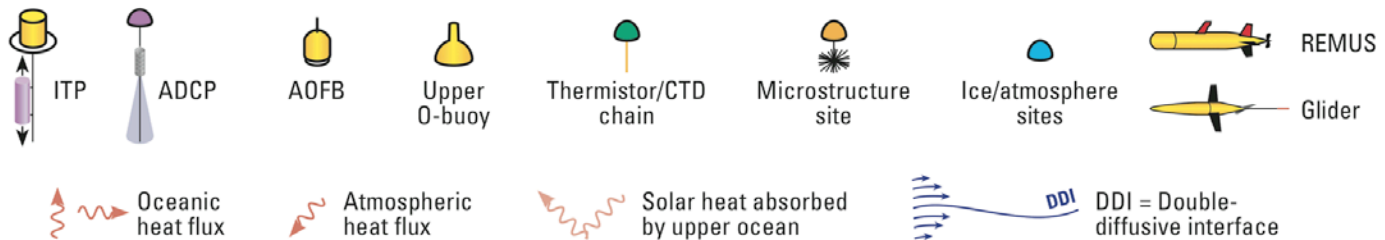
Proposed Arctic Ocean Drift Study (AODS) including ice camp experiment in the eastern Eurasian Basin



Ice camp observations in the eastern Eurasian Basin



Camp



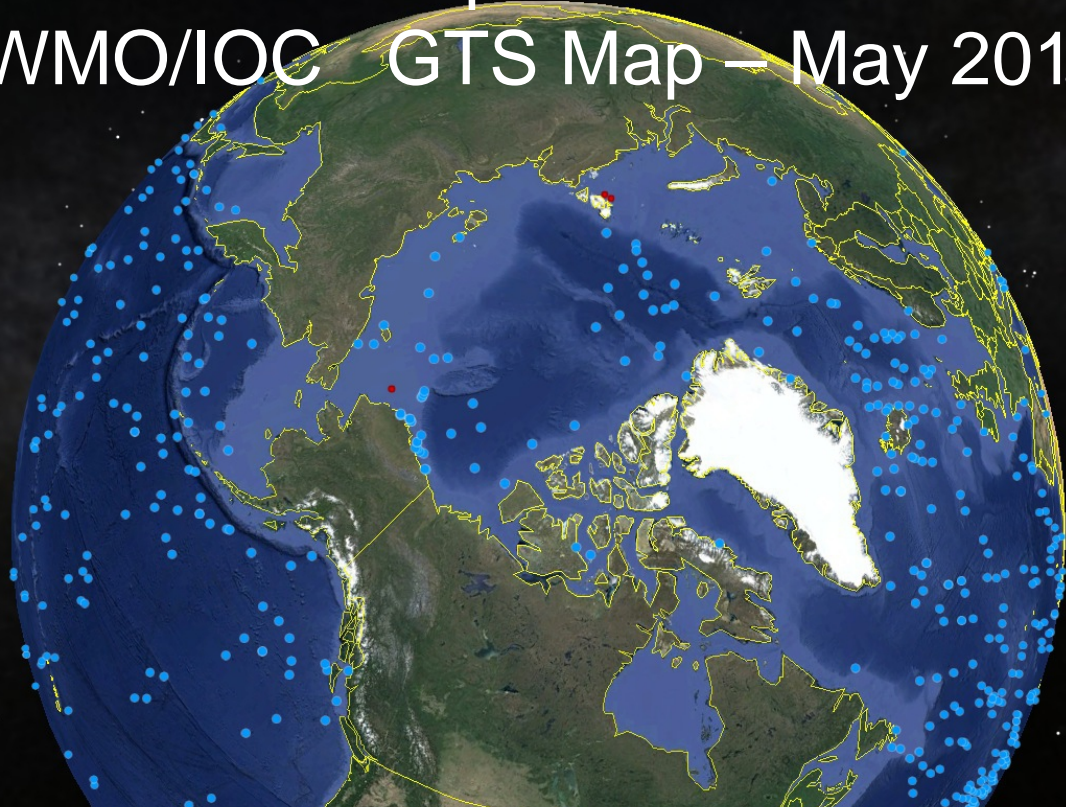
Status of Membership

- 35 Participants on our last meeting
- Jeremy Wilkinson has moved from Scottish Association for Marine Science (SAMS) to the British Antarctic Survey (BAS).
- New SAMS contact?
- Asked Jeremy Wilkinson if BAS should become a Participant.
- Jenny Hutchings has moved from University of Alaska Fairbanks (UAF) to Oregon State University (OSU), and would like to become a member.
- John Walsh suggested adding Andy Mahoney and Peter Winsor as our primary contacts at UAF.
- $35 + \text{BAS} + \text{OSU} - \text{SAMS} = 36$

2015 and beyond

- Eurasian Arctic Deployments
 - Russia/Ukraine conflict may jeopardize Russian Collaboration
 - NABOS Cruise relies on Russian logistics
 - Polarstern
- R/V Sikuliaq, November 2015
- CGC Healy, CCG Louie, Araon
- Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC)
- Polar Prediction Programme (PPP) & Year of Polar Prediction (YOPP)

Observations for Operations and Research WMO/IOC GTS Map – May 2014



IABP High Lights & Summary

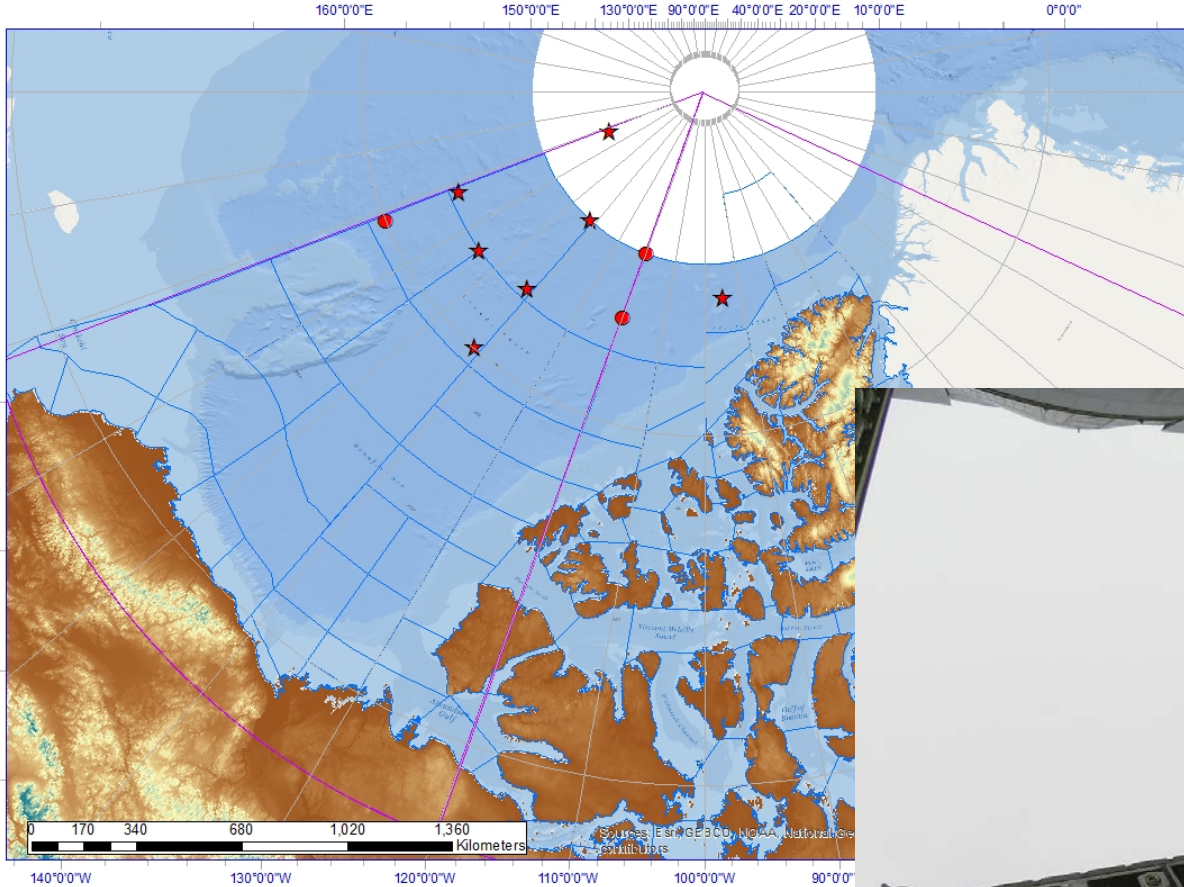
- New Data Manager: Wendy Ermold
- Ongoing updates to the web pages, especially maps and data availability in near real-time. Comments and Suggestions?
- 188 buoys reporting
 - 22 USIABP BeaCON Buoys
 - 42 ONR MIZ Buoys, including 4 AWS (NOT ON GTS)
 - 17 WHOI ITPs (NOT ON GTS, should show up as Argo floats)
 - 8 IMBs (not all on GTS)

Google Earth
US Dept of State
Data SIO, NOAA,
Image Landsat
© 2014 Google

View from Space (Altitude: 7414 mi)

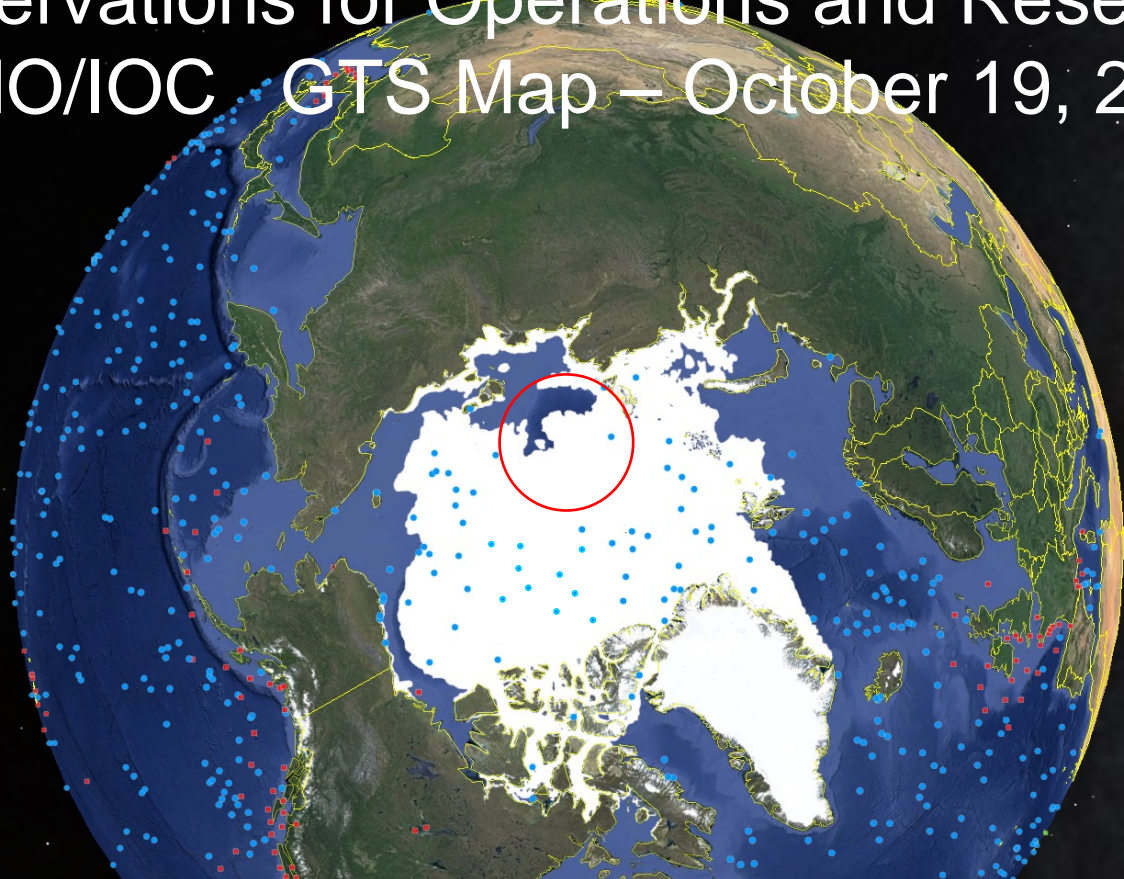
Environment Canada Air Deployments

Drifter Buoy Air Deployment Locations - September 2014



**10 barometer buoys air
deployed by RCAF C-130
operating from Alert (Thanks
Champika!)**

Observations for Operations and Research WMO/IOC GTS Map – October 19, 2014



IABP High Lights & Summary

• Since May we deployed another 80+ buoys during the summer.

- Araon: ONR MIZ 5th Cluster: 1 ITP, 1 AOFB, 10 Wave, 5 SAMS IMBs, 2 navigation
- CCG Louie: 4 WHOI ITPs, 1 IMB, 1 SIMB
- CGC Healy: 12 SVP-B, 6 AXIBs
- EC: 7 ICEXAIR, 3 SVP-B
- Federov: 2 SVP-B, 11 SVP-GPS
- Oden: 6 SVP-B buoys
- Polarstern: 5 SVP-B in Canadian Basin, 5 SVP-B in Eurasian Basin
- USCGC C-130: 6 AXIBs, 2 UpTempOs

US Dept of State Geographer
© 2014 Google
Image IBCAO
Image Landsat

Google earth

• Spatial coverage is good except gaps persist on the Russian side of the Arctic Ocean (red circle).

• Need to find ways to continue deploying buoys on the Russian side.

END

Extra Slides

IABP Arctic Group Report

Thirtieth Session of the Data Buoy Cooperation Panel
27 - 31 October 2014, Weihai, China

OUTLINE

- asdfasdfasf
- Summary

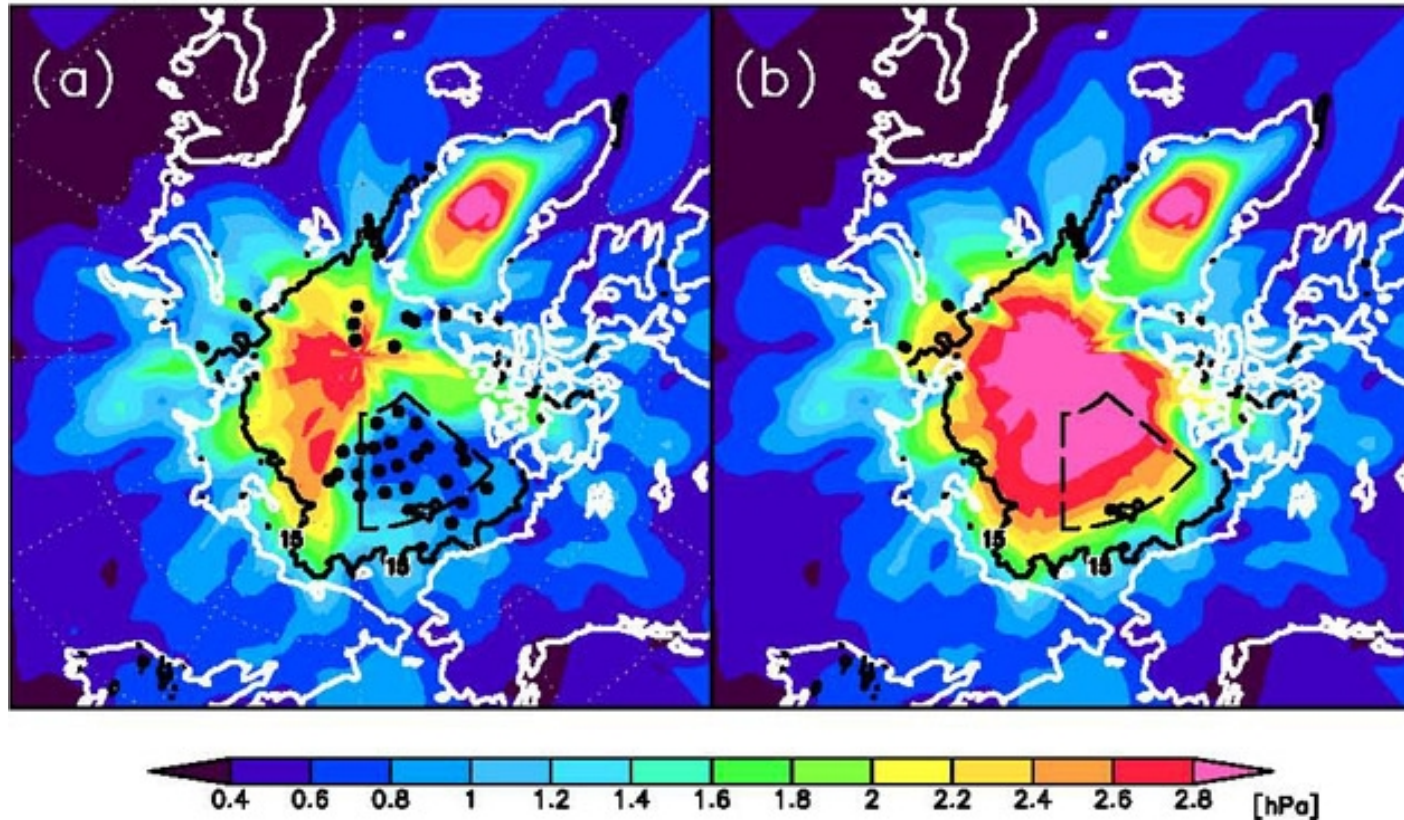
MIZ news and plans

Martin Doble

Laboratoire d'Océanographie de Villefranche
doble@obs-vlfr.fr



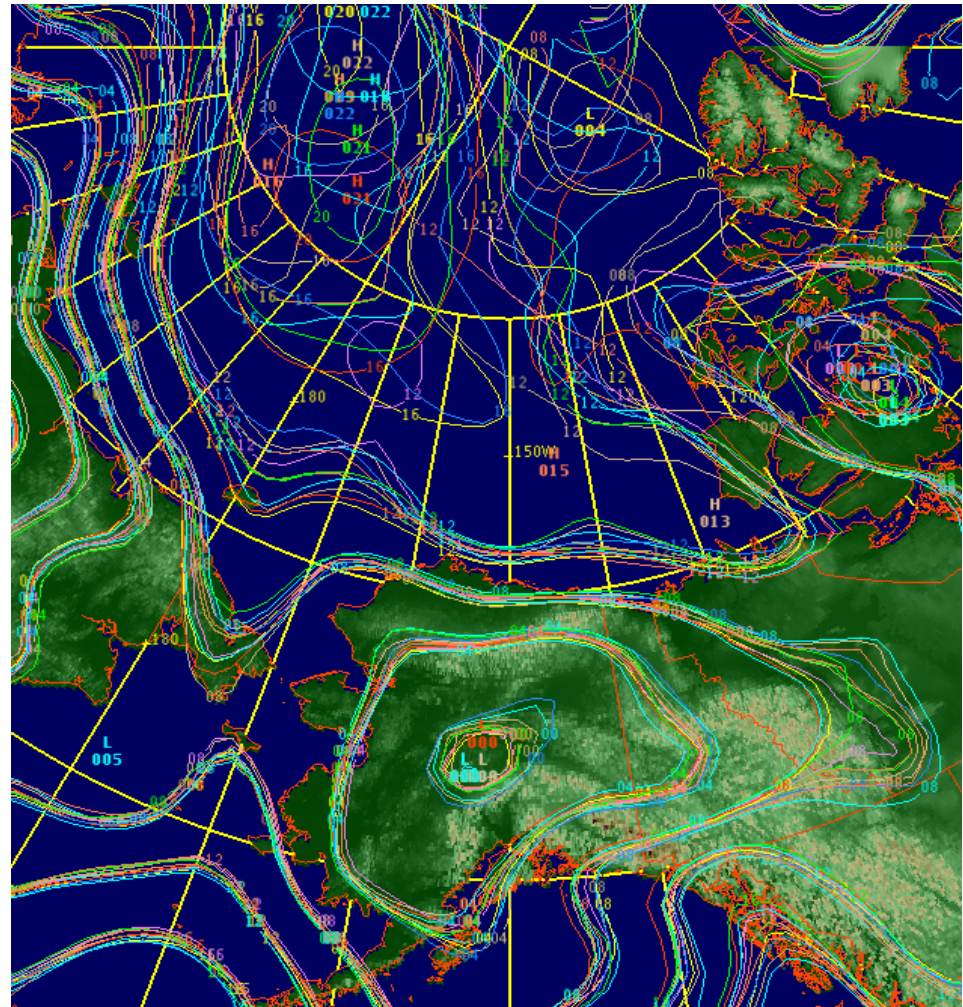
Impact of buoy obs. on SLP fields.



The spread between SLP Reanalyses is low in areas where there are buoy observations (left). The spread increases to cover the whole Arctic when the buoys are removed from the reanalyses (right). The buoy obs. also help constrain estimates of wind and heat.

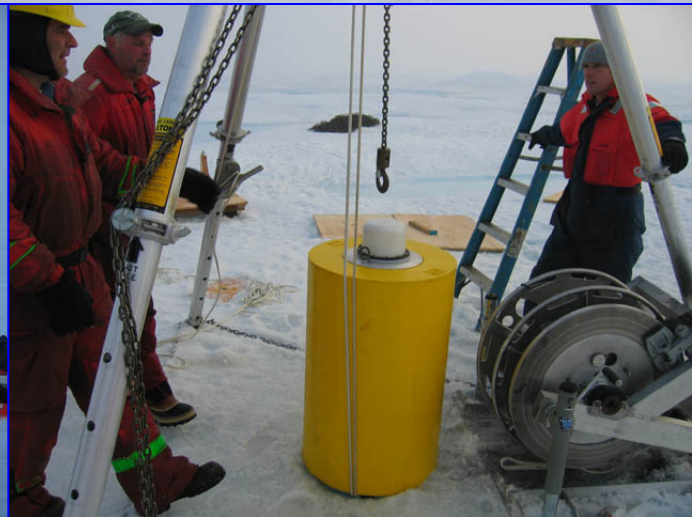
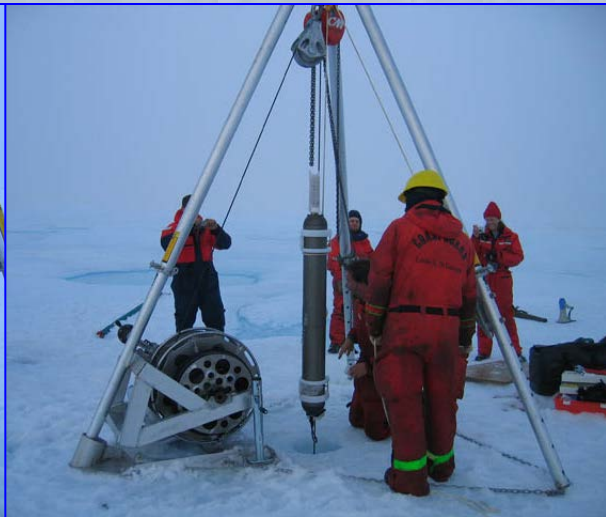
Why do we need more observations in the Arctic?

- Large Model Differences in Initial Conditions are very common over the Arctic
- Often leads to poor and inconsistent model performance with significant Arctic Weather features.
- Weather is the short term driver of local Sea Ice Changes



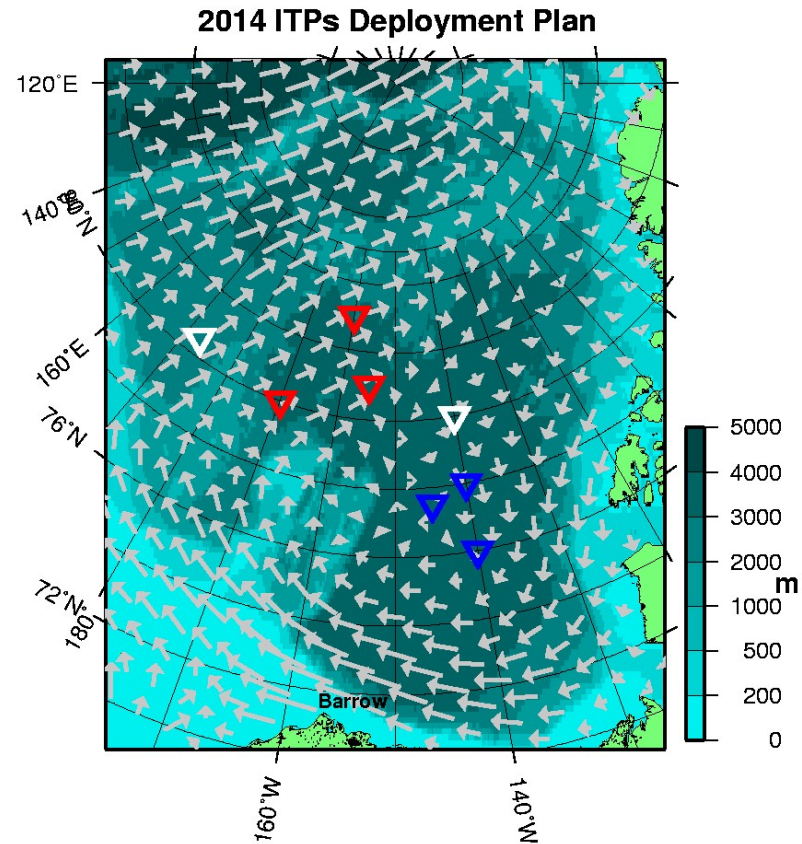
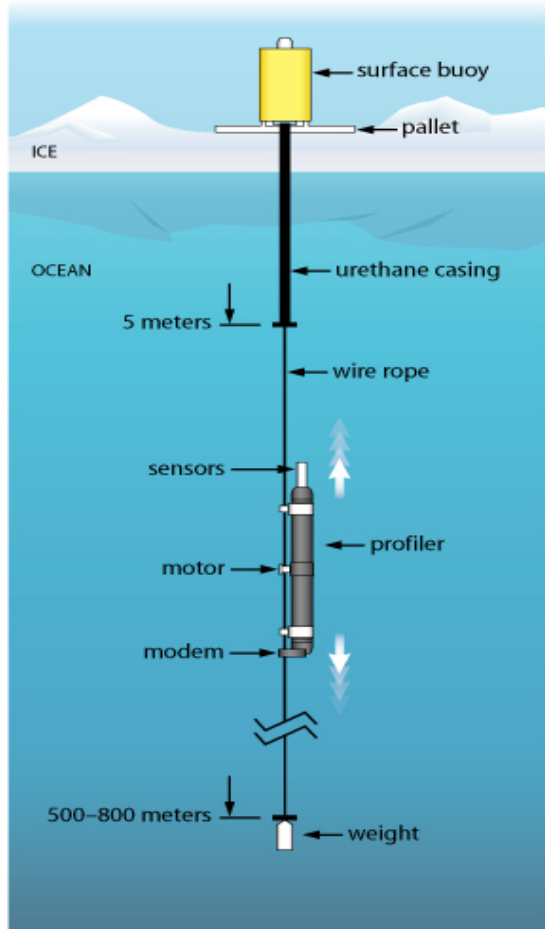
Comparison of Multiple Weather Model
Sea Level Pressure Initializations over the
Arctic

Woods Hole Oceanographic Institute Ice Tethered (Ocean) Profilers



Woods Hole Oceanographic Institute

Ice Tethered (Ocean) Profilers

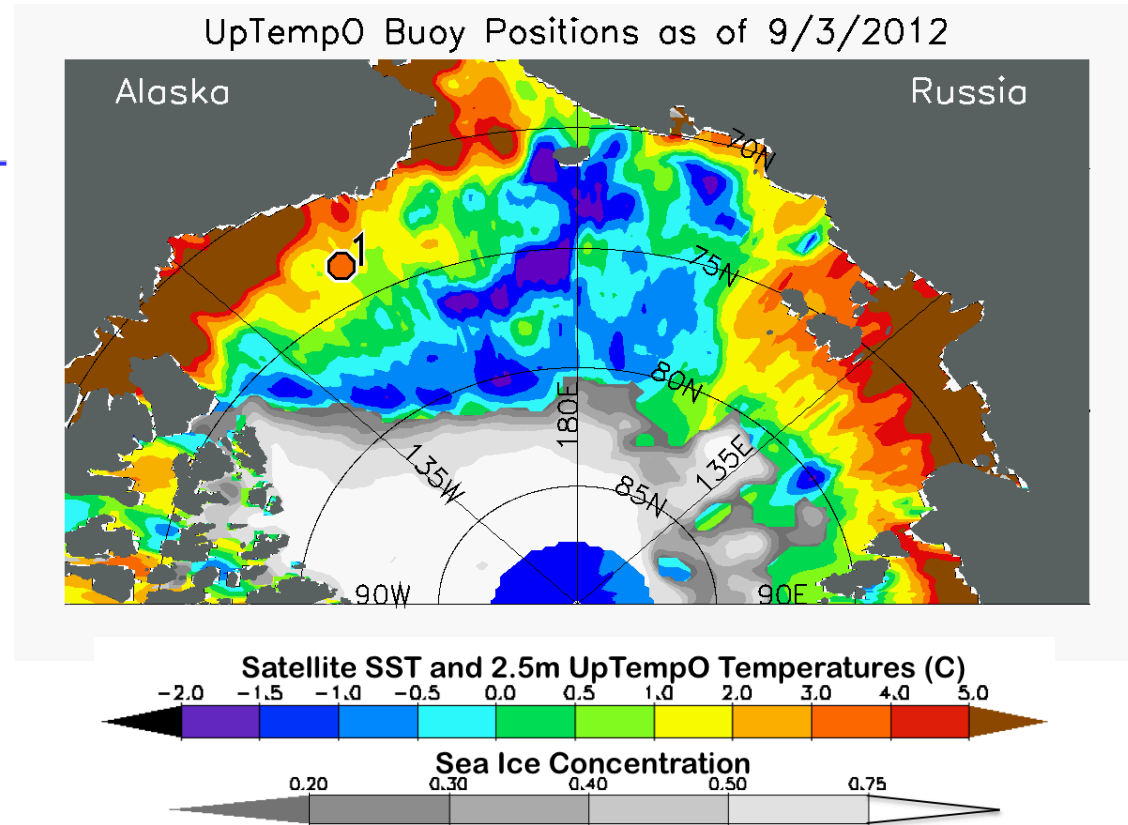
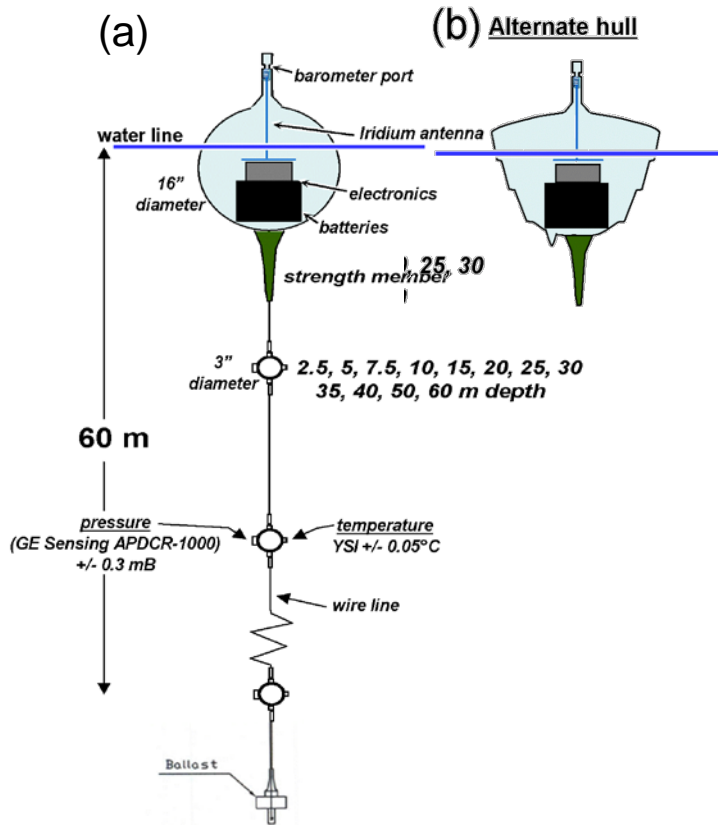


Annual ice drift from IABP (grey vectors)
on IBCAO bathymetry (shading).

- 17 ITPs reporting.
- Deployment Plans: Araon 2 (white), Xuelong 3 (red), Louis 3 (blue)

Polar Science Center

UpTempO Buoys

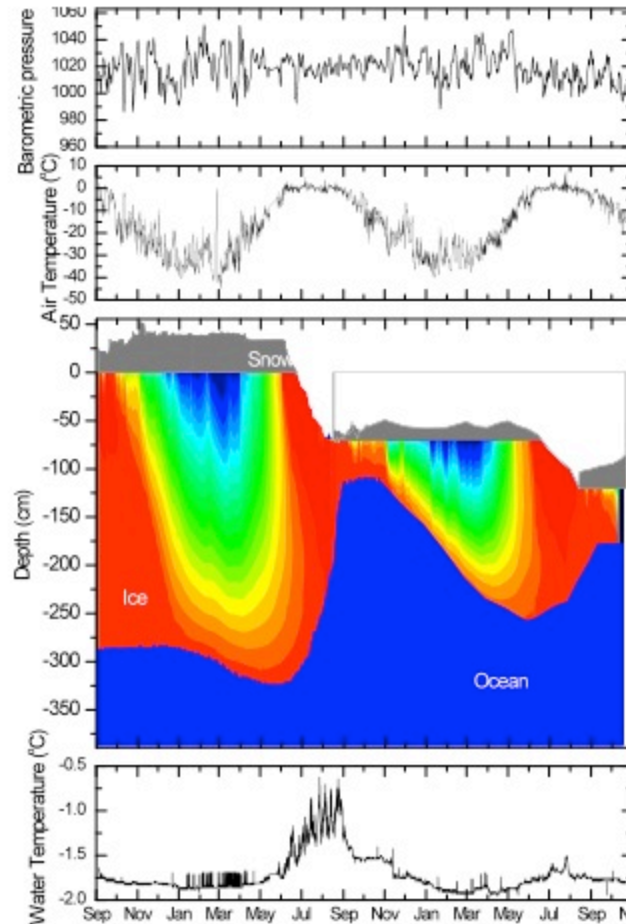
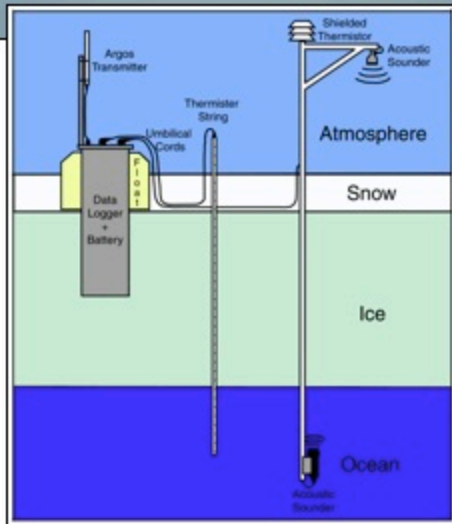


- Reynolds SST estimates are colder than UpTempO measurements.
- Testing UpTempOs produced by Marlin Yug, MetOcean, and Pacific Gyre.
- More on UpTempOs during the Technical Session

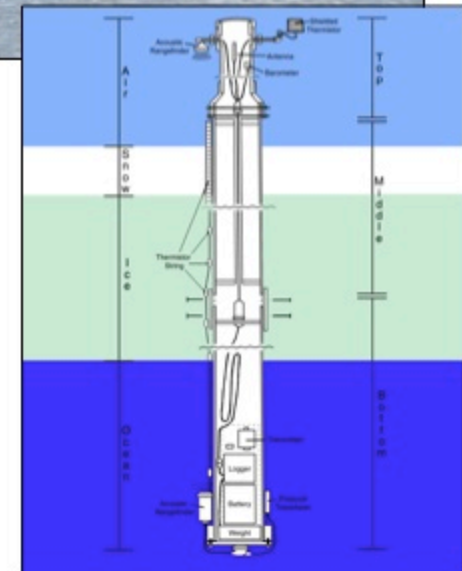
Cold Regions Research & Engineering Lab

Ice Mass Balance Buoys

Multi-year Ice



Seasonal Ice



Observe and attribute change in ice thickness

Cold Regions Research & Engineering Lab

Ice Mass Balance Buoys

At this time, we have a total of 8 IMBs reporting data of some sort, back to us. They include:

- 300025010125530 IMB 2012G - Standard IMB - that was at the Russian Drifting station (NP40) and is still alive
- 300025010922710 IMB 2013F -
- 300025010713490 IMB 2013G - actually belongs to Environment Canada so we can't set up the GTS for them
- 300234060522180 SIMB 2013I - this is a Seasonal IMB
- 300234061216540 SIMB 2014B - this is a Seasonal IMB
- 300234061217550 SIMB 2014C - this is a Seasonal IMB
- 300234011040710 IMB 2014D - This is a re-manufactured IMB
- 300025010922730 IMB 2014E - IMB deployed at NPEO

IMB Losses:

- 2014A – USIABP BeaCON SIMBr

Planned IMB Deployments

- Seasonal IMBs
 - 1 – CGC Healy (USIABP BeaCON)
 - 1 - Beaufort Sea - Louis St. Laurent
- Beaufort Sea - Louis St. Laurent

The O-Buoy Chemical Network for Long Term Studies of O₃, CO₂, and BrO over the Arctic Ocean

P. Matrai¹, J. W. Bottenheim², F. Chavez³, D. Perovich⁴, P. B. Shepson⁵, W. R. Simpson⁶, S. Netcheva², C. Rauschenberg¹, C. Williams⁴, T. Valentic⁷, M. Carlsen⁵, G. Friederich³, R. Oglesbee⁵, C. Wahl³, P. J. Wyss⁵ and J. Zimmermann⁵

Students: W. Halfacre⁵, P. Peterson⁶, S. Walsh⁶, P. Joyce⁶

¹Bigelow Laboratory

²Environment Canada

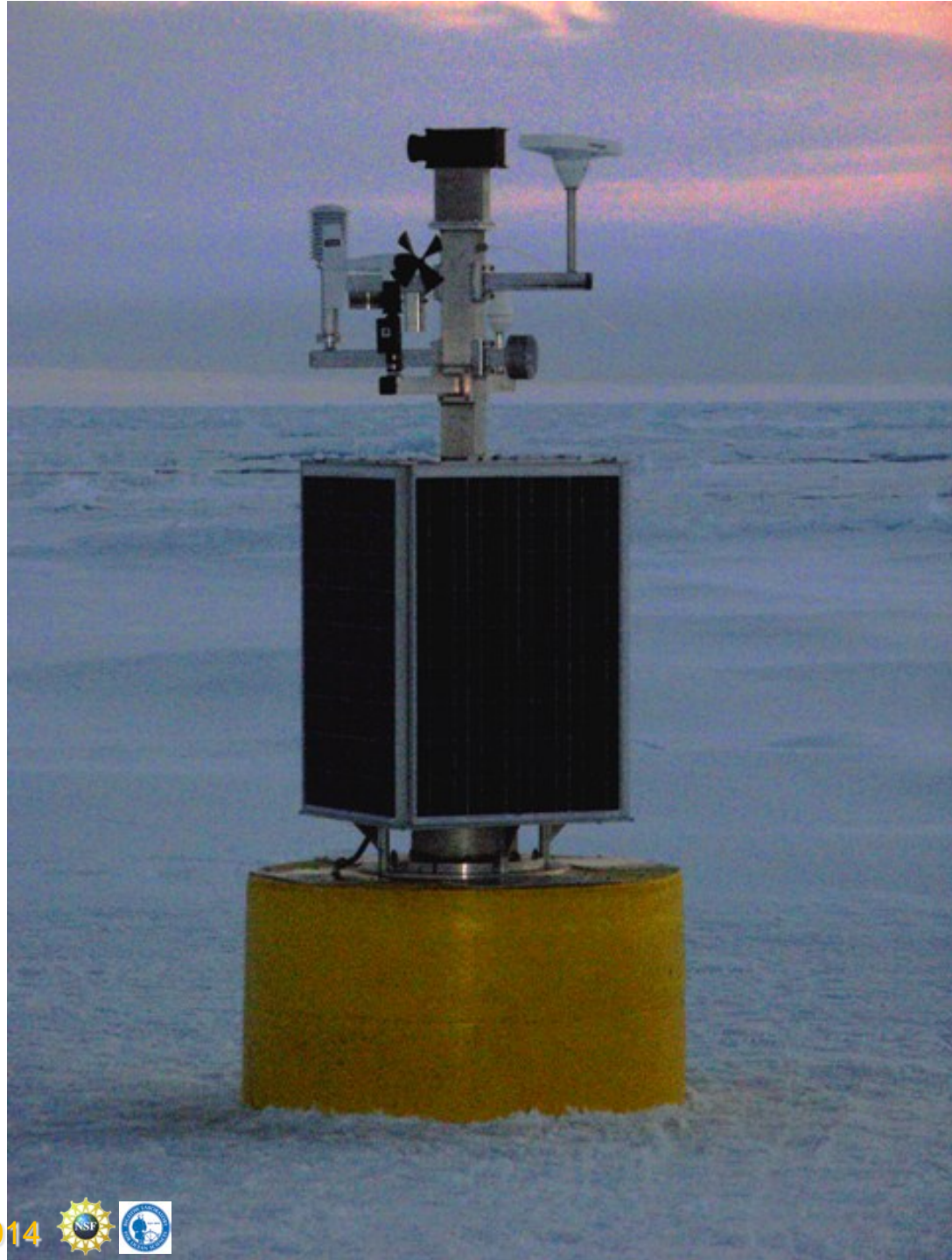
³MBARI

⁴CRREL

⁵Purdue University

⁶U. Alaska, Fairbanks

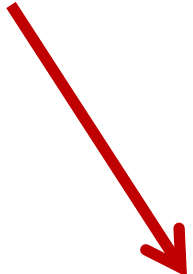
⁷SRI-International





'First crane deployment' movie; click on photo

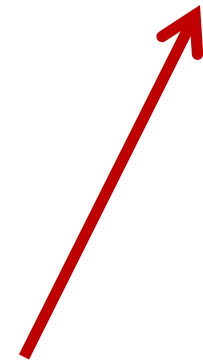
'View from OB-9' movie: ITP deployment



**NABOS
2013**



OB-9 by the R/V Fodorov



Looking for a 3rd long-term deployment in 2015!

O-Buoy websites:

1) General public information:

<http://www.o-buoy.org>

2) Project data portal, storage, and display:

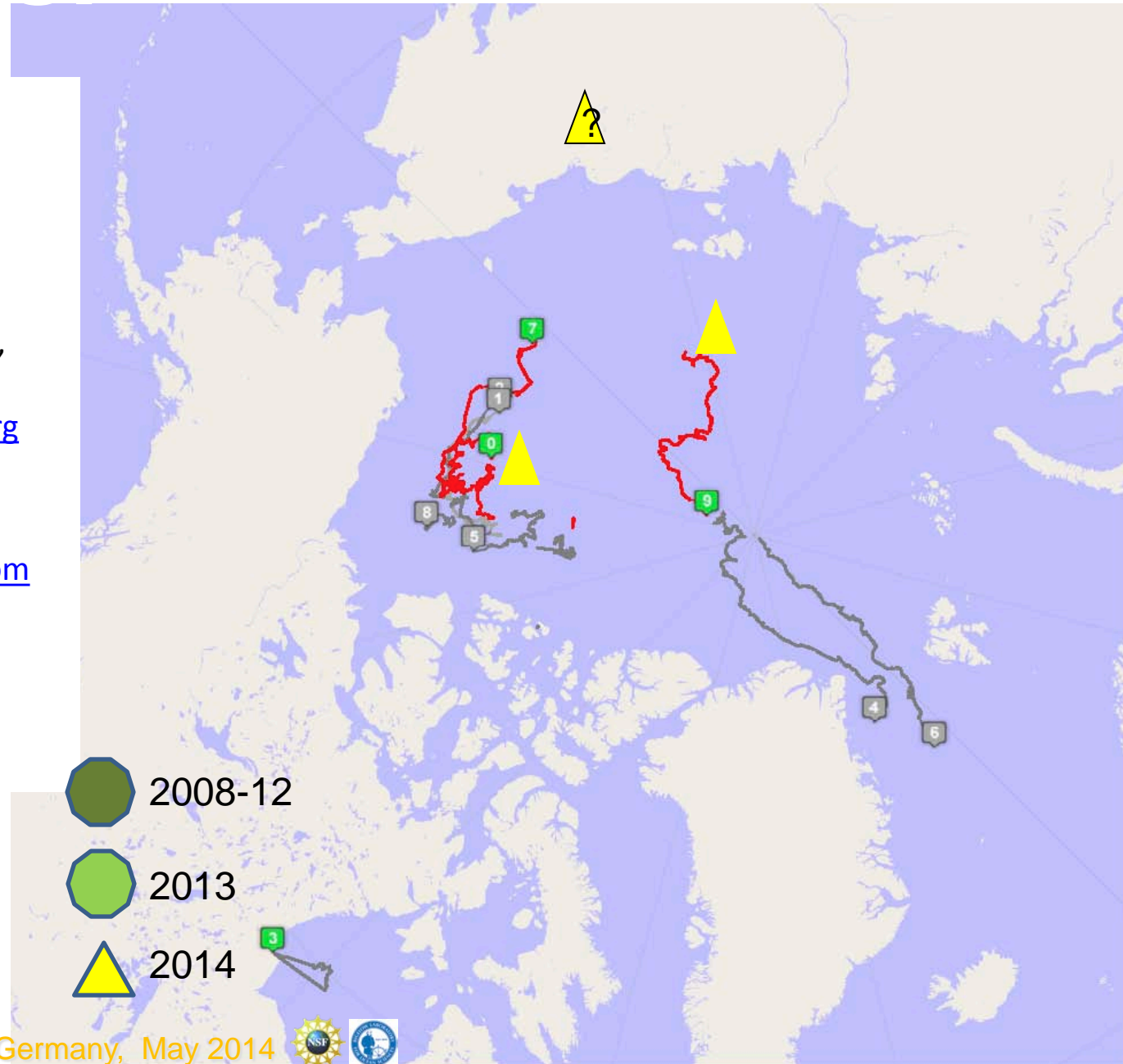
<http://obuoy.datatransport.org>

3) Project Management:

<https://obuoy.basecamphq.com>

4) Data archival:

<http://www.acadis.org>



Summer 2014 deployments

Aim is to complete “5th cluster” of MIZ deployments, to N of the existing array
To be deployed during a 7-day ice station by the Korean icebreaker *Araon*

August 1-24: Nome – Beaufort – Chukchi – Barrow

Location deployment will depend on location of clusters 1-4 at the time

Expected ~76°N, 150°W but may have to go to 80°N, depending on ice conditions

Will deploy ITP-V, AOFB, 4x wavebuoys in 1 km square alongside ship

Then 6 additional wavebuoys in nested 10 km and O(100km) squares

Also 5x SAMS IMBs

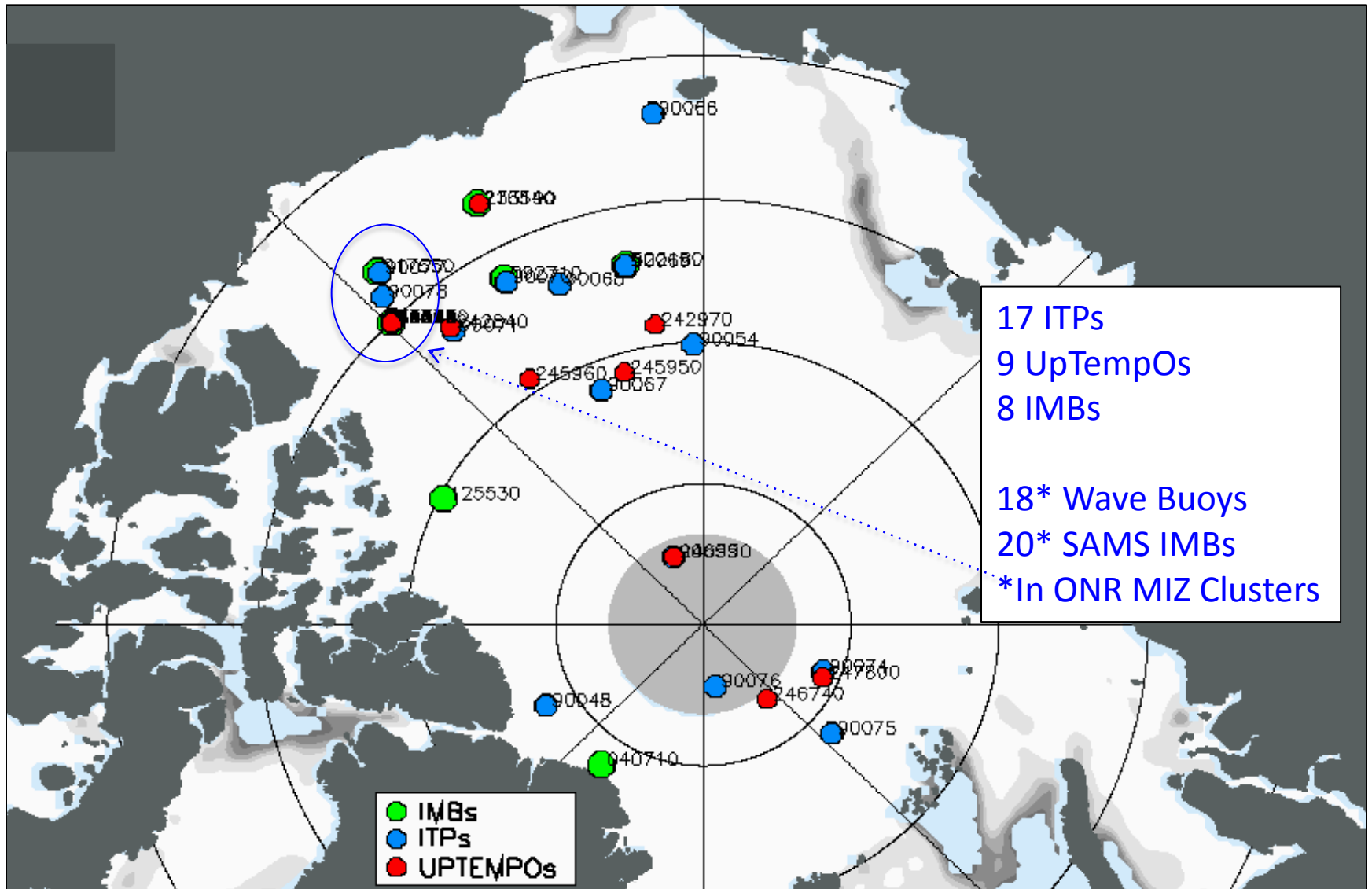
Plus 2x acoustic navigation sources and 1x SeaGlider

Other plans

Wavebuoy deployments from N-ICE *Lance* drift, Fram Strait, winter 2014-2015

Further deployments planned from dedicated *R/V Sikuliak* cruise November 2015, tracking Beaufort Sea ice advance, as part of the ONR “Sea State” DRI

IABP Ocean & Ice Buoy



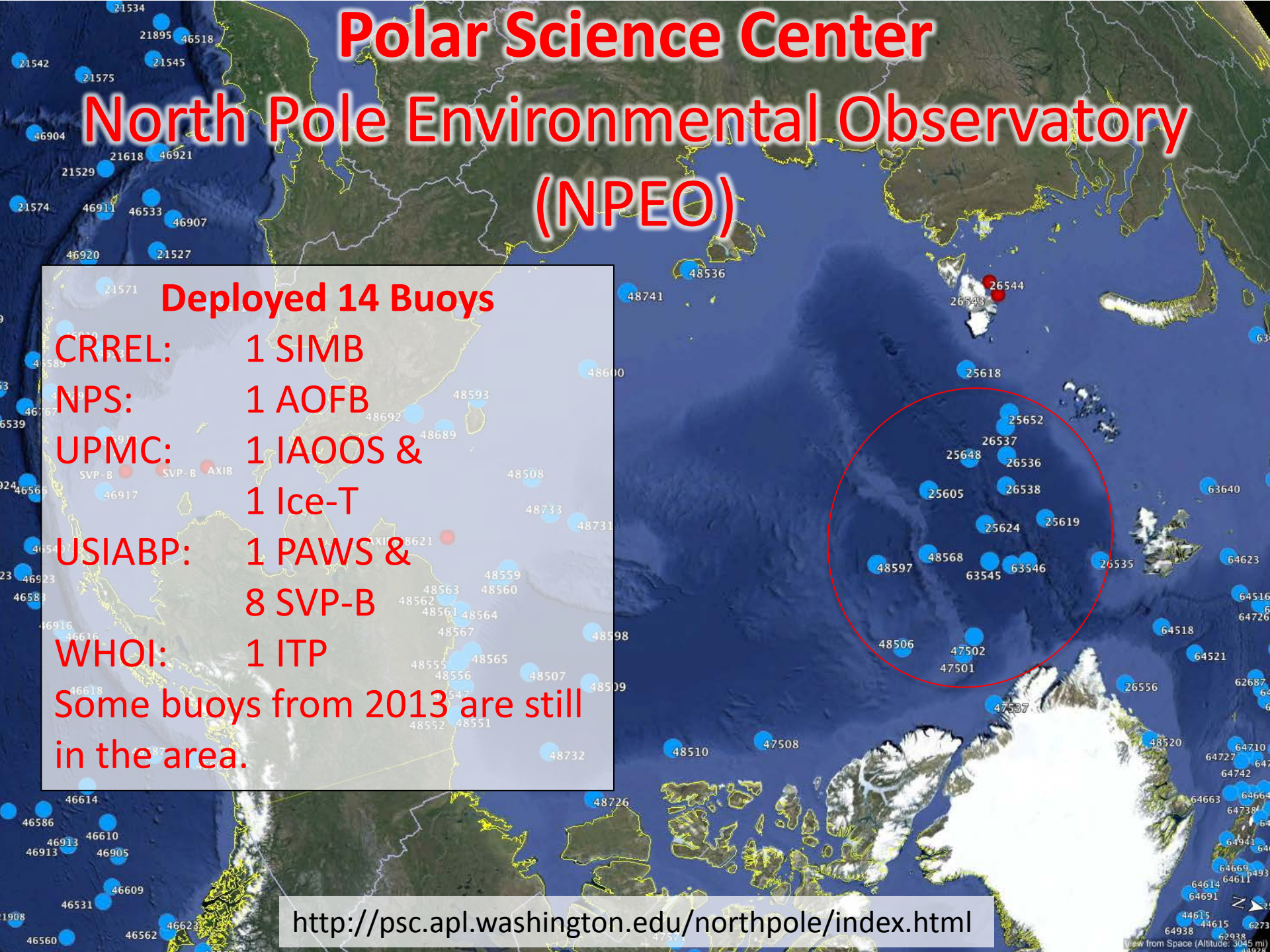
Polar Science Center North Pole Environmental Observatory (NPEO)

Deployed 14 Buoys

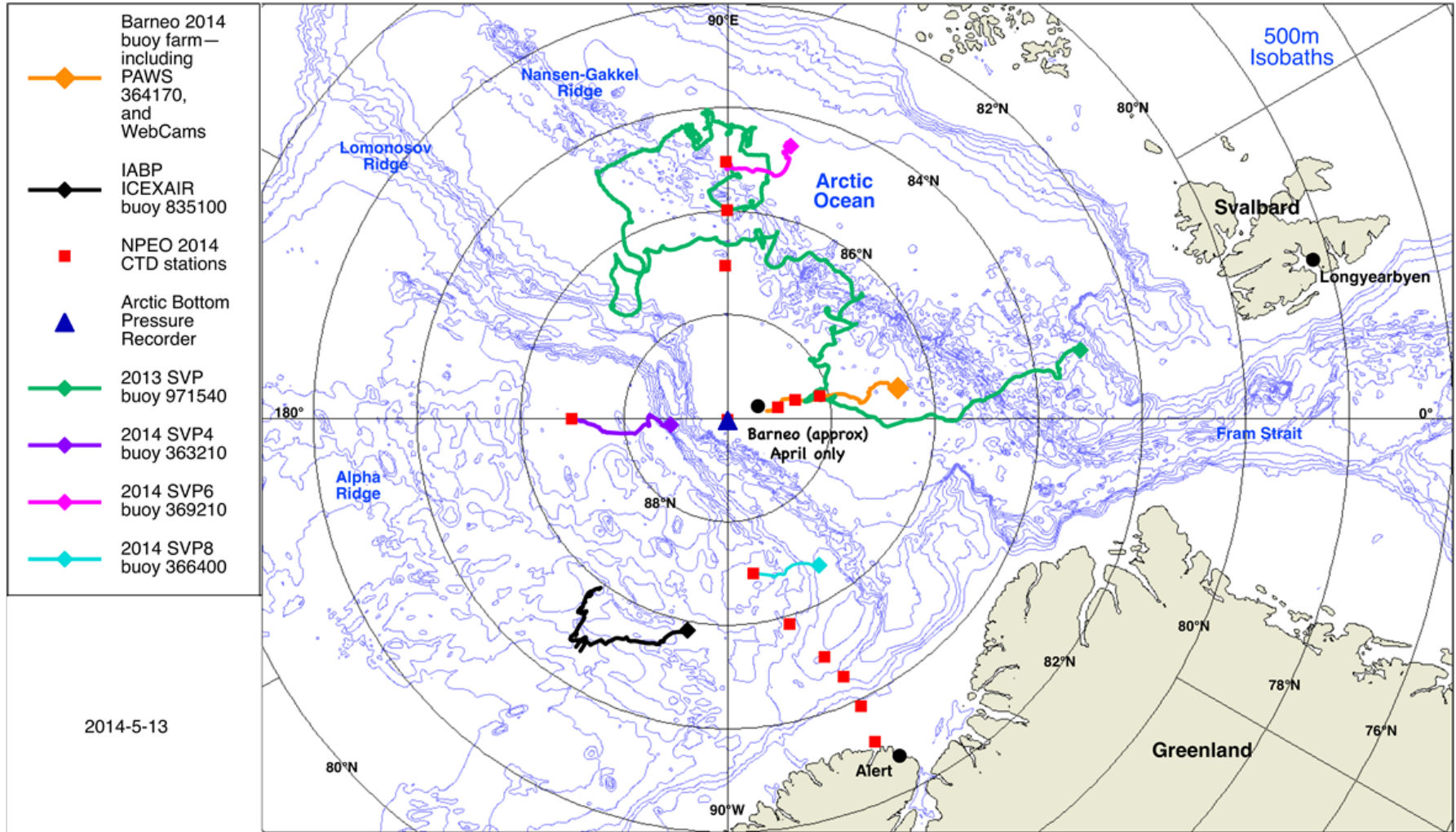
- CRREL: 1 SIMB
- NPS: 1 AOFB
- UPMC: 1 IAOOS &
1 Ice-T
- USIABP: 1 PAWS &
8 SVP-B
- WHOI: 1 ITP

Some buoys from 2013 are still
in the area.

<http://psc.apl.washington.edu/northpole/index.html>



North Pole Environmental Observatory (NPEO)



<http://psc.apl.washington.edu/northpole/index.html>

IABP Deployment Plans 2014 (Place Holder)

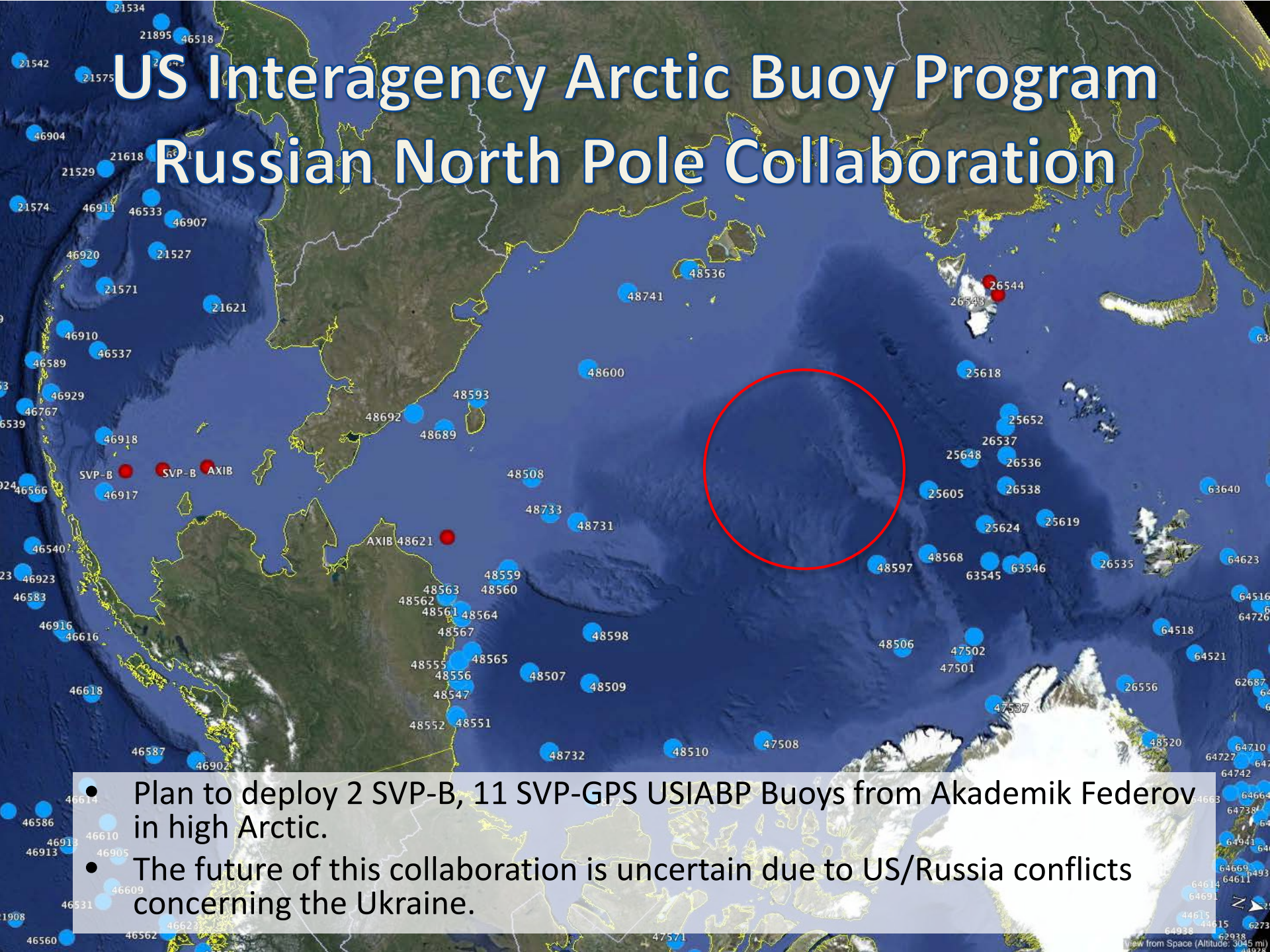
Canadian METAREAS Air Deployments

Air Deployment Of Drifting Buoys in the Canadian High Arctic - 2013



Data as of May 06, 2013

US Interagency Arctic Buoy Program Russian North Pole Collaboration



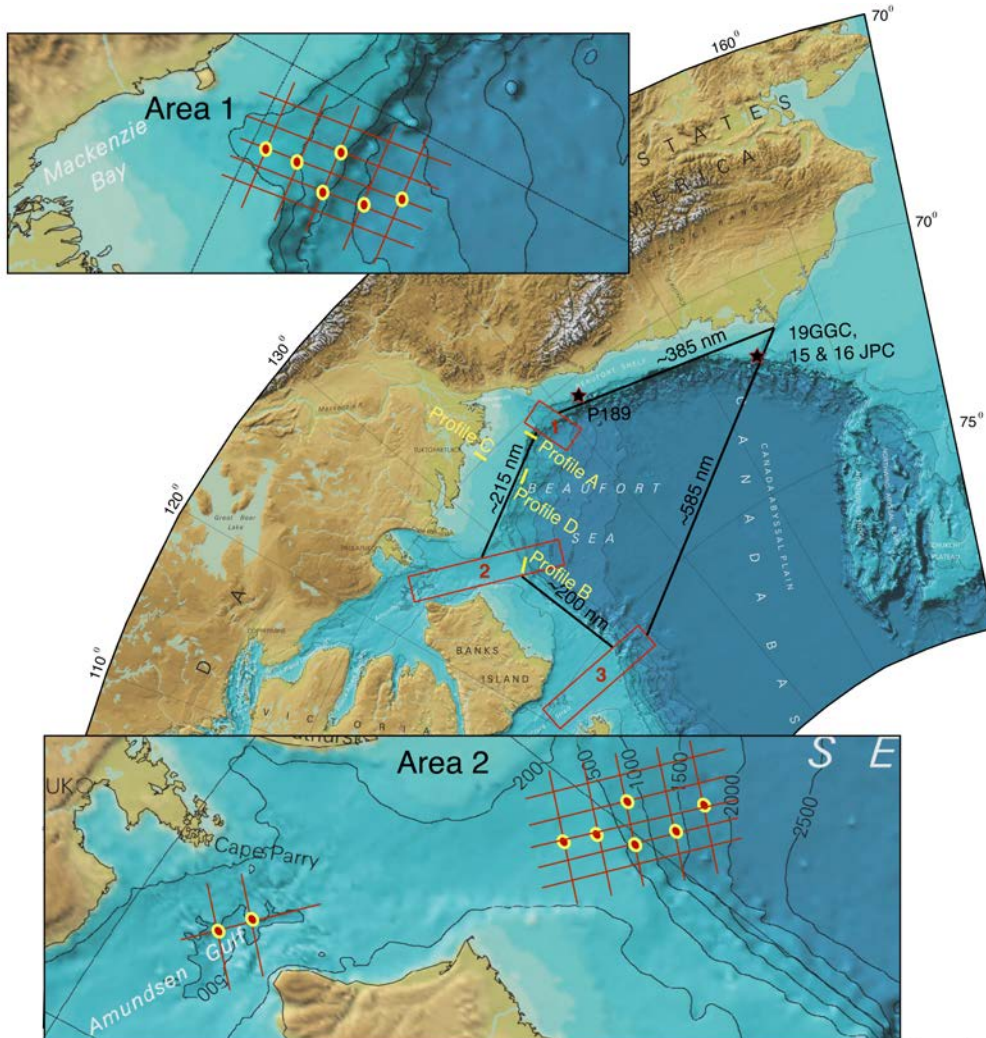
- Plan to deploy 2 SVP-B, 11 SVP-GPS USIABP Buoys from Akademik Federov in high Arctic.
- The future of this collaboration is uncertain due to US/Russia conflicts concerning the Ukraine.

US Interagency Arctic Buoy Program

CG HC-130 Deployments



USCG Healy 1402 & 1403 Chukchi and Beaufort Seas

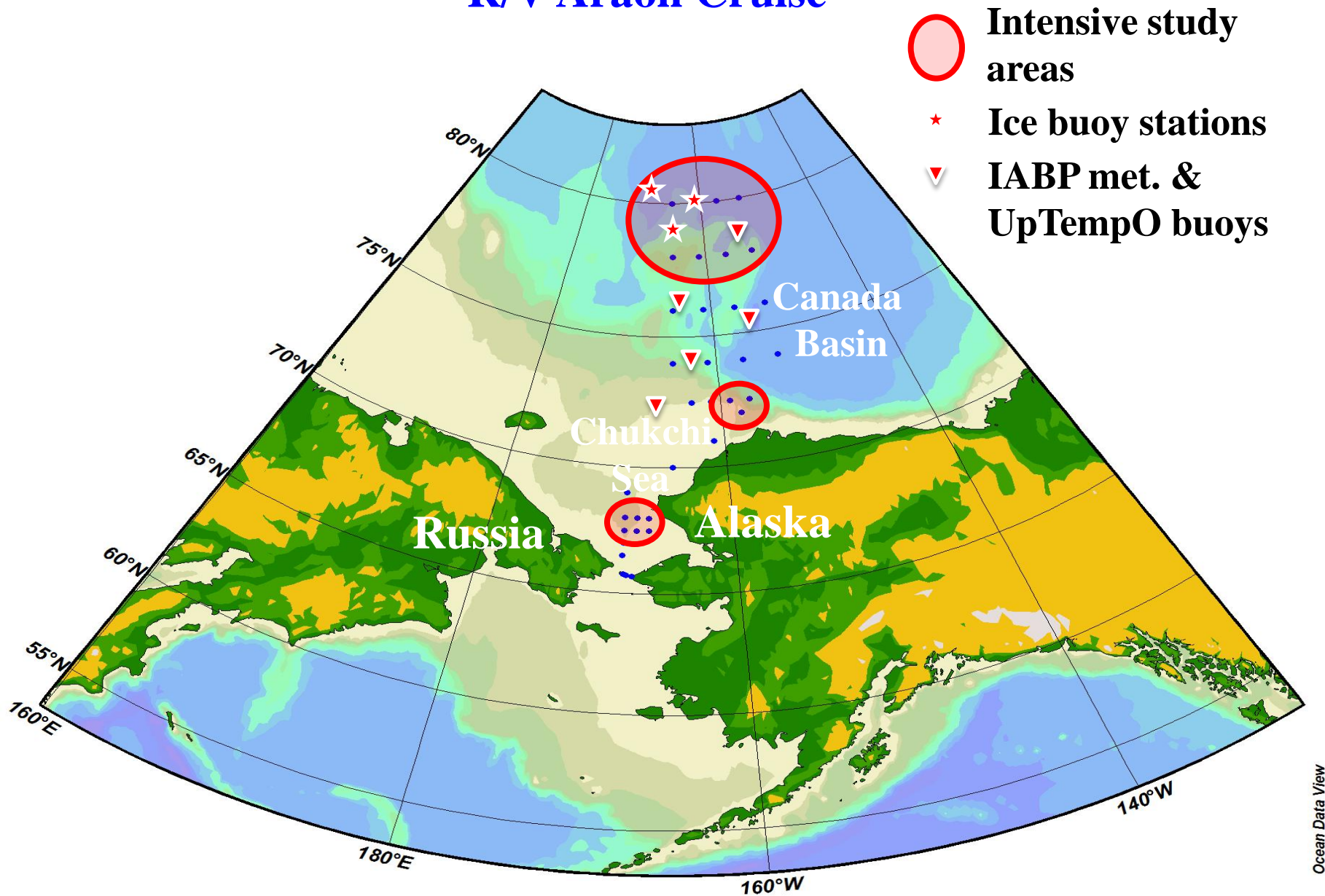


- 12 USIABP SVP-B Buoys
- 4 USIABP AXIB

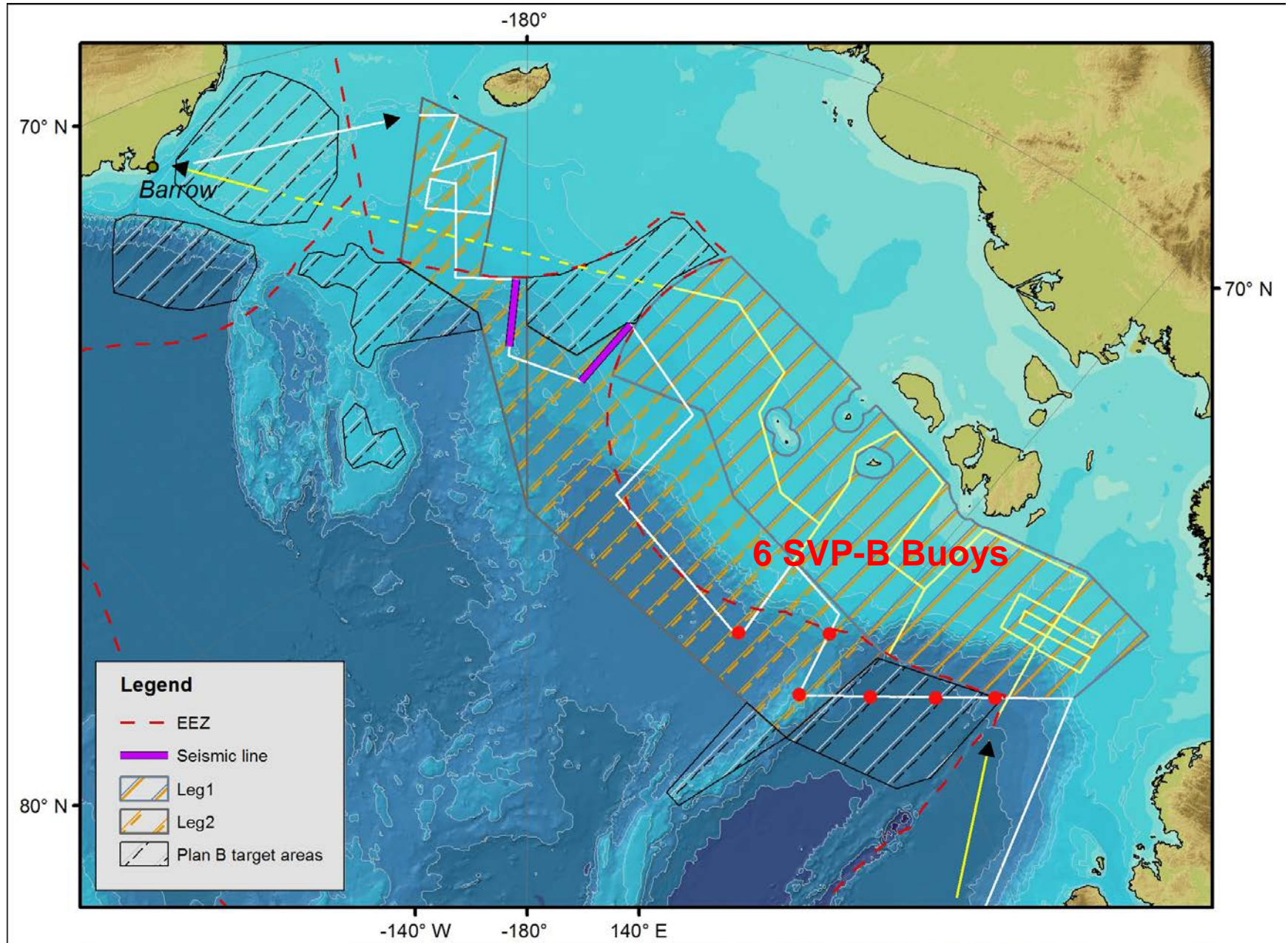
Figure 1

Korea Polar Research Institute

R/V Araon Cruise

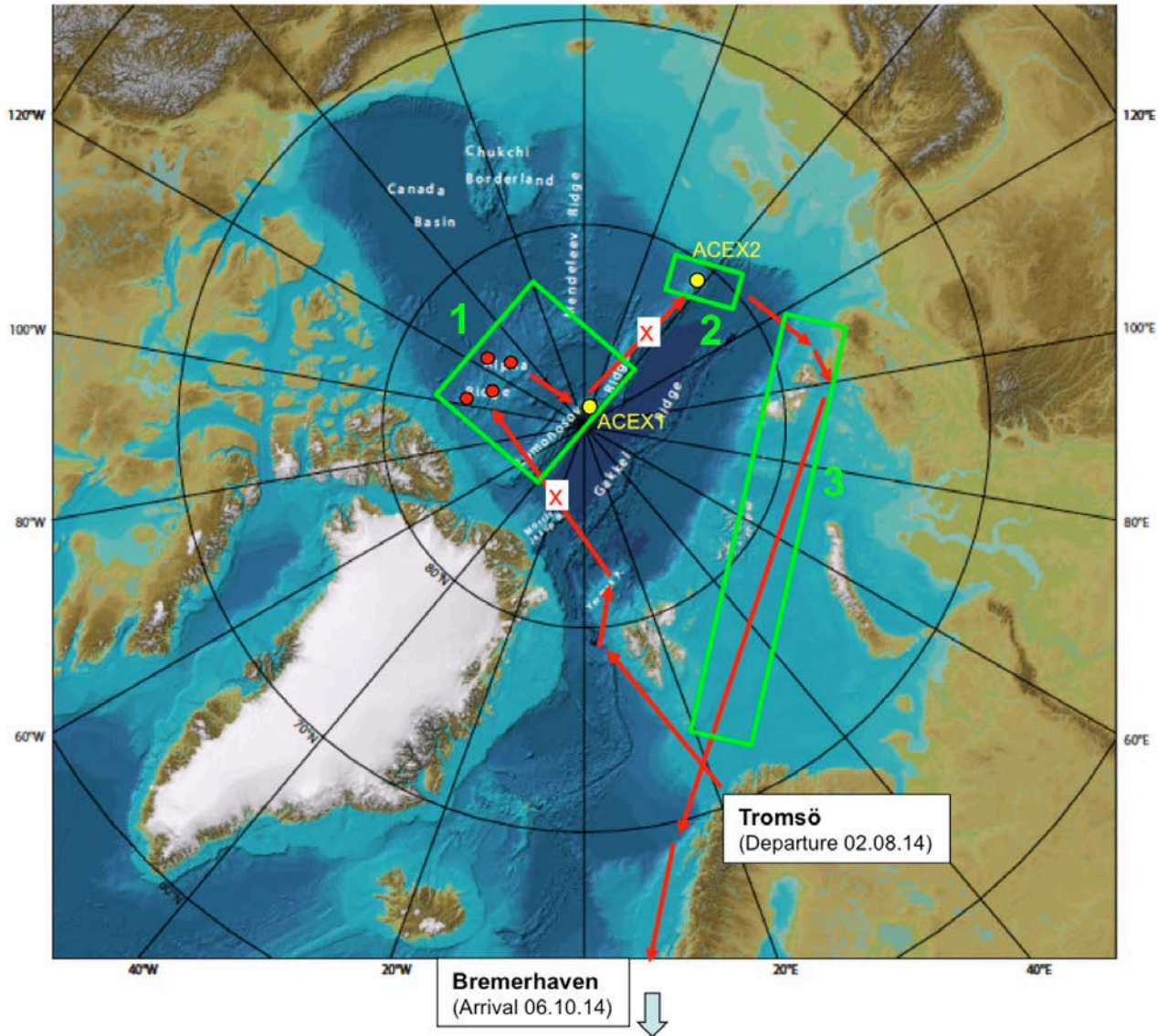


Oden & EUMETNET Deployments



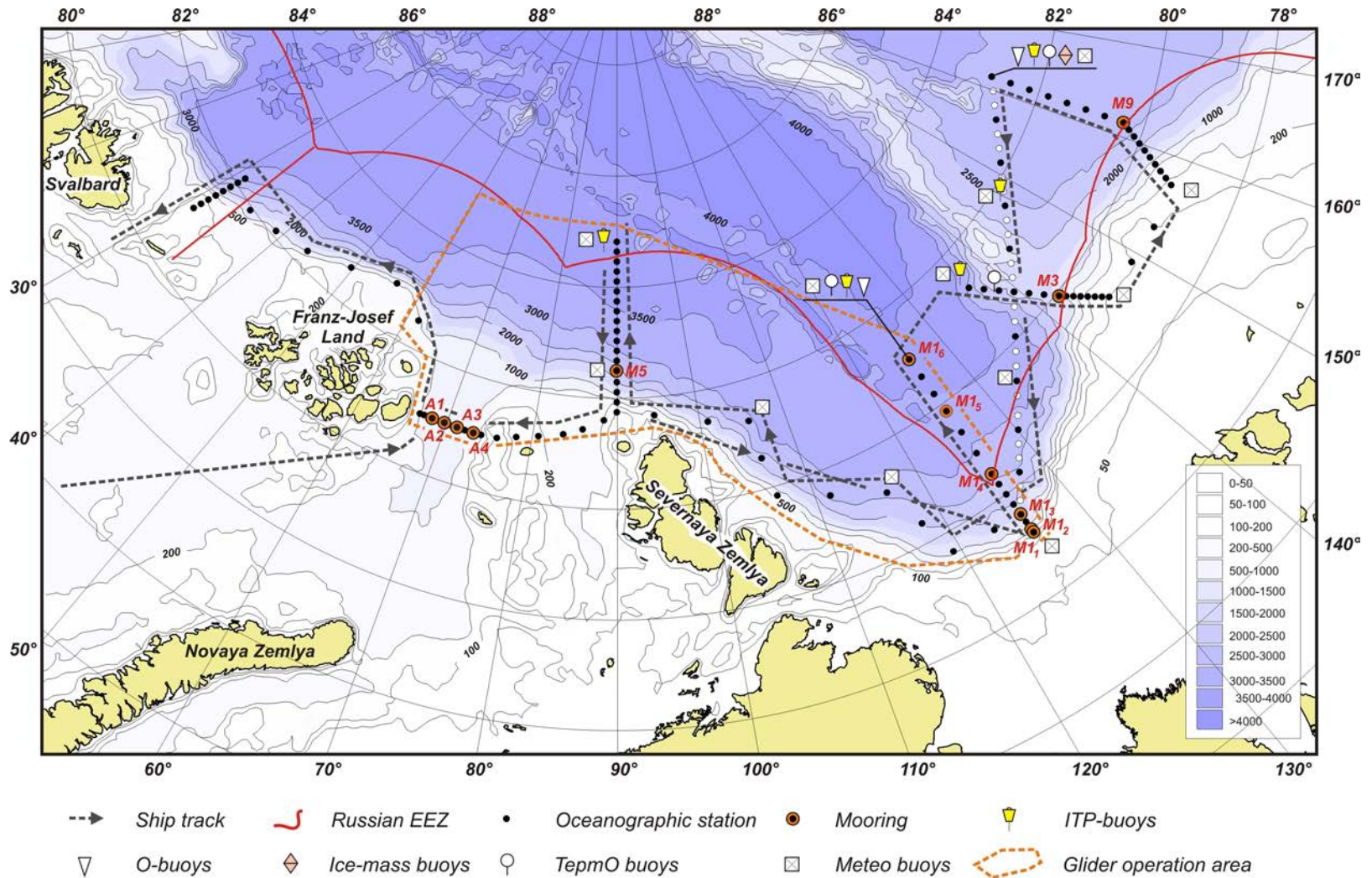
Polarstern

10 SVP-B (USIABP), 2 UpTempOs, +++

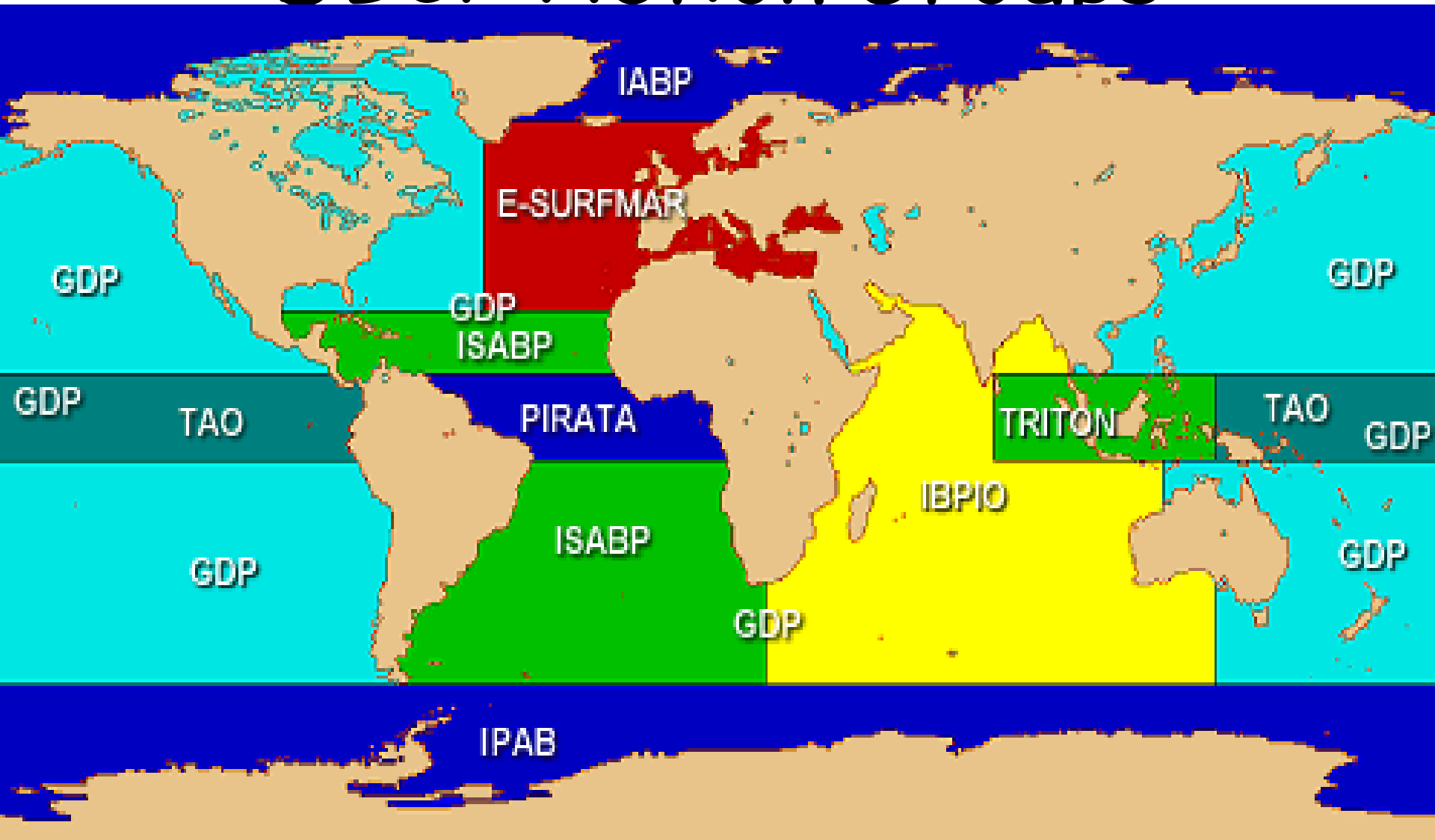


IABP Deployment Plans 2015

Nansen and Amundsen Basin Observing System (NABOS) Cruise



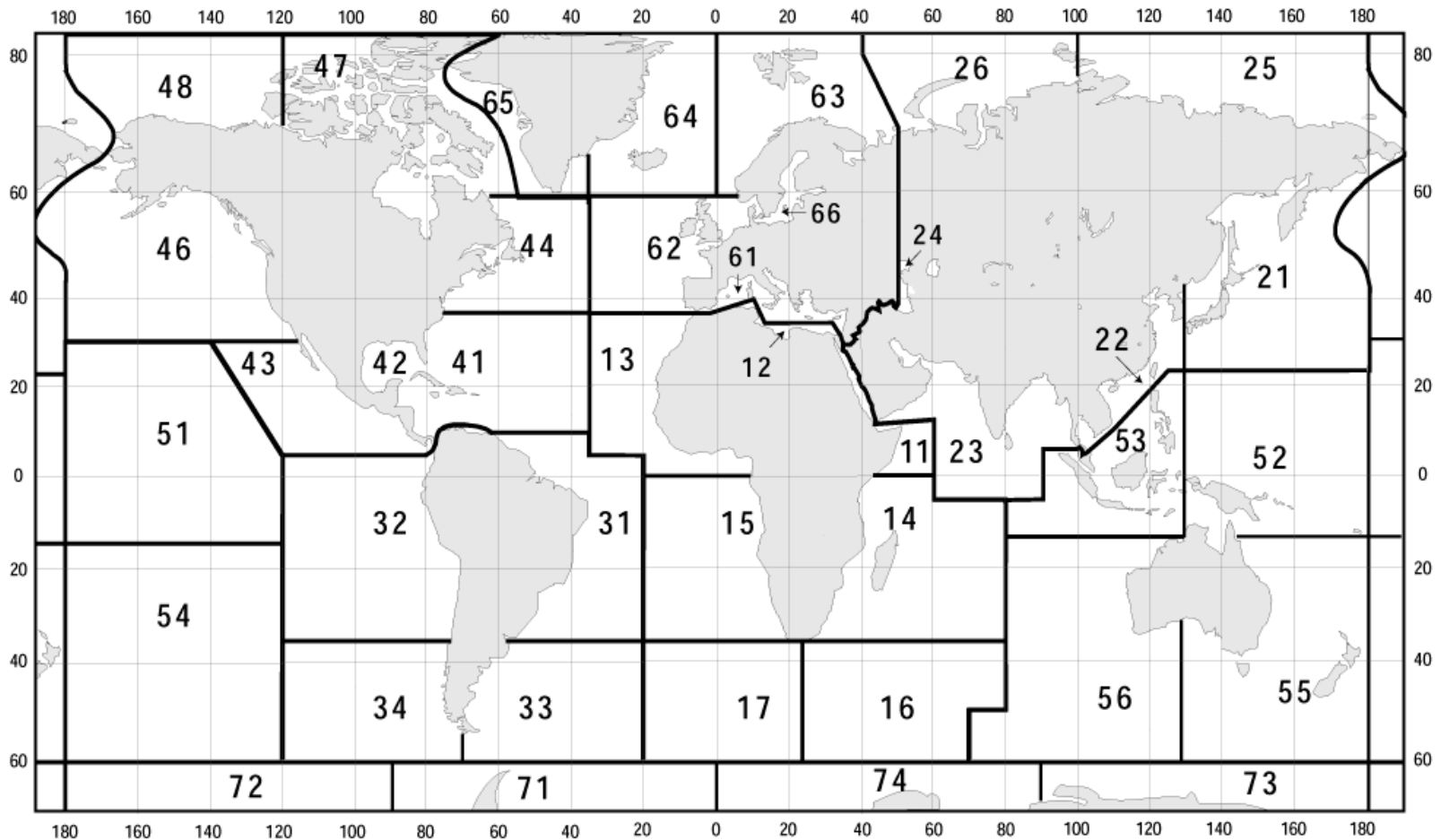
DBCP Action Groups



USIABP Summary

- BeaCON: Fast-ice lines, Ice/Floe Bergs, MY ice. 22 buoys total.
- CGC Healy: 6 AXIBs, 12 SVP-B, 1 SIMBr
- SIZRS: 6 AXIBs, 4 UpTempOs
- Russian Collaboration
 - Yamal (2 SVP-G)
 - Federov NP-25 (uncertain)
 - Federov High Arctic (2 SVP-B, 11 SVP-GPS)

WMO Areas



IABP Buoys are typically deployed in
48, 47, 25, and 26