

Updates of 2012 field results and plans for 2013 field season c. Japan

Takashi Kikuchi (JAMSTEC)
with inputs from other Japanese scientists

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PAG related observational activities in 2012

Pacific Arctic Group Meeting
09:00-18:00 on April 14, 2013
@ Polonia House
Krakow, Poland

1) Japanese Research vessel cruise

R/V Mirai Arctic cruise in September-October 2012

2) Participations in ice-breaker cruises

CCGS S. W. Laurier July cruise; *Mooring deployments*

CCGS Louis S. St.- Laurant cruises

(North-west passage and Canada Basin cruises);

Sea ice observation, hydrography & water sampling,

and mooring recoveries & deployments

IBRV Araon Arctic cruise; *Hydrography, mooring deployments, etc.*

3) Others

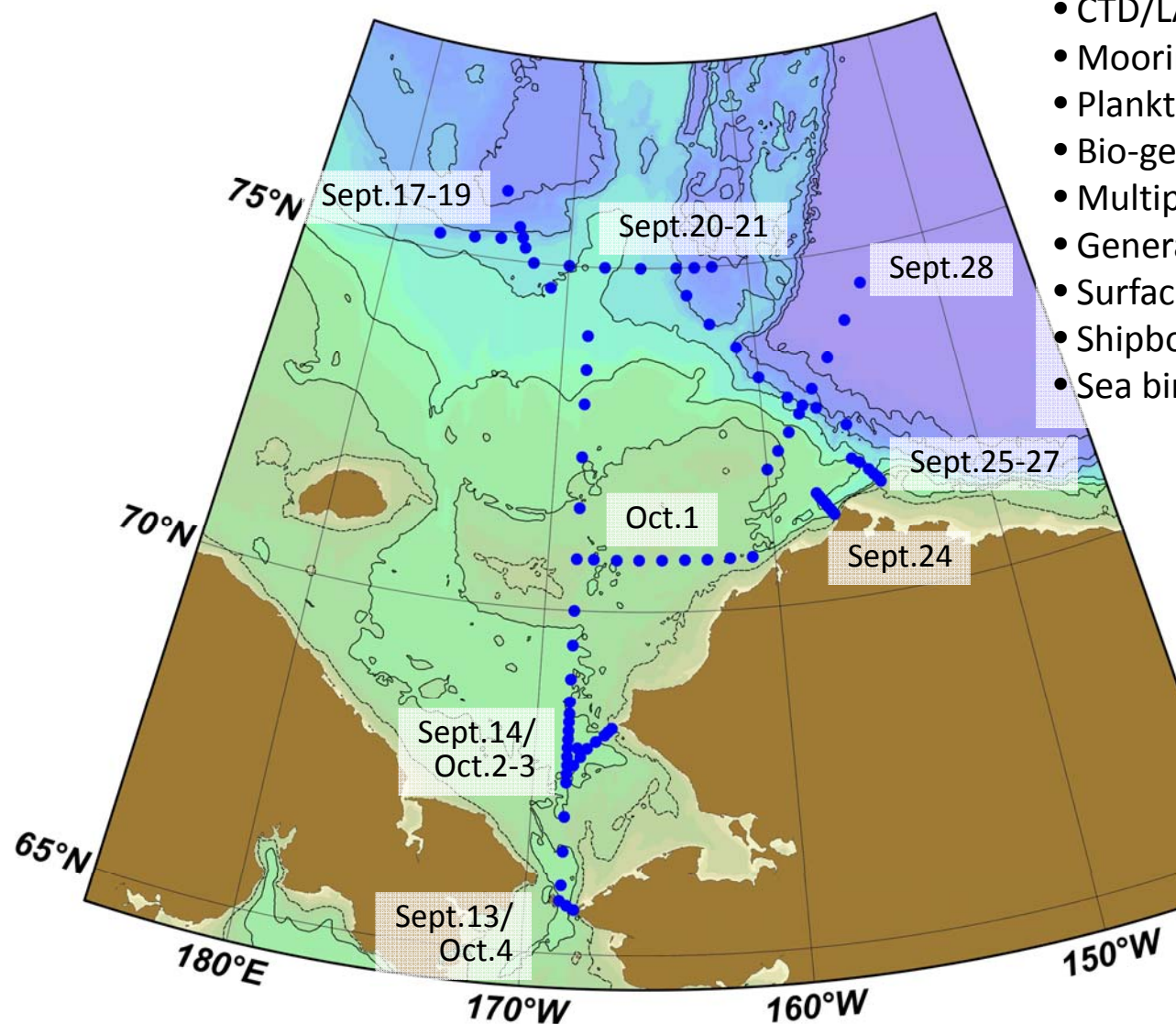
Ice thickness monitoring off Barrow, Alaska

XCTD observation in the Arctic Ocean

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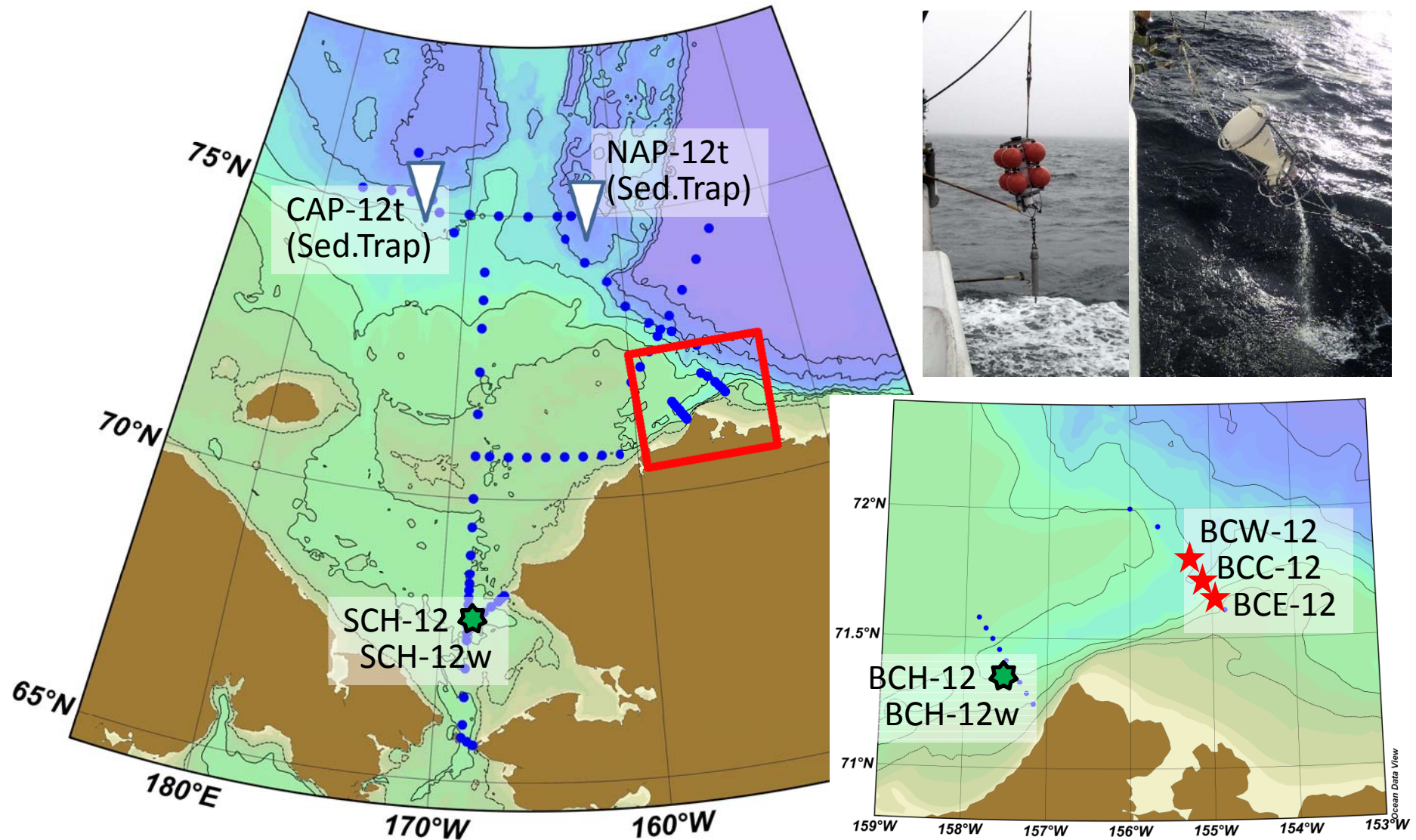
- CTD/LADCP/water sampling & XCTD
- Mooring recovery/deployment
- Plankton net sampling
- Bio-geochemical measurements
- Multiple corer sampling
- General meteorological monitoring
- Surface water sampling/monitoring
- Shipboard ADCP monitoring
- Sea bird and marine mammal survey



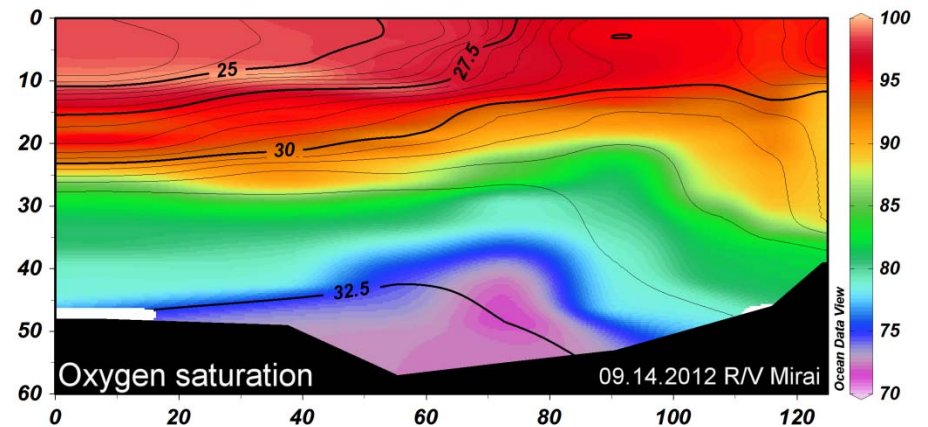
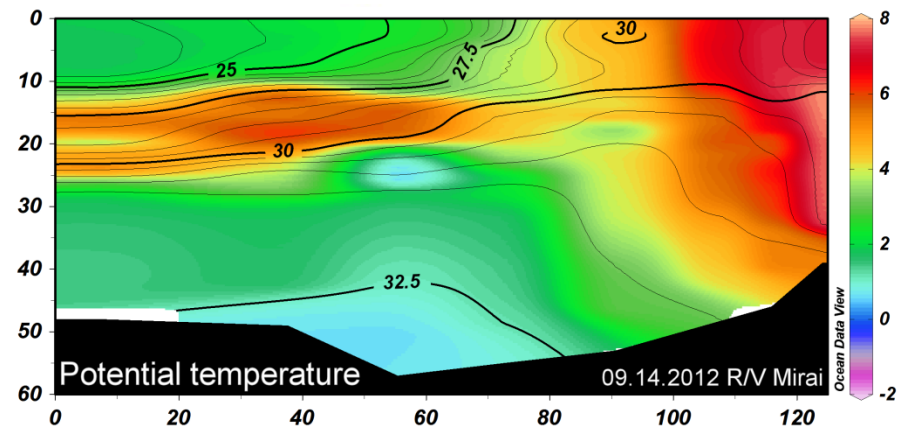
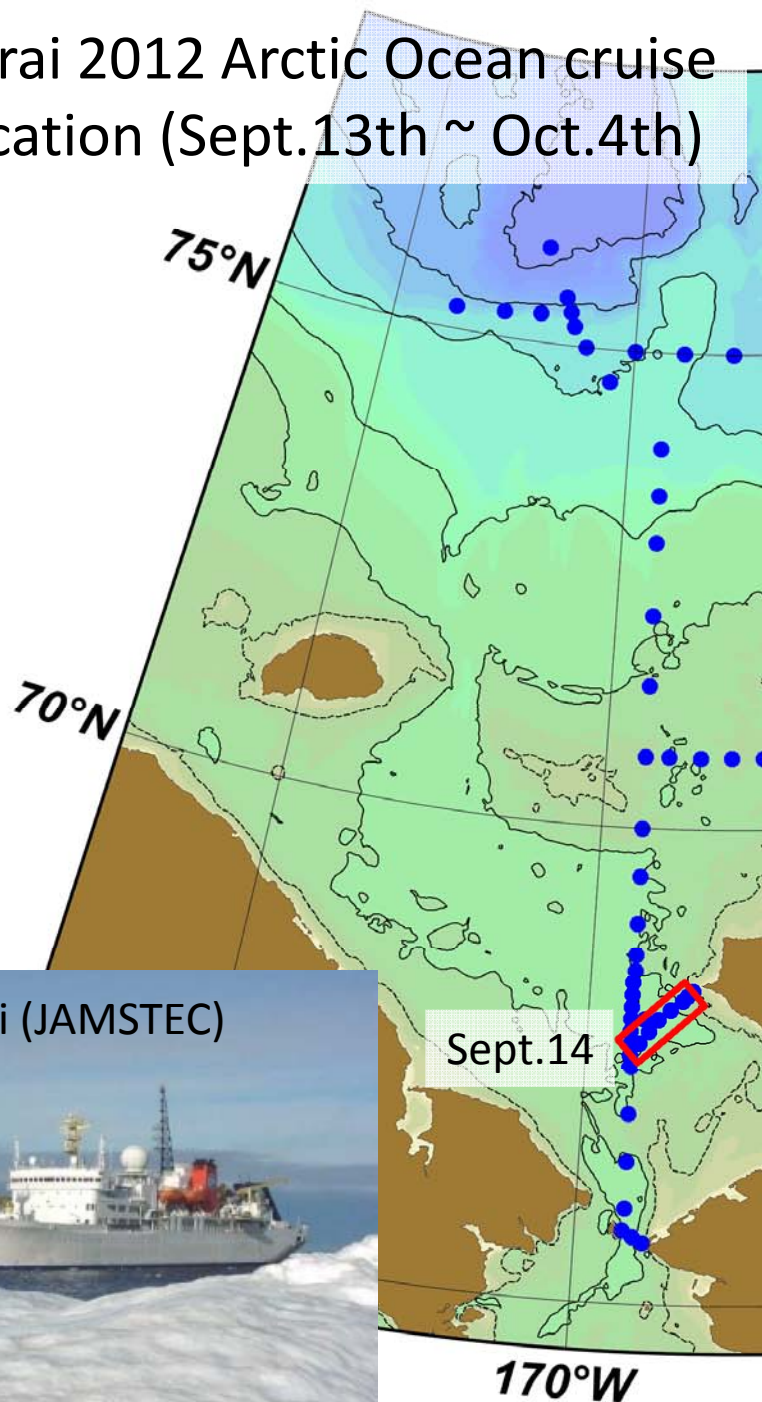
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R/V Mirai Arctic cruise in September-October 2012



R/V Mirai 2012 Arctic Ocean cruise CTD location (Sept.13th ~ Oct.4th)



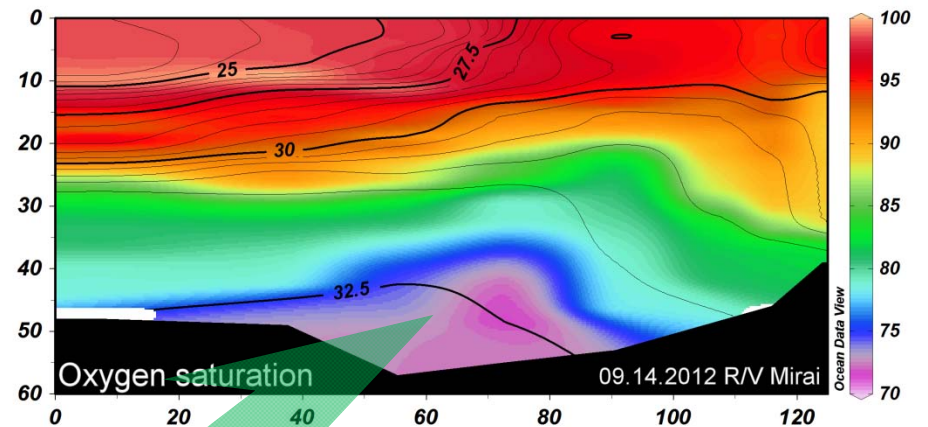
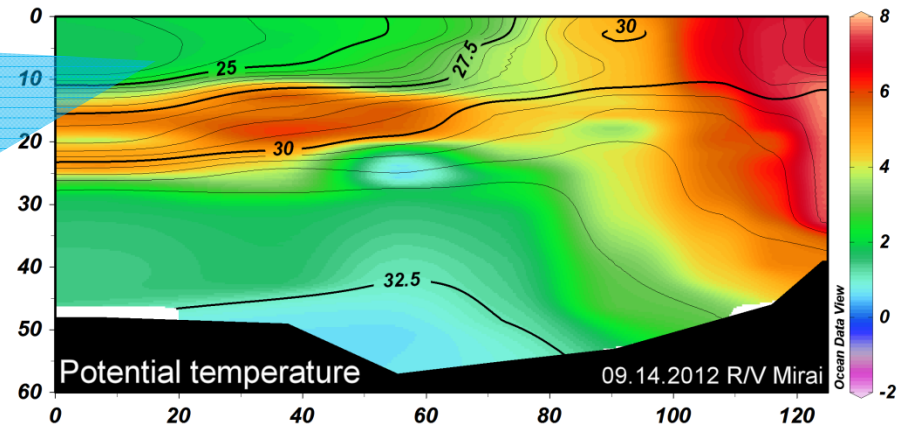
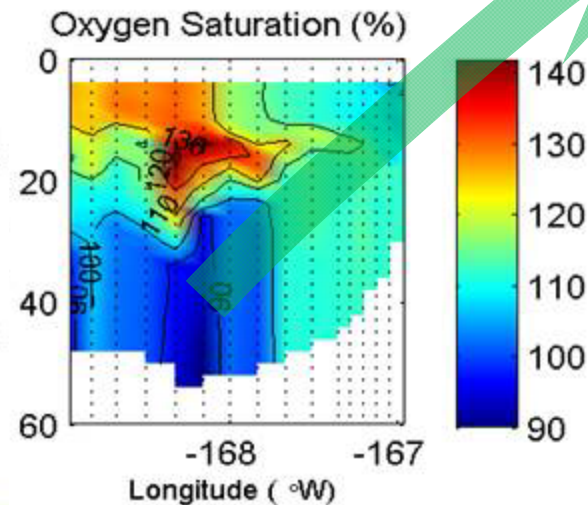
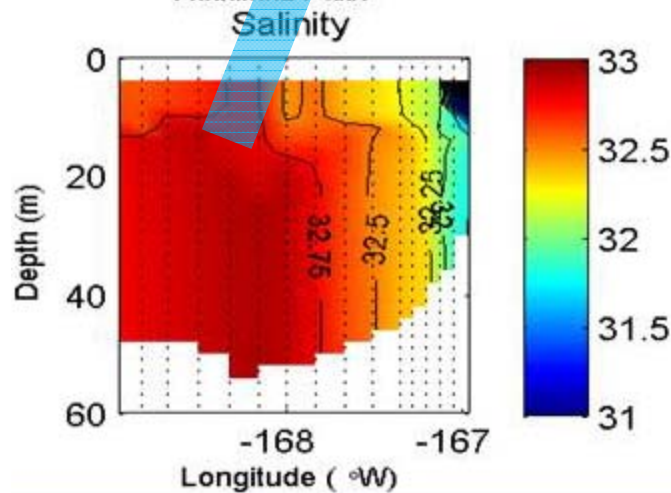
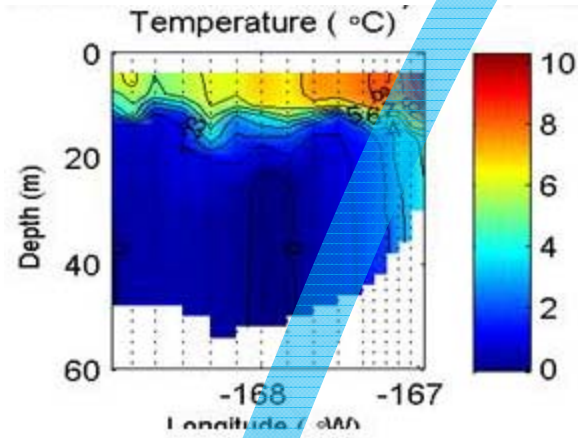
R/V Mirai 2012 Arctic Ocean cruise CTD location (Sept.13th ~ Oct.4th)

RUSALCA - BERING STRAIT AON 2012 MOORING CRUISE REPORT
Russian Research Vessel Professor Khromov (also called Spirit of Enderby)
Nome, 10th July 2012 - Nome, 20th July 2012
Rebecca Woodgate, University of Washington (UW), woodgate@apl.washington.edu
and the RUSALCA 2012 Science Team
Funding from NOAA RUSALCA Program and NSF Arctic Observing Network Program ARC-0855748
and NSF ARC - 1023264 (OSU)



(Photo by Aleksey Ostrovskiy)

Freshening

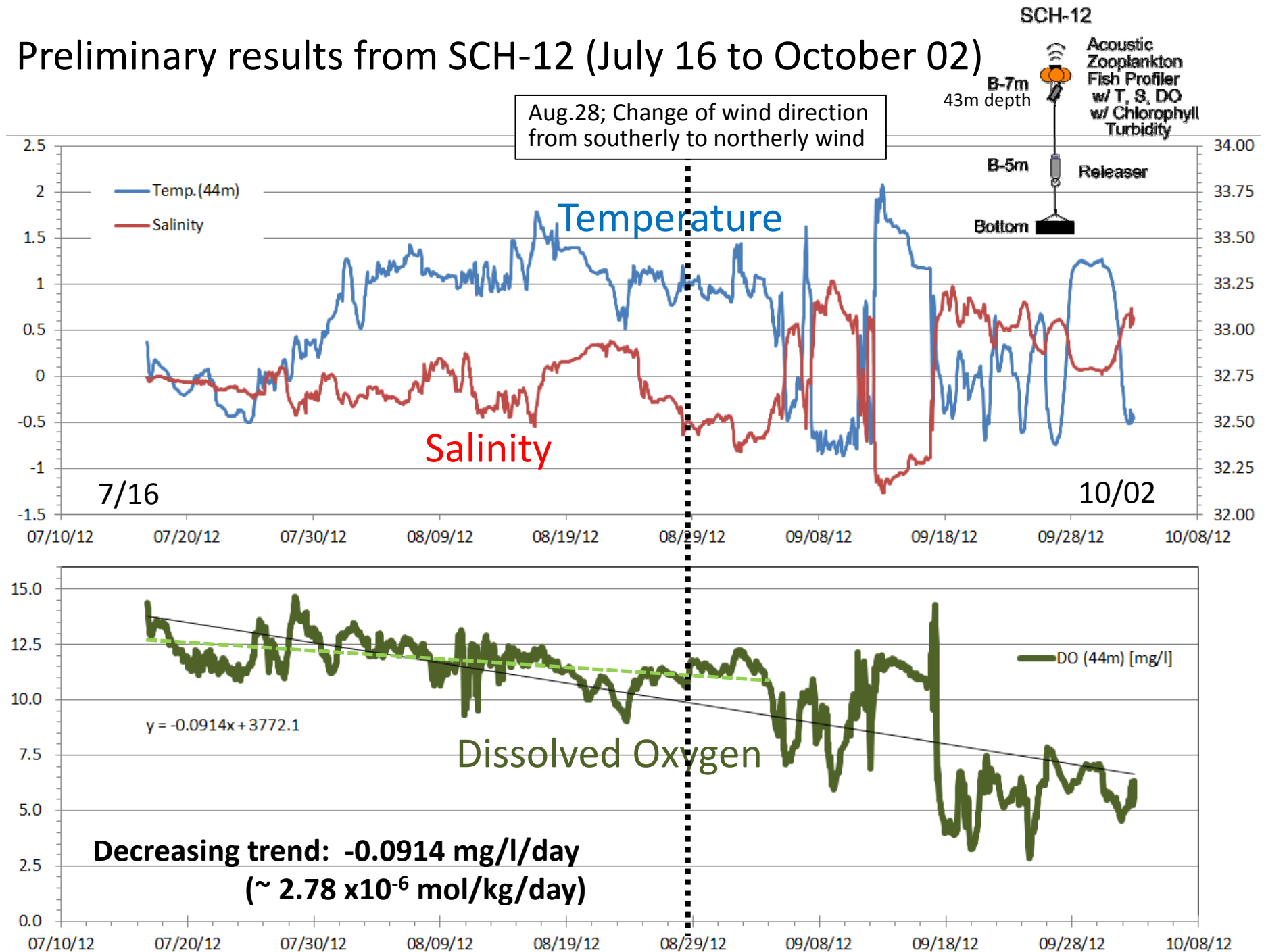


Decreasing

R/V Mirai (JAMSTEC)



Preliminary results from SCH-12 (July 16 to October 02)

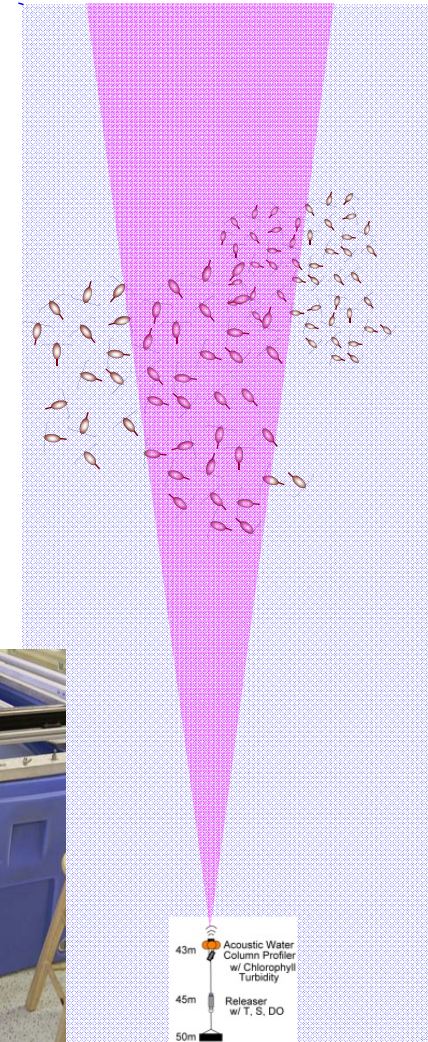
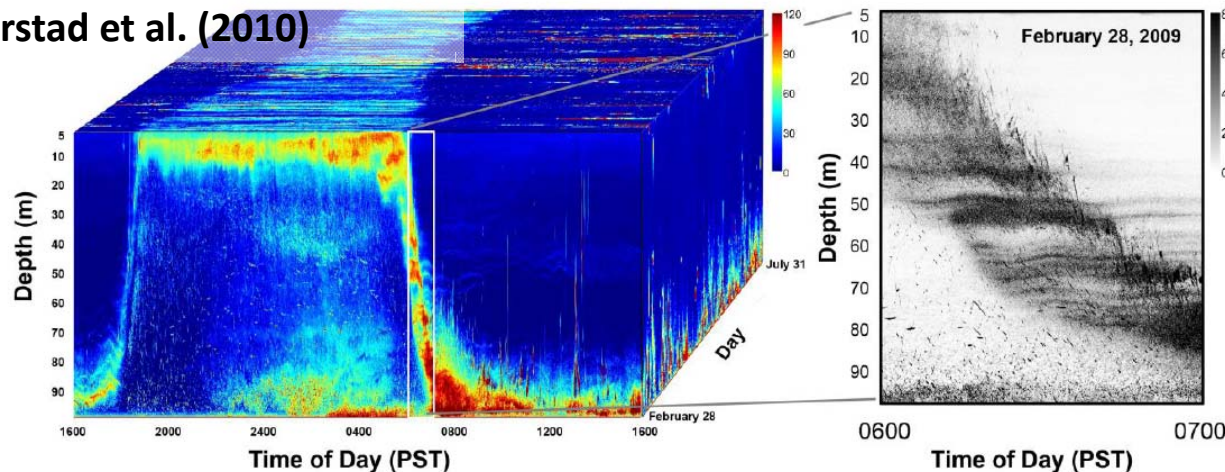


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Multi-frequency Acoustic Zooplankton Fish Profiler (AZFP)







Borstad et al. (2010)



which acoustic profiles
the series extending in
and 0700 PST on



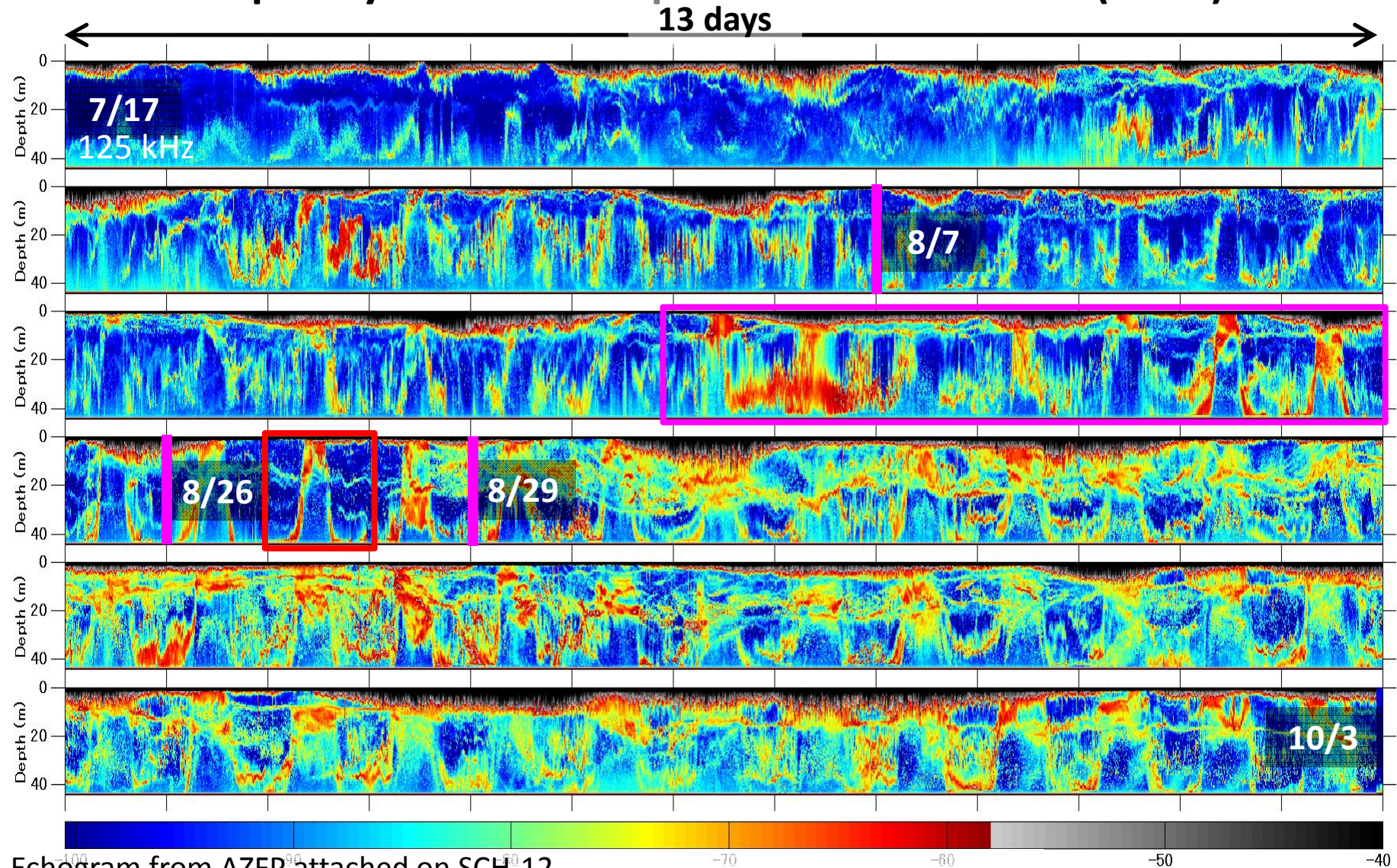
ASL Environmental
Sciences

Instrument Frequency (kHz)	Approximate Minimum Particle Size Detected (mm)		Representative Organisms	Estimated effective Range (m)
775	2		small copepods, nauplii	50
460	6		mysids, larval euphausiids	100
200	16		larval fish, euphausiids	200
125	20		adult euphausiids, mysids, amphipods	250
70	30		small fish	Est 275
38	75		larger fish	Est 325

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Multi-frequency Acoustic Zooplankton Fish Profiler (AZFP)



Echogram from AZFP attached on SCH-12
(Courtesy from Dr. Amakasu (Tokyo University of Marine Science and Technology))

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3) Others

Ice thickness monitoring off Barrow, Alaska

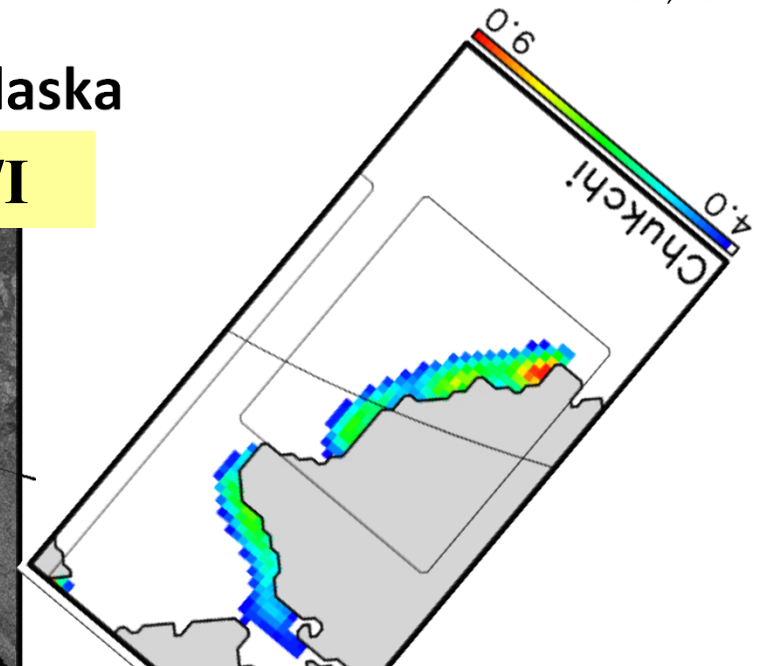
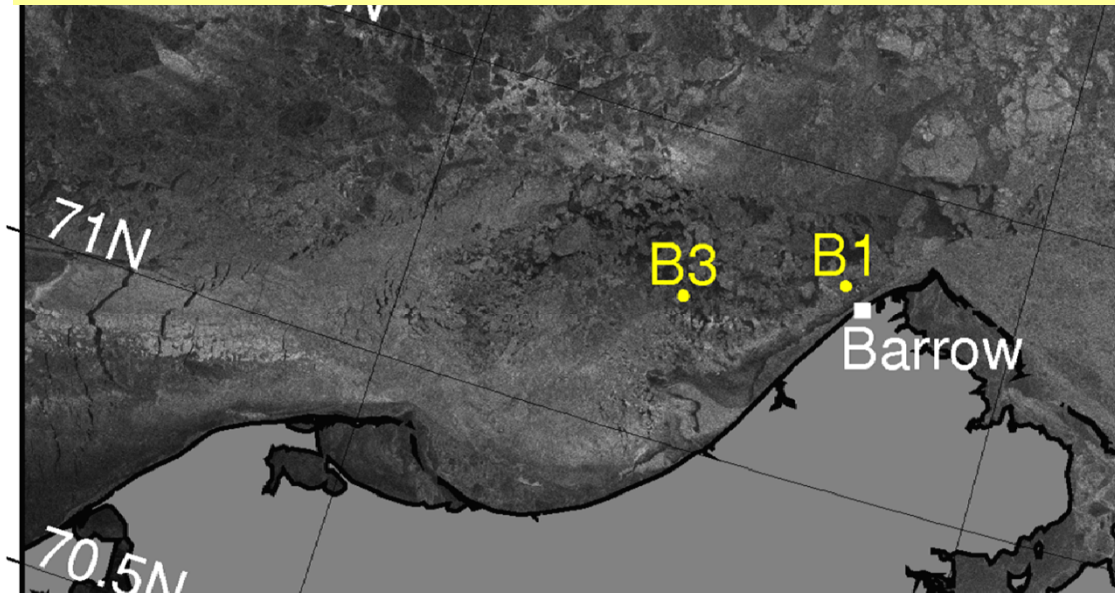
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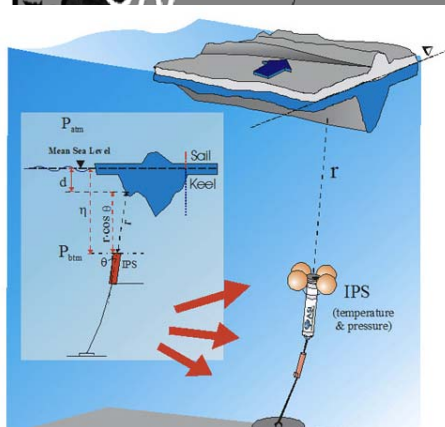
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Ice thickness monitoring off Barrow, Alaska

Mapping of sea ice production by SSM/I



Tamura & Ohshima, 2011, JGR



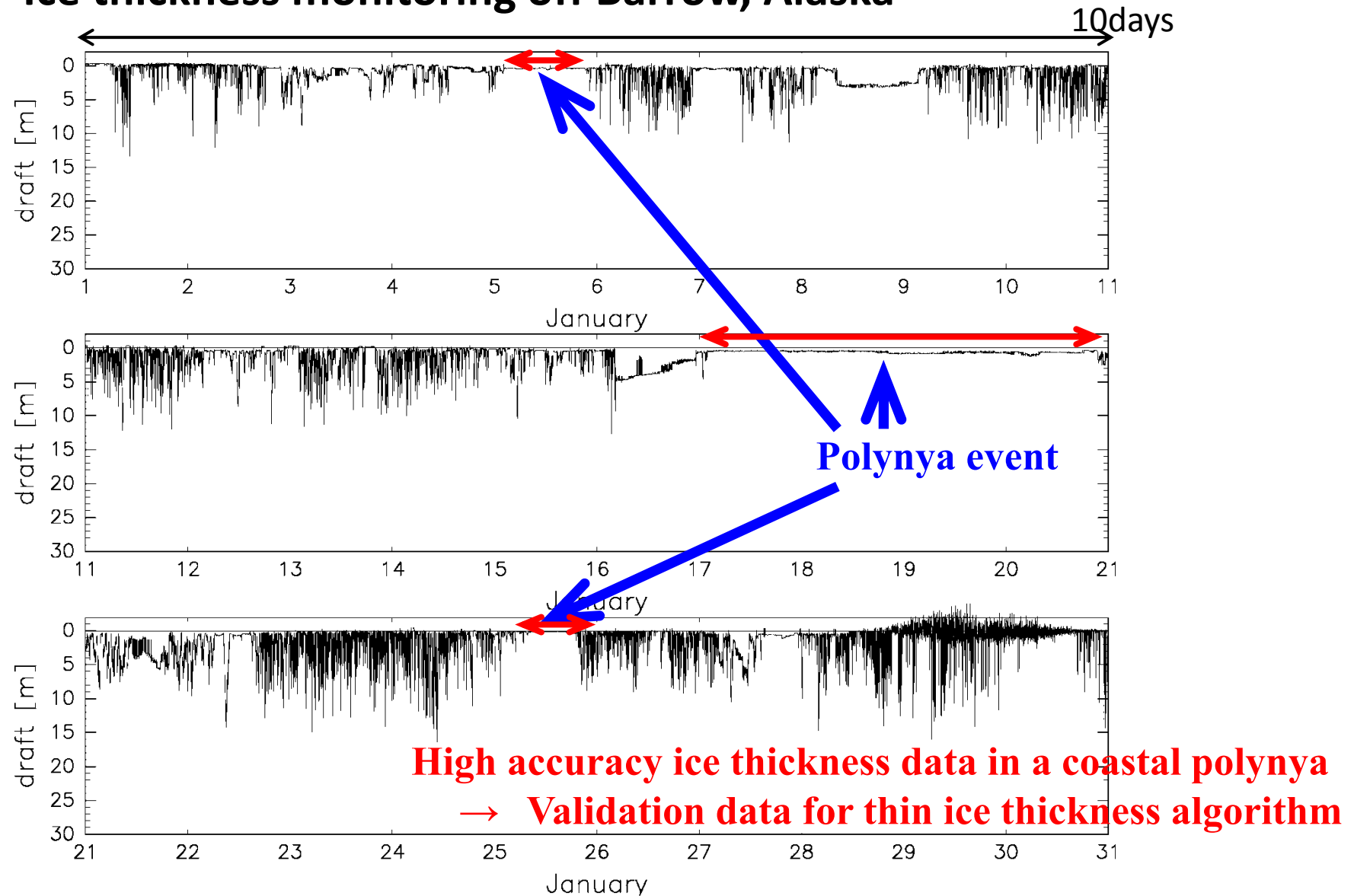
Courtesy from Dr. Ohshima (Ints.Low Tem. Sci., Hokkaido University)



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T/S Oshoro-maru cruise in June-July 2013



Goal;

Using data from cruises in 1991, 1992, 2007, 2008 and this year,

- 1) To reveal relationship between biology at higher trophic levels and oceanographic condition (sea ice, physio-chemical, primary and secondary production).
- 2) To construct habitat model of biology under current condition to consider future reaction of fish and mammals.



-
- CTD/CMS (Normal and Clean Niskin)
 - Air sampling (VOC gas)
 - Sea ice sampling and incubation
 - Optics
 - ADCP
 - Plankton net
 - Grab type bottom sampler
 - Bottom corer
 - Dredge
 - Bottom/midwater trawl
 - ROV
 - Eye observation
 - Tagging to whale
 - Fish finder

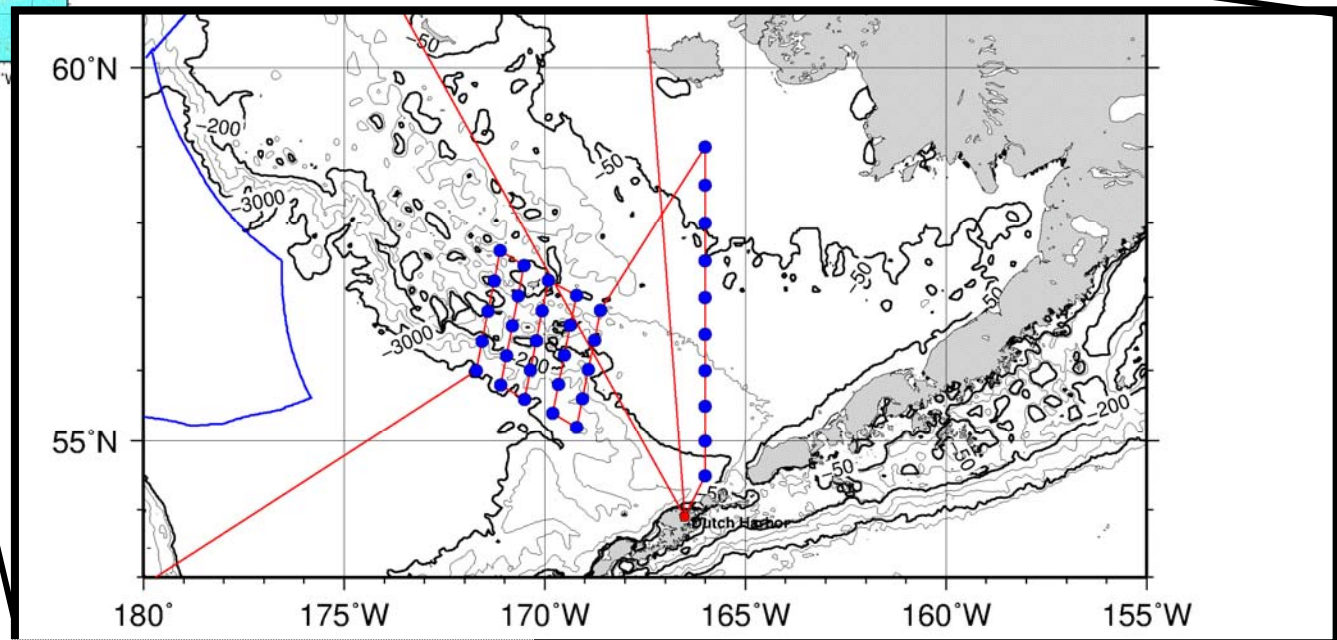
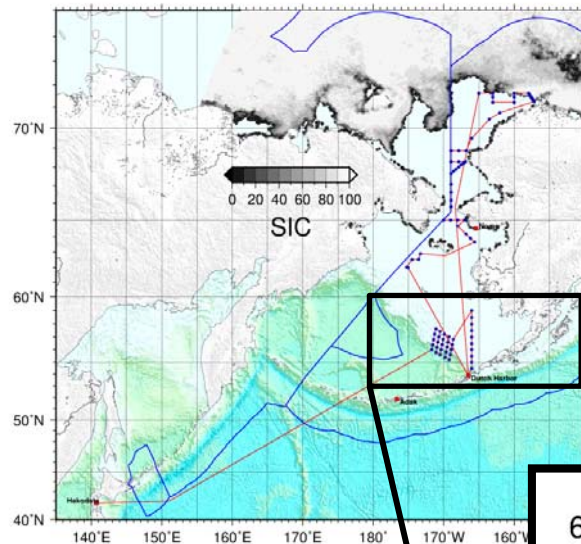
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T/S Oshoro-maru cruise in June-July 2013

Leg-1

14-27 June
Hakodate - Dutch Harbor

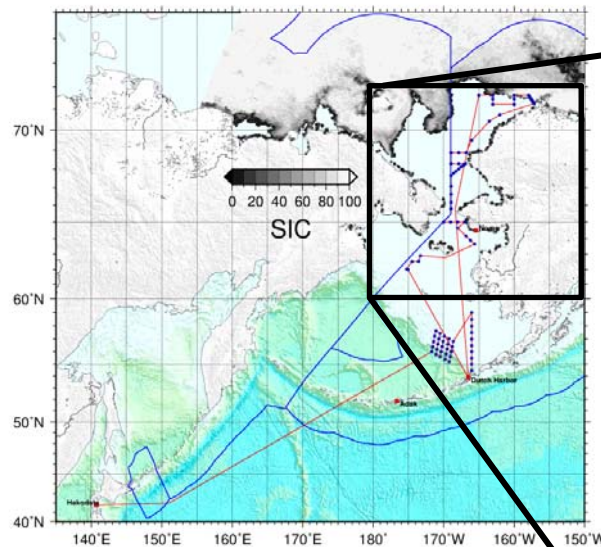


Courtesy from Dr. Hirawake (Fac. Fisheries Sci., Hokkaido University)

PAG related observational activities in 2013

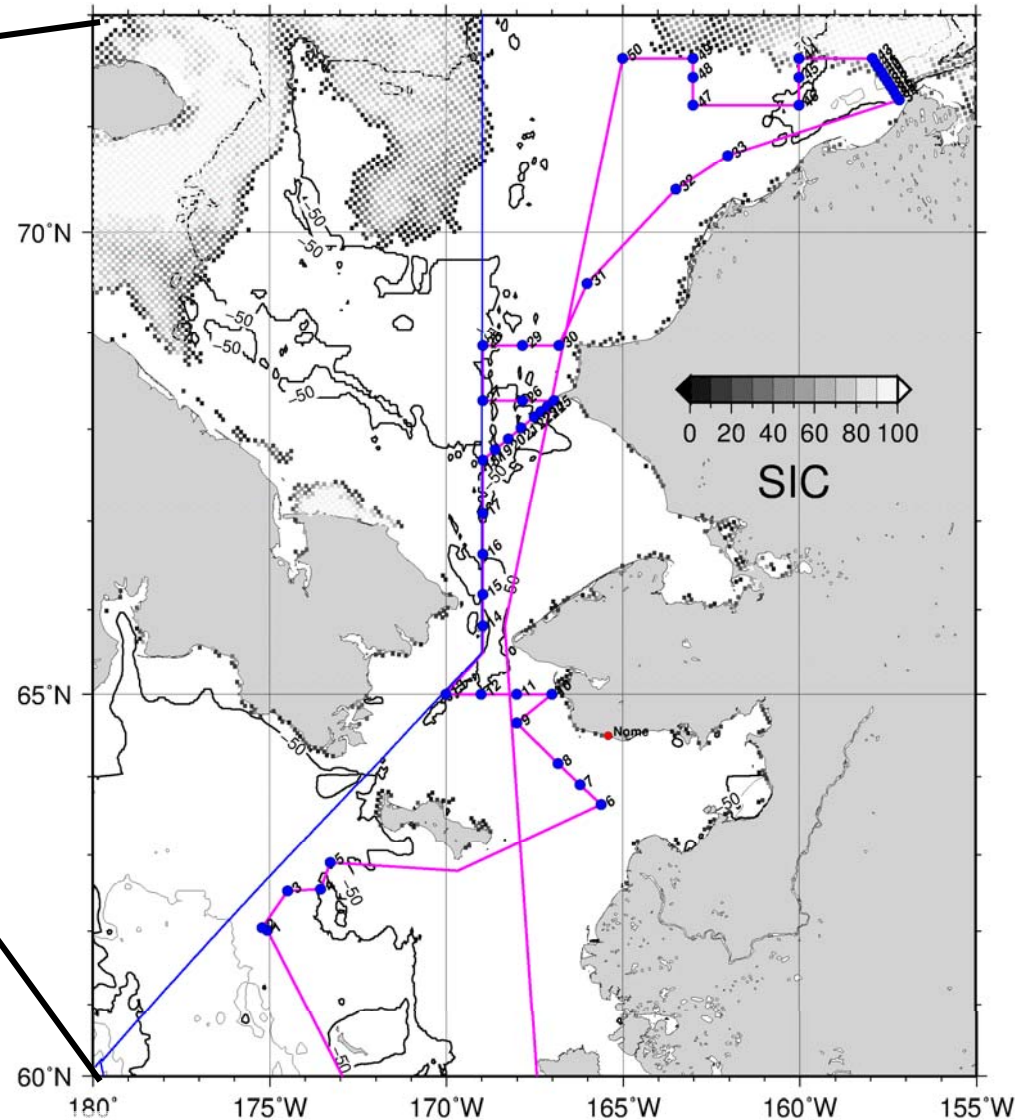
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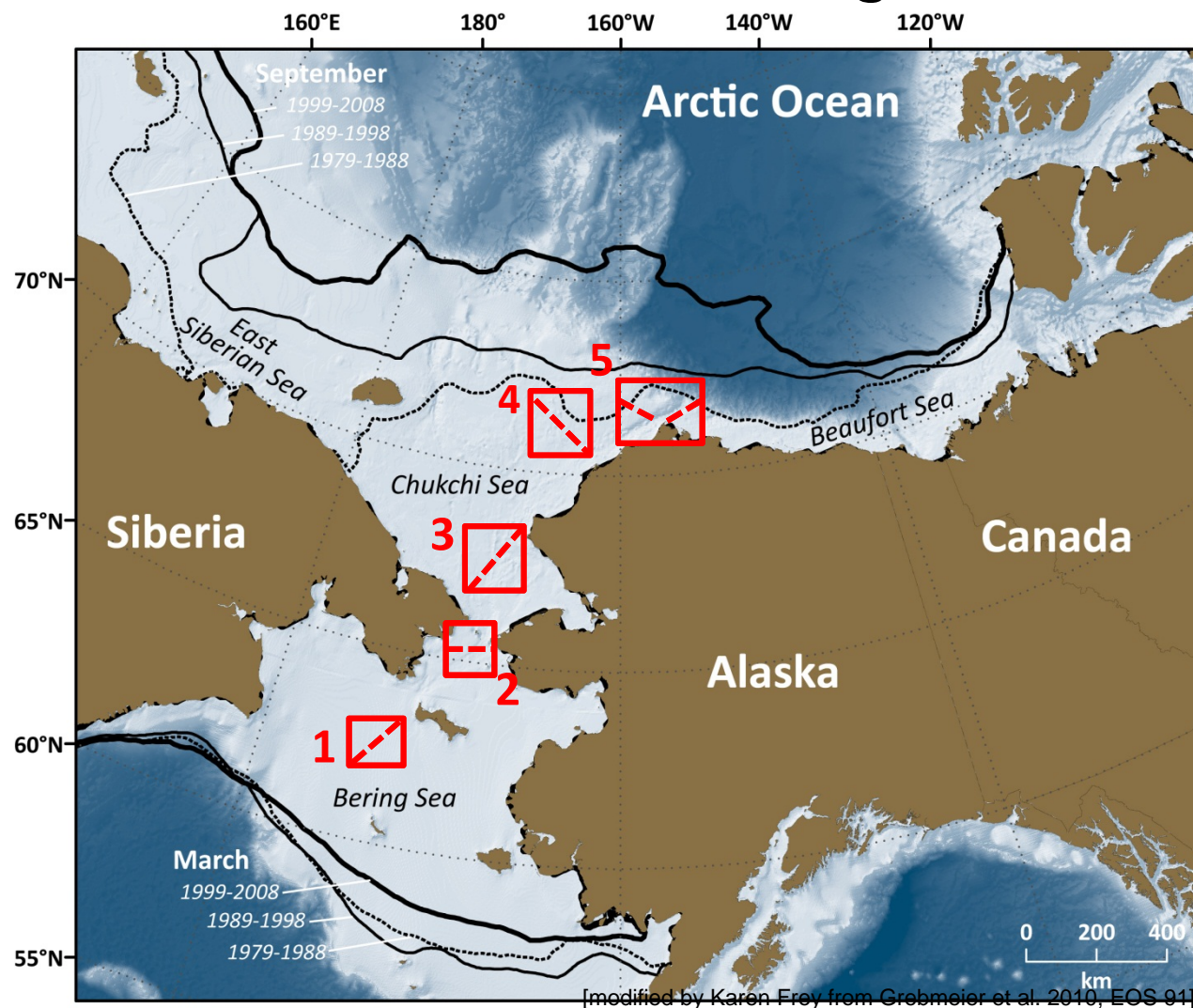
Leg-2

1-23 July
Dutch Harbor -
Dutch Harbor



Courtesy from Dr. Hirawake (Fac. Fisheries Sci., Hokkaido University)

Linking Physics to Biology: the Distributed Biological Observatory (DBO)



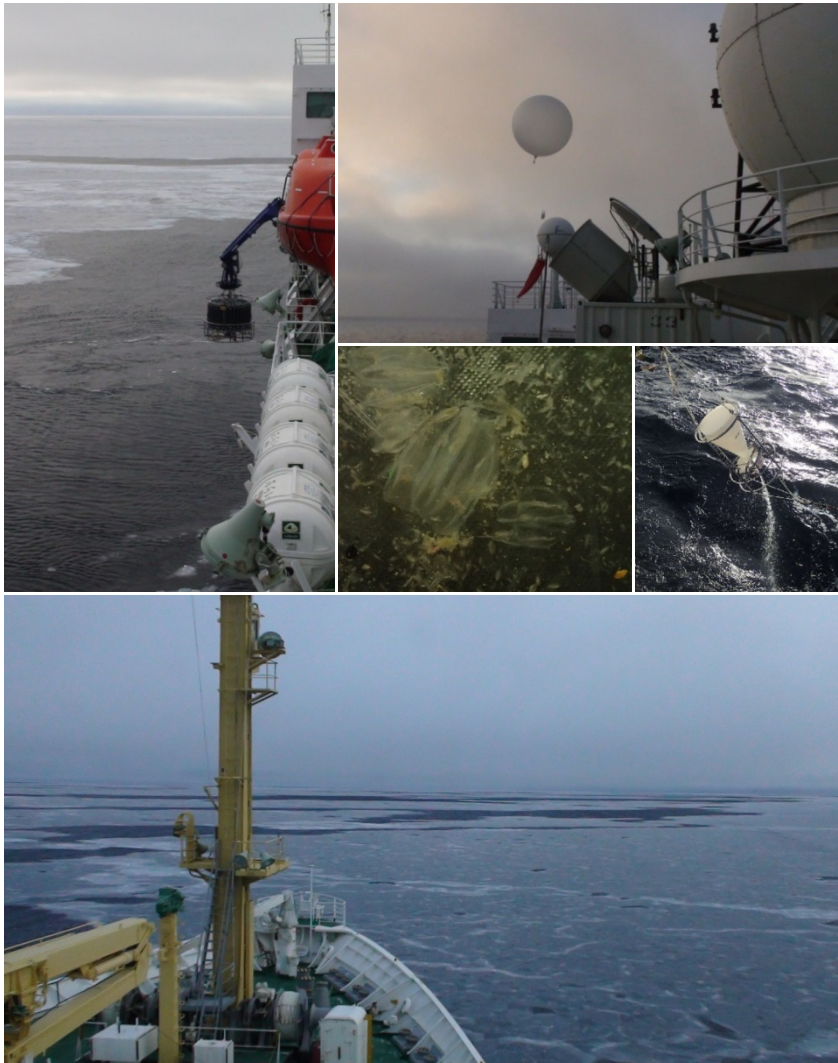
- DBO sites (red boxes) are regional “hotspot” transect lines and stations located along a latitudinal gradient
- DBO sites are considered to exhibit high productivity, biodiversity, and overall rates of change
- DBO sites will serve as a change detection array for the identification and consistent monitoring of biophysical responses
- Sites occupied by national and international entities with shared data plan



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R/V Mirai Arctic cruise in September-October 2013



Objectives;

- Understanding the impact of atmospheric events on the ocean stratification and ecosystem in the sea ice reduction region of the Arctic Ocean
- Leading to a better understanding of the uncertainty of the Arctic atmospheric circulation.

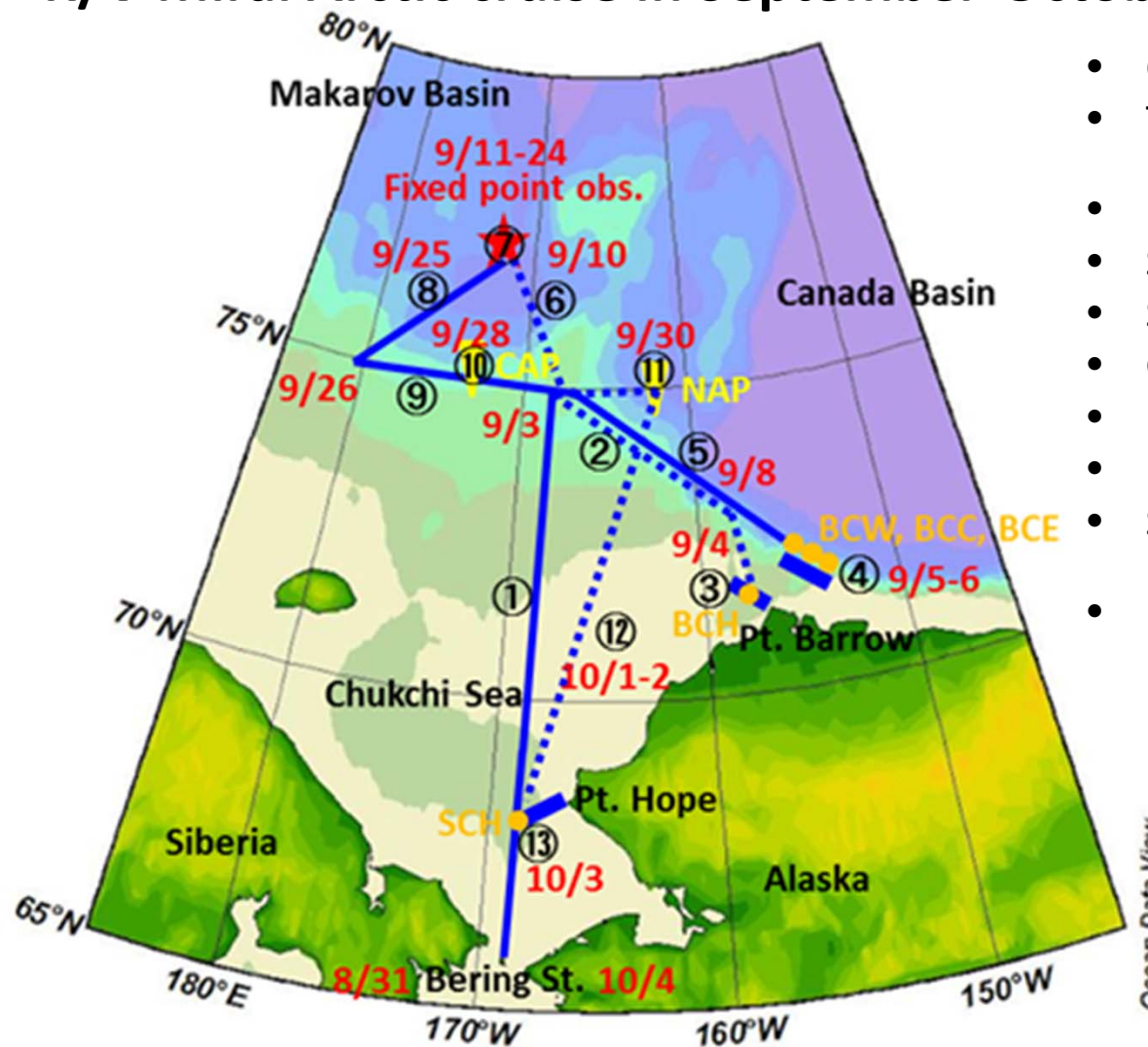
→ Fixed point observation for 2 weeks

- Estimating the changes in biological production caused by the enhancement of ocean circulation due to the sea ice loss
- Monitoring the Arctic ecosystem
- Capturing the Arctic ocean environmental changes with the seasonal prevalence of sea ice (Joint cruise with T/S Oshoro-maru and others)

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R/V Mirai Arctic cruise in September-October 2013



- CTD/XCTD and water samplings
- Turbulence microstructure measurement
- Plankton net samplings
- Ship-board ADCP ocean current and
- Surface water monitoring
- General meteorological monitoring
- Radiosonde measurement,
- Doppler radar observation,
- Sea bottom topography, gravity and magnetic field measurements
- Mooring recoveries & deployments



Planned cruise tracks and estimated date of the R/V Mirai cruise in 2013.

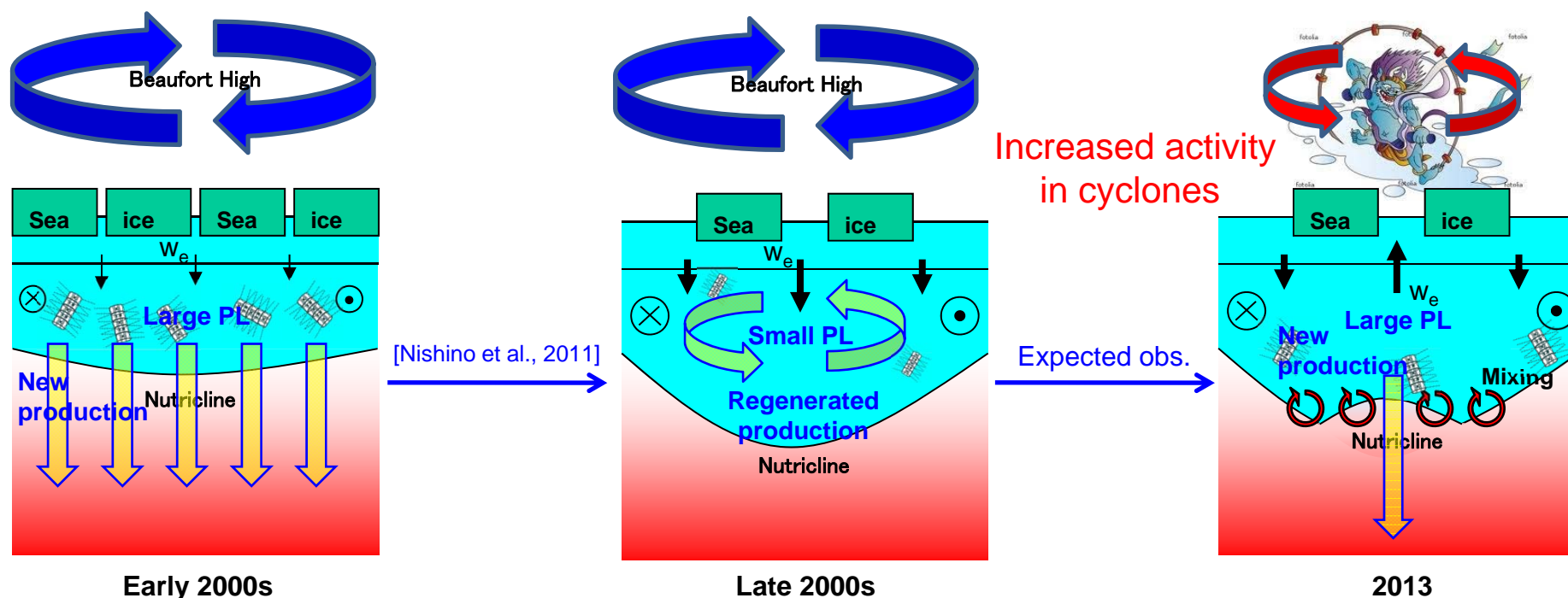
Courtesy from Dr. Nishino (JAMSTEC)

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R/V Mirai Arctic cruise in September-October 2013

Impact of atmospheric events on
the ocean stratification and ecosystem in the sea ice reduction region



- In the Canada Basin (within the Beaufort Gyre), deepening of nutricline may result in the decrease of export production.
- Recent increased activity in cyclones may enhance the vertical mixing, resulting in the increases of nutrient supply to the surface layer and export production.

Courtesy from Dr. Nishino (JAMSTEC)

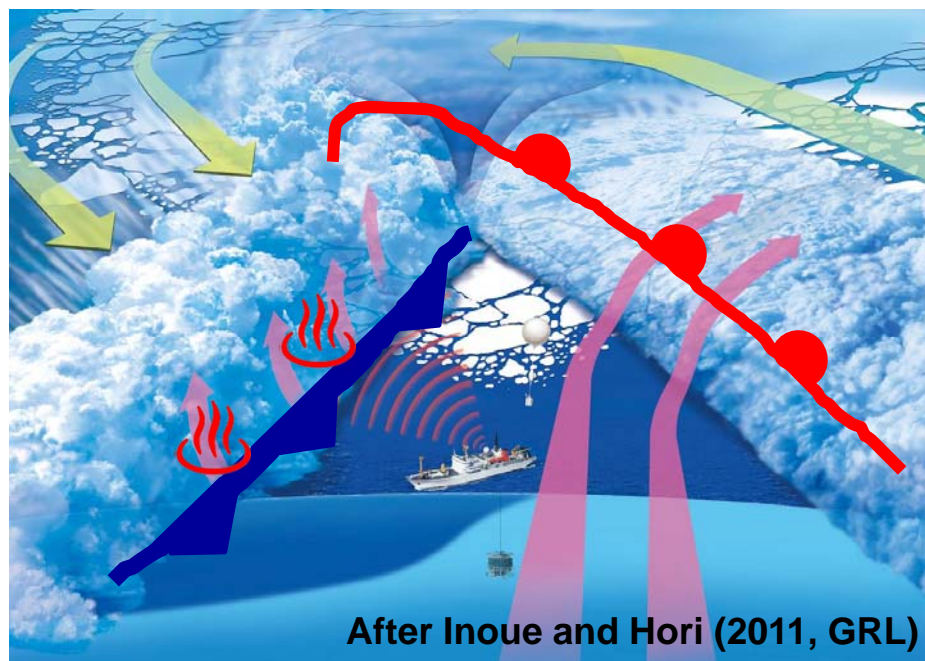
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Leading to a better understanding of
the uncertainty of the Arctic atmospheric circulation

Schematic of meteorological observation



Heat flux from the ocean to the atmosphere behind
the cold front could produce polar cyclones

Courtesy from Dr. Inoue (NIPR/JAMSTEC)

Intensive observation of radiosonde under international collaborations

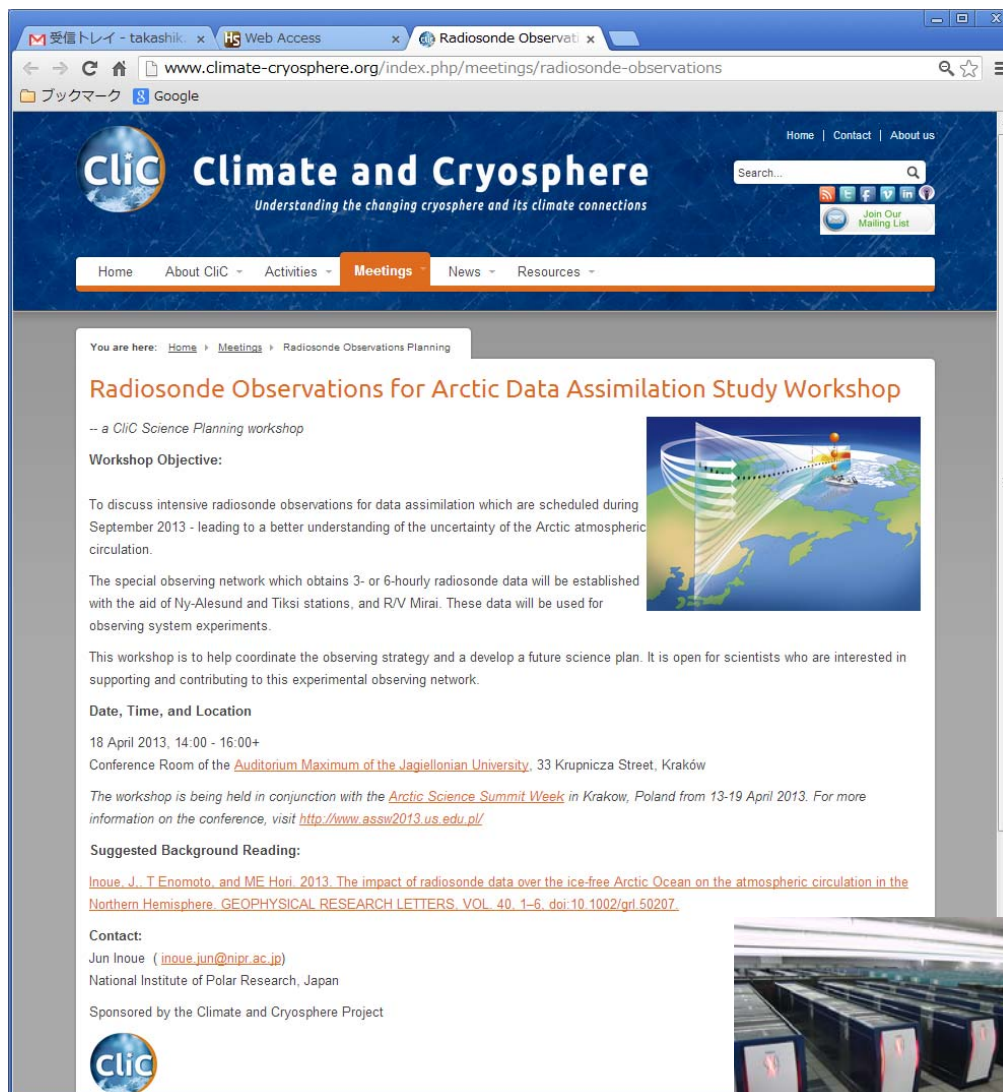


Assimilation of radiosonde data from polar
regions could improve the reconstruction
of atmospheric circulation in the mid-
latitudes.

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The screenshot shows the CliC website with the following content:

- Header:** CliC Climate and Cryosphere. Understanding the changing cryosphere and its climate connections.
- Navigation:** Home, About CliC, Activities, Meetings, News, Resources.
- Breadcrumbs:** You are here: Home > Meetings > Radiosonde Observations Planning
- Title:** Radiosonde Observations for Arctic Data Assimilation Study Workshop
- Subtitle:** -- a CliC Science Planning workshop
- Workshop Objective:**

To discuss intensive radiosonde observations for data assimilation which are scheduled during September 2013 - leading to a better understanding of the uncertainty of the Arctic atmospheric circulation.

The special observing network which obtains 3- or 6-hourly radiosonde data will be established with the aid of Ny-Alesund and Tiksi stations, and R/V Mirai. These data will be used for observing system experiments.

This workshop is to help coordinate the observing strategy and develop a future science plan. It is open for scientists who are interested in supporting and contributing to this experimental observing network.
- Date, Time, and Location:**

18 April 2013, 14:00 - 16:00+

Conference Room of the Auditorium Maximumum of the Jagiellonian University, 33 Krupnicza Street, Kraków

The workshop is being held in conjunction with the Arctic Science Summit Week in Krakow, Poland from 13-19 April 2013. For more information on the conference, visit <http://www.assw2013.us.edu.pl/>
- Suggested Background Reading:**

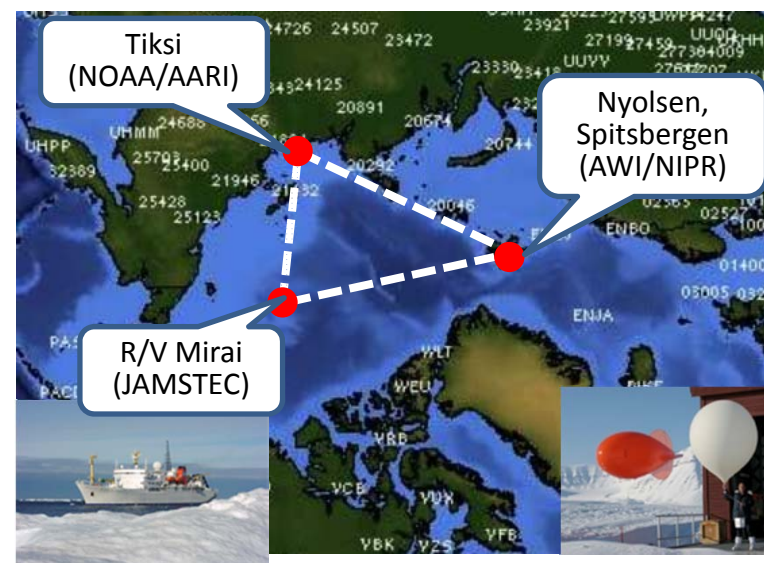
Inoue, J., T Enomoto, and ME Hori. 2013. The impact of radiosonde data over the ice-free Arctic Ocean on the atmospheric circulation in the Northern Hemisphere. GEOPHYSICAL RESEARCH LETTERS, VOL. 40, 1-6. doi:10.1002/grl.50207.
- Contact:**

Jun Inoue (inoue.jun@nipr.ac.jp)
National Institute of Polar Research, Japan

Sponsored by the Climate and Cryosphere Project
- Footer:** CliC logo

WS on intensified met. observation
led by Dr. J. Inoue (NIPR/JAMSTEC)

18 April 2013, 1400~1600



Courtesy from Dr. Inoue (NIPR/JAMSTEC)

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