Mooring observation at DBO-3 & 5

Two moorings (BCH & SCH) will be deployed close to the DBO repeat observation lines in the Barrow canyon and the southern Chukchi Sea, respectively.

BCH (plan): *71.2N??, 159.0W??*, ~100m depth

SCH (plan): *68.0N??, 168.0W??*, ~50m depth

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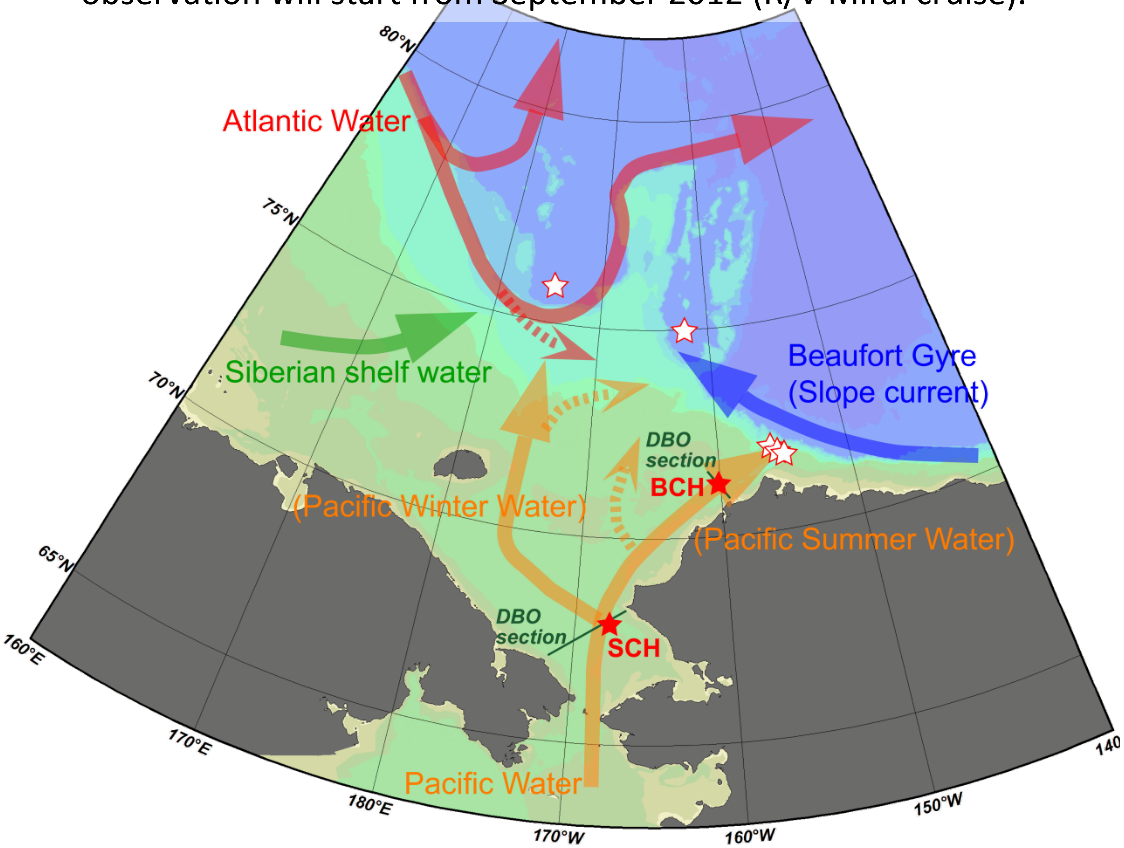
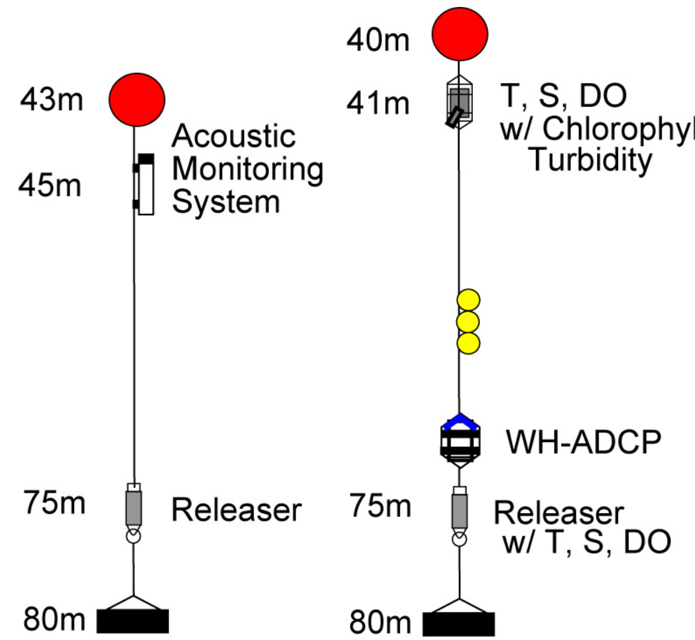
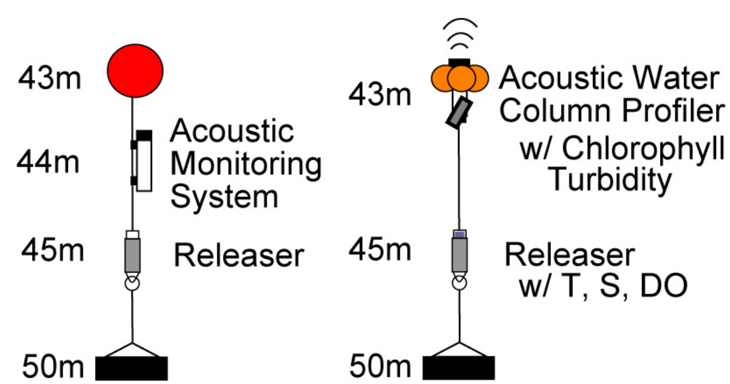


BCH; Barrow Canyon Hotspot



SCH ; Southern Chukchi Hotspot



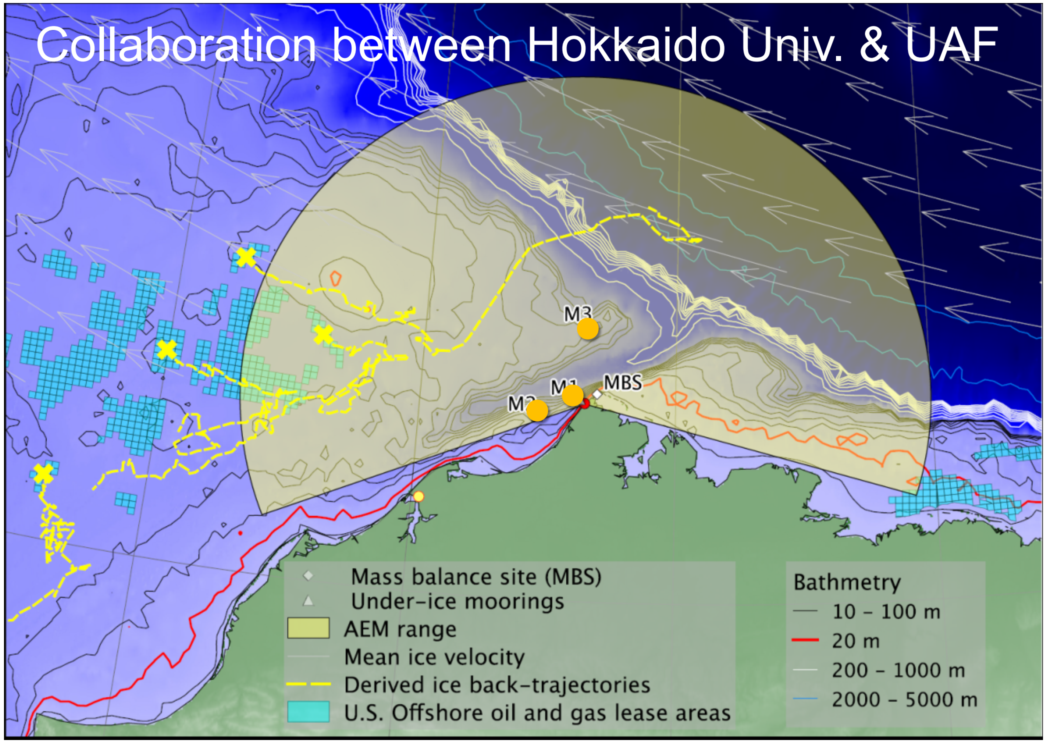
Mooring monitoring at DBO 3 & 5

- Mooring observation (July 2012 to Sept. 2015)

DBO 3 (Southern Chukchi Sea Hotspot: SCH)					
Name	Deploy date	Latitude	Longitude	Depth	Recovery data
SCH-12	16 July 2012	67° 42.35' N	168° 49.52' W	52m	2 Oct. 2012
SCH-12w	16 July 2012	67° 43.09' N	168° 50.01' W	53m	2 Oct. 2012
SCH-12-2	2 Oct. 2012	68° 02.00' N	168° 50.03' W	60m	20 July 2013
SCH-12w-2	2 Oct. 2012	68° 03.01' N	168° 50.00' W	60m	20 July 2013
SCH-13	20 July 2013	68° 02.00' N	168° 50.03' W	60m	19 July 2014
SCH-13w	20 July 2013	68° 03.01' N	168° 50.00' W	60m	19 July 2014
SCH-14w	19 July 2014	68° 03.01' N	168° 50.00' W	60m	1 Oct. 2015

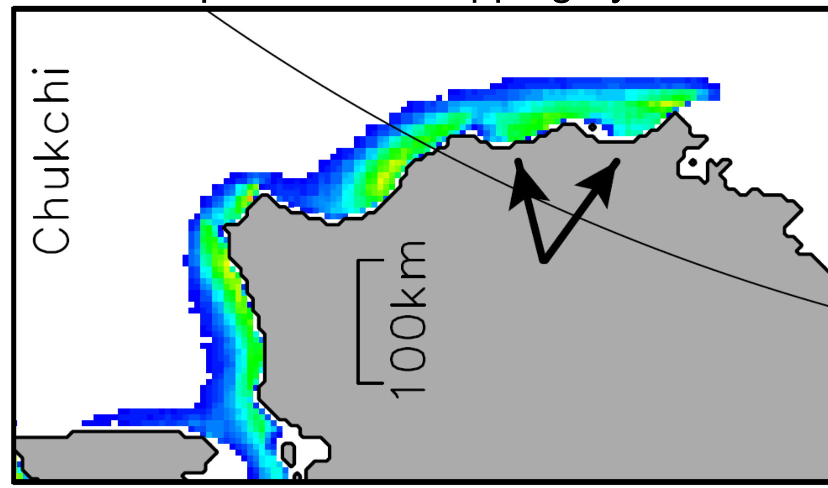
DBO 5 (Barrow Canyon Hotspot: BCH)					
Name	Deploy date	Latitude	Longitude	Depth	Recovery data
BCH-12	16 July 2012	71° 19.64' N	157° 39.69' W	103m	30 Sept. 2012
BCH-12w	16 July 2012	71° 20.46' N	157° 36.45' W	100m	24 Sept. 2012
BCH-12-2	30 Sept. 2012	71° 19.63' N	157° 39.67' W	98m	20 July 2013
BCH-12w-2	24 Sept. 2012	71° 20.49' N	157° 36.36' W	101m	20 July 2013
BCH-13 (w) * Due to sea ice	20 July 2013	<u>71° 18.92' N</u>	<u>157° 08.80' W</u>	<u>60m</u>	23 July 2014
BCH-14 (w)	22 July 2014	71° 19.76' N	157° 36.01' W	103m	19 July 2015

Ice thickness monitoring off Barrow (Aug. 2009 to present)



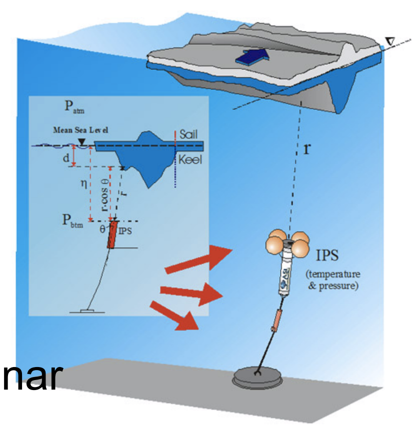
Courtesy of Dr. A. Mahoney (UAF)

Sea-ice production mapping by AMSR-E

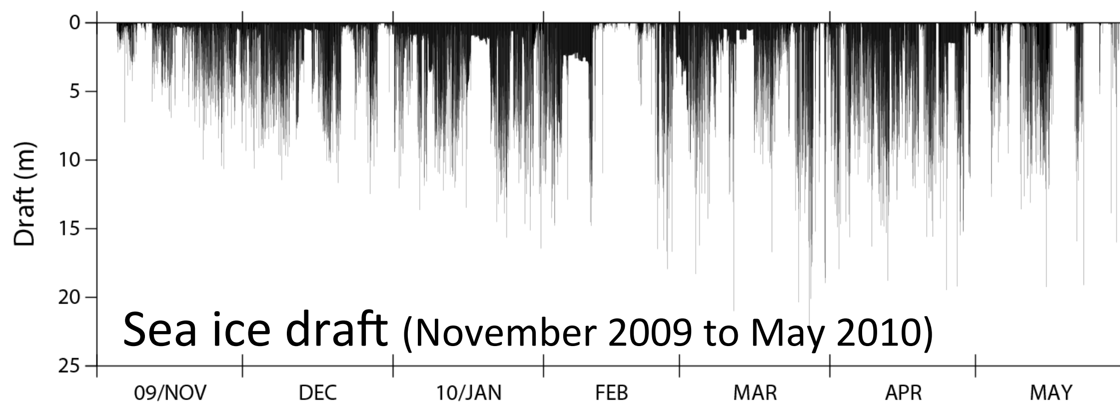


Annual cumulative production over 2002/03-2010/11

Iwamoto et al. (2014, JGR)



Ice-Profiling Sonar



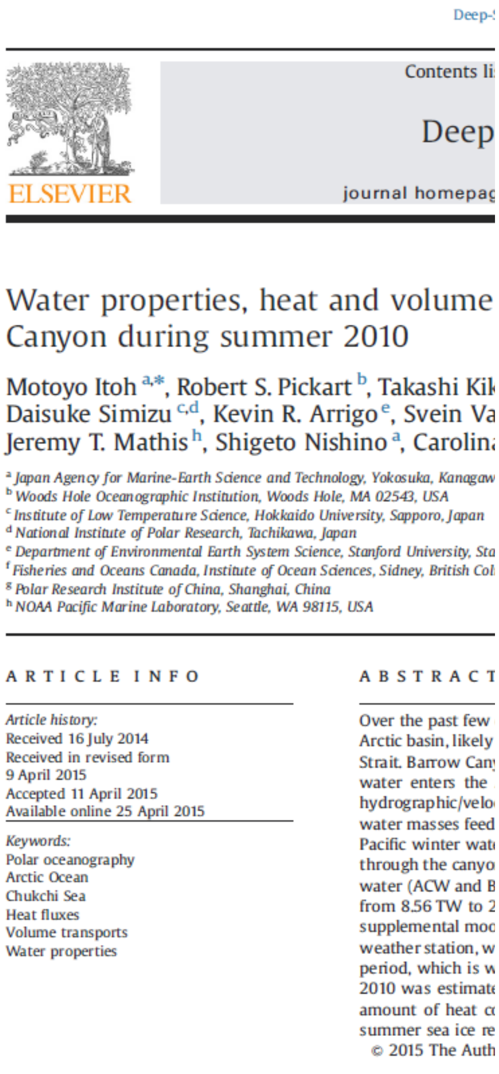
Sea ice draft (November 2009 to May 2010)

Courtesy from Dr. Fukamachi (Hokkaido Univ.)

Mooring observations at DBO-3 & 5

- Publication

Itoh et al. (2015, DS


Deep-

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Water properties, heat and volume
Canyon during summer 2010

Motoyo Itoh [a,*], Robert S. Pickart [b], Takashi Kik
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[a] Japan Agency for Marine-Earth Science and Technology, Yokosuka, Kanagaw
[b] Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
[c] Institute of Low Temperature Science, Hokkaido University, Sapporo, Japan
[d] National Institute of Polar Research, Tachikawa, Japan
[e] Department of Environmental Earth System Science, Stanford University, Sta
[f] Fisheries and Oceans Canada, Institute of Ocean Sciences, Sidney, British Col
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[h] NOAA Pacific Marine Laboratory, Seattle, WA 98115, USA

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Keywords:
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Chukchi Sea
Heat fluxes
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ABSTRACT

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Strait. Barrow Can
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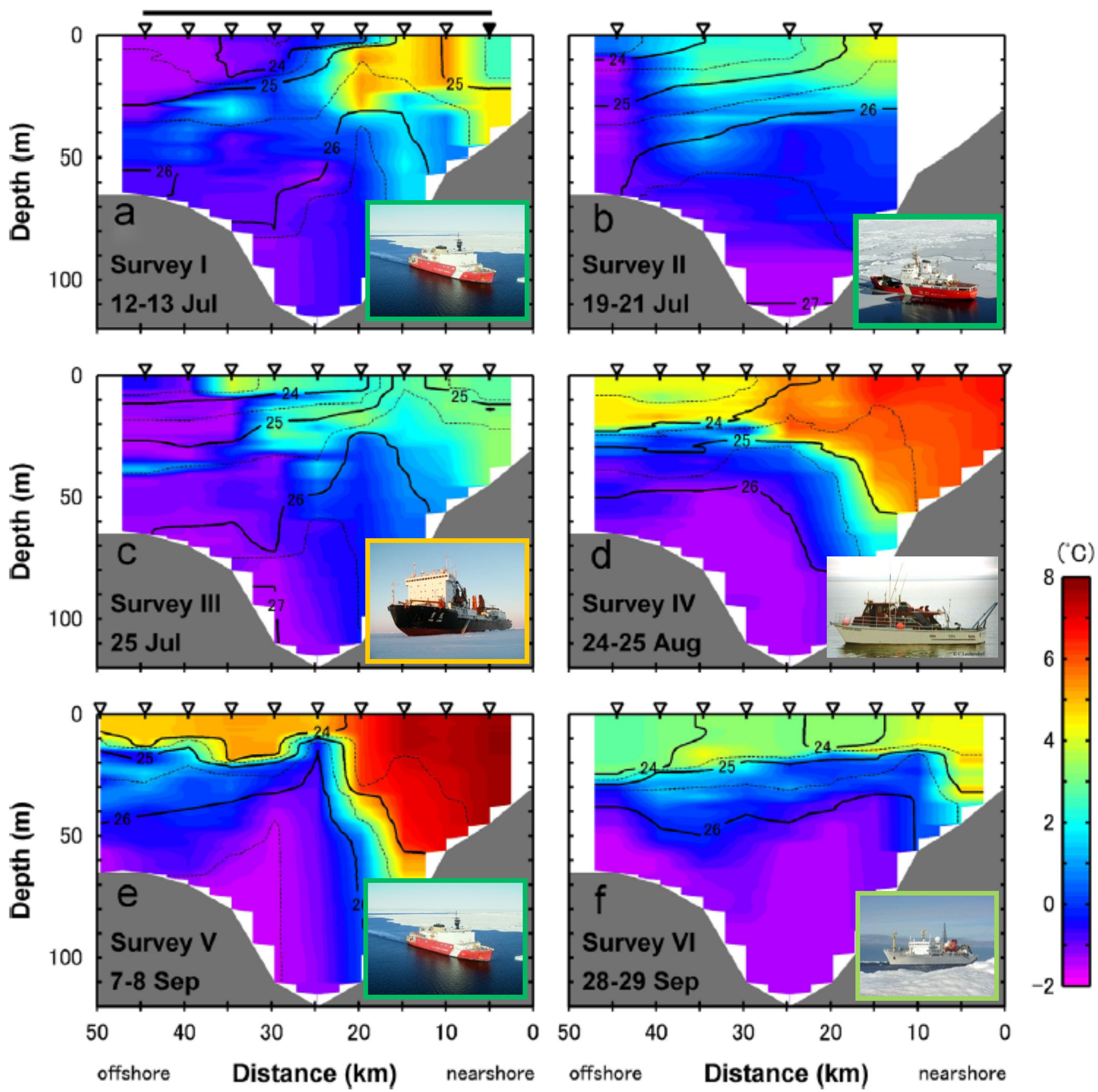

DBO 3rd data workshop
PMEL/NOAA, Seattle, WA, U.S.A.
12:45~13:45 / 22 February, 2016

Mooring observations at DBO-3 & 5

- Publication

Itoh et al. (2015, DSR-I)

Deep-Sea Research I 102 (2015) 43-

Contents lists available at ScienceD

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journal homepage: www.elsevier.com

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[a] Japan Agency for Marine-Earth Science and Technology, Yokosuka, Japan
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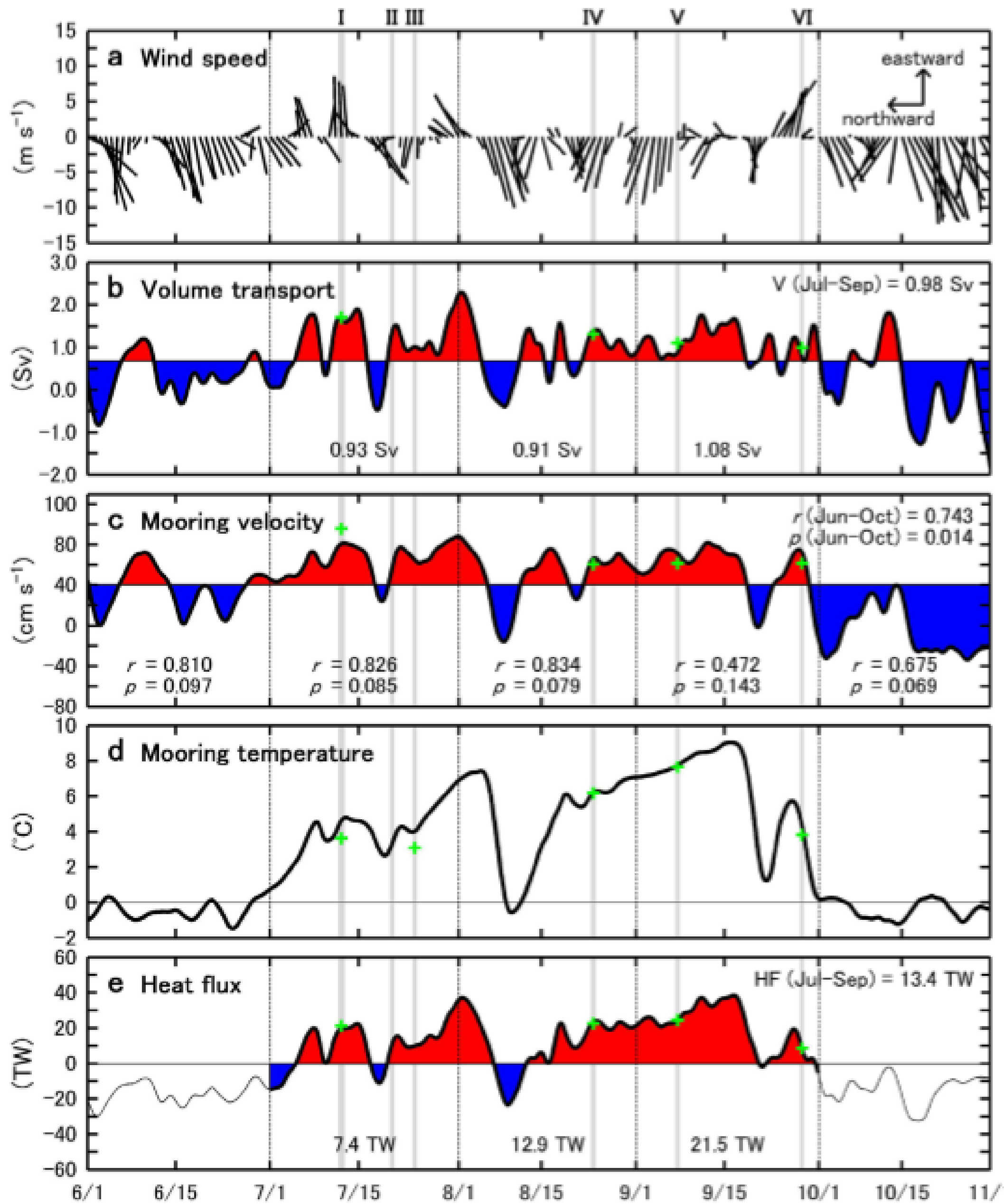
A B S T R A C T

Over the past few decades, sea ice retreat du
Arctic basin, likely due in part to increasing su
Strait. Barrow Canyon, in the northeast Chuk
water enters the Arctic basin. This paper p
hydrographic/velocity sections occupied acr
water masses feeding the canyon – Alaskan
Pacific winter water (PWW) – all displayed s
through the canyon were between 0.96 and 1
water (ACW and BSW) and 0.28–0.65 Sv of P
from 8.56 TW to 24.56 TW, mainly due to th
supplemental mooring data from the core of
weather station, we derive and assess a proxy
period, which is when most of the heat pass
2010 was estimated to be 3.34 TW, which i
amount of heat could melt 315,000 km^2 of
summer sea ice retreat in the Pacific sector



AGU PUBLICATIONS
JGR
Journal of Geophysical Research: Oceans

RESEARCH ARTICLE

10.1002/2015JC011318

A wind-driven, hybrid latent and sensible heat coastal polynya off Barrow, Alaska

Daisuke Hirano[1], Yasushi Fukamachi[2], Eiji Watanabe[3], Kay I. Ohshima[2], Katsushi Iwamoto[1,4,5], Andrew R. Mahoney[6], Hajo Eicken[7], Daisuke Simizu[1], and Takeshi Tamura[1,8,9]

Key Points:

- Nature of the Barrow Coastal Polynya (BCP) formed off the Alaska coast in

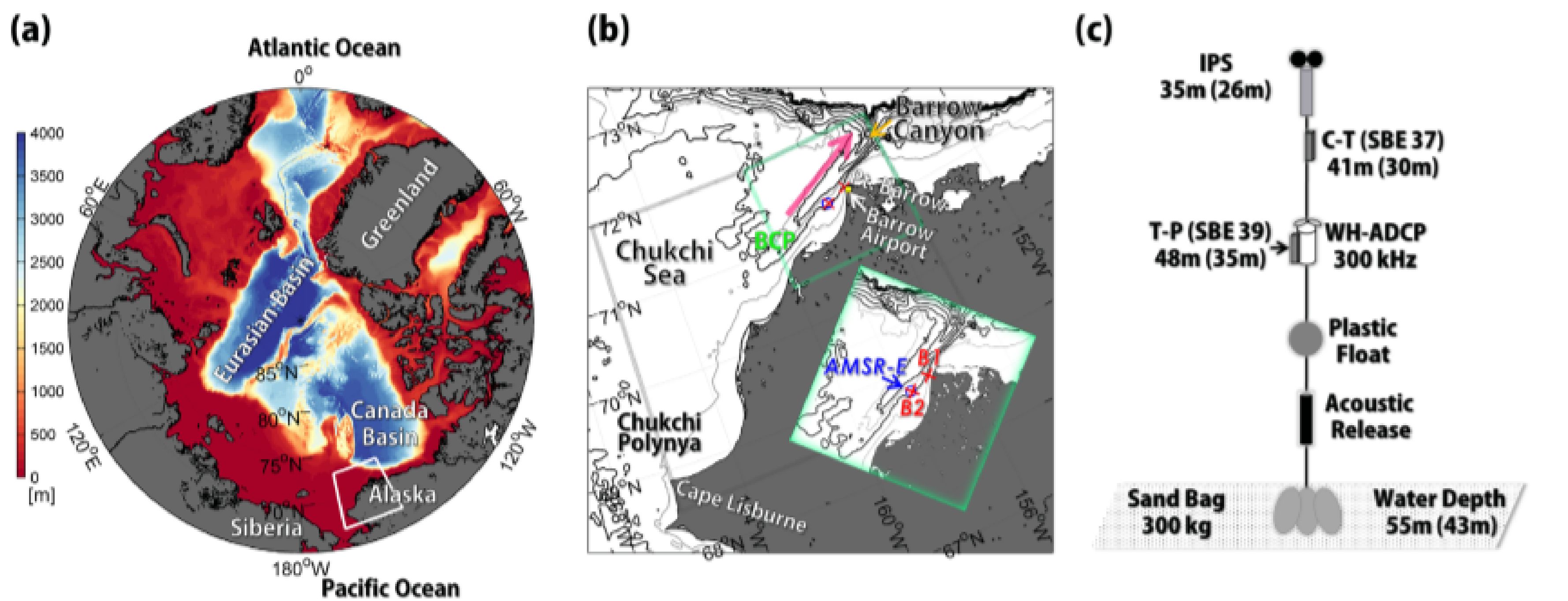
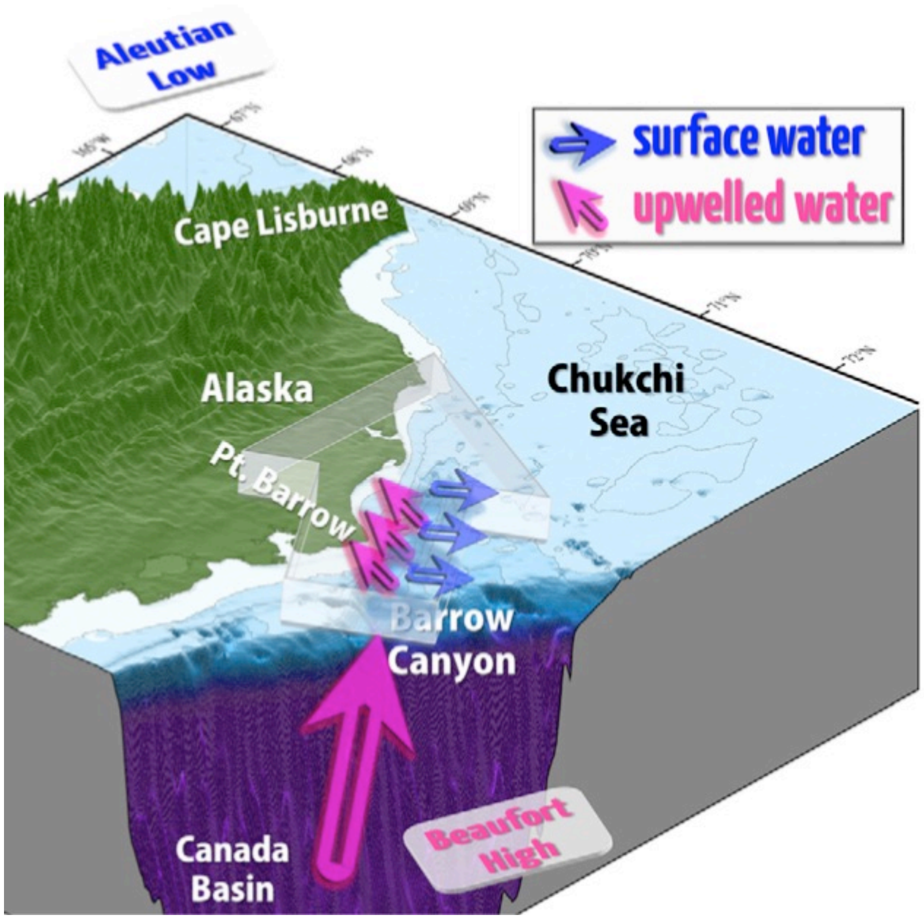
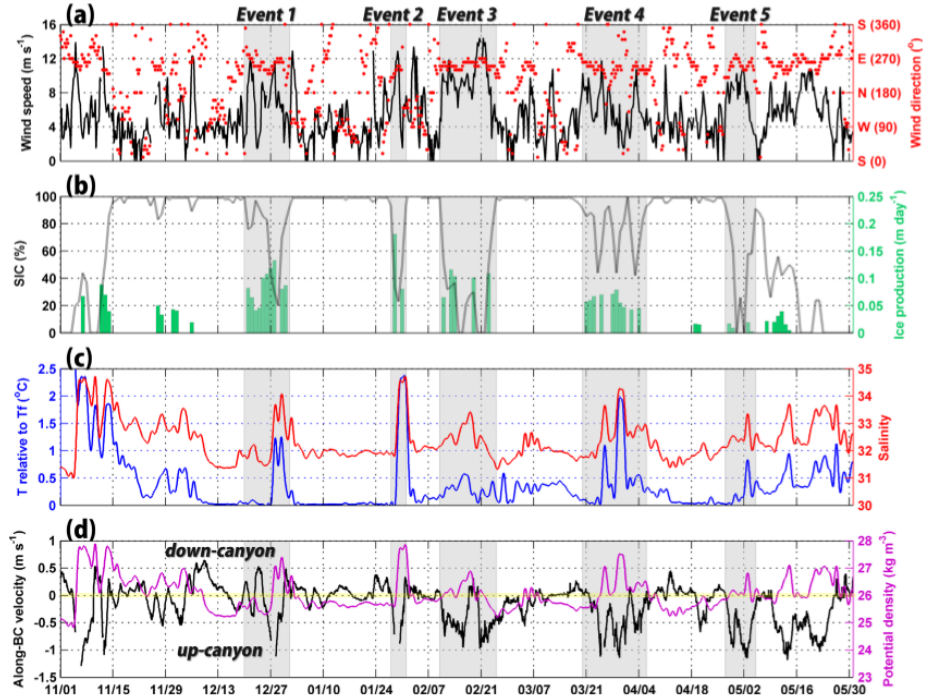
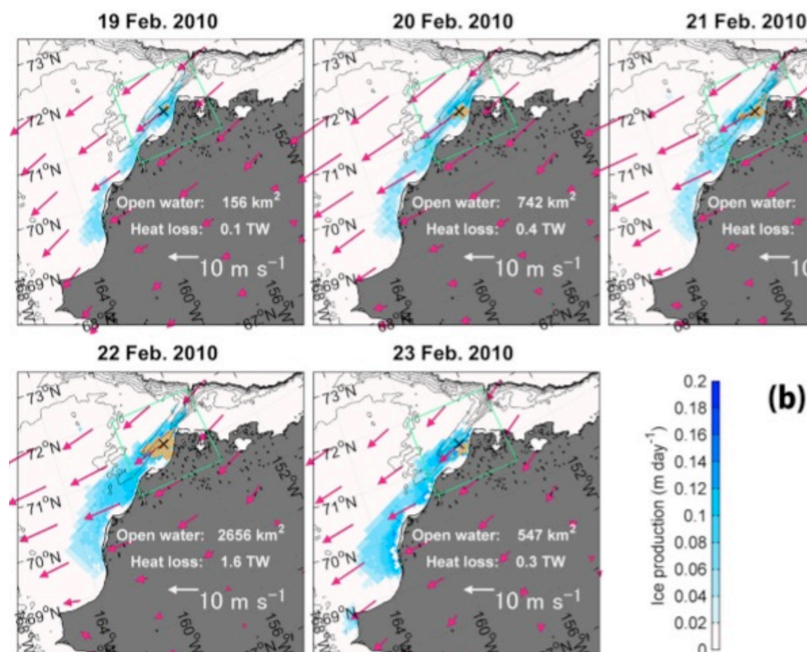


Figure 1. (a) Bathymetry of the Arctic Ocean from the International Bathymetric Chart of the Arctic Ocean (IBCAO version 3.0). The enclosed region is shown in Figure 1b. (b) Bathymetry around the mooring sites on the northeastern Chukchi shelf. The gray and green-enclosed regions represent the Chukchi Polynya and Barrow Coastal Polynya (BCP), respectively. Inset at the bottom right is the region around the mooring sites in the BCP. Red crosses represent moorings B1 (71.33°N, 156.89°W, water depth of 43 m) and B2 (71.23°N, 157.65°W, water depth of 55 m). Blue circle represents the location of the nearest AMSR-E grid point to B2 (71.25°N, 157.69°W). Yellow square near Pt. Barrow indicates the location of Barrow Wiley-Post Airport. Direction of along-Barrow Canyon (63°T: 0°T corresponds to the north) is also indicated by the pink arrow. (c) Mooring configurations at B1 and B2. Nominal depths of instruments are indicated for B2 and B1 (in parentheses).

A wind-driven, hybrid latent and sensible heat coastal polynya off Barrow, Alaska (Hirano et al., 2016, JGR-Oceans)







Mooring monitoring at DBO 3 & 5

- Publications

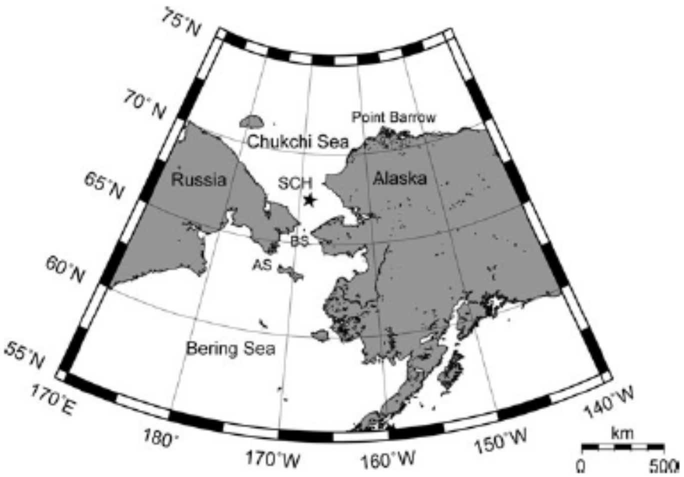


Figure 1. Map of the study area in the Chukchi Sea, and the Bering Sea located south of the Chukchi Sea. The black star indicates the SCH station where we deployed the moorings. AS, Anadyr Strait; BS, Bering Strait.

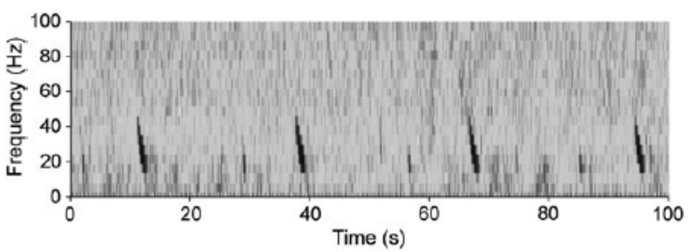


Figure 2. Spectrograms of fin whale calls (4096-point FFT, Hamming window) recorded at the SCH station on 4 October 2012. *Y*-axis is frequency in Hertz and *x*-axis is time in seconds. Fin whales mainly produce a "20 Hz pulse", which is a downsweep that decreases from ~25 to 18 Hz over its duration of ~1 s. In this spectrogram, we can isolate a downsweep that decreases from ~40 to 20 Hz and a lower-frequency note, called a "backbeat" between pulses.

Tsujii et al. (2016, ICES J. Mar. Sci)

ICES Journal of Marine Science Advance Access published January 26, 2016

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ICES CIEM International Council for the Exploration of the Sea / Conseil International pour l'Exploration de la Mer

ICES Journal of Marine Science; doi:10.1093/icesjms/fsv271

The migration of fin whales into the southern Chukchi Sea as monitored with passive acoustics

Koki Tsujii[1]*, Mayuko Otsuki[1], Tomonari Akamatsu[2,3], Ikuo Matsuo[3,4], Kazuo Amakasu[5], Minoru Kitamura[6], Takashi Kikuchi[6], Kazushi Miyashita[7], and Yoko Mitani[7]

[1]*Graduate School of Environmental Science, Hokkaido University, 20-5 Benten-cho Hakodate, Hokkaido 040-0051, Japan*
[2]*National Research Institute of Fisheries Science, Fisheries Research Agency, 2-12-4 Fukuura, Kanazawa, Yokohama, Kanagawa 236-8648, Japan*
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[5]*Tokyo University of Marine Science and Technology, 4-5-7, Konan, Minato-ku, Tokyo 108-8477, Japan*
[6]*Japan Agency for Marine-Earth Science and Technology, 2-15 Natsushima-cho, Yokosuka, Kanagawa 237-0061, Japan*
[7]*Field Science Center for Northern Biosphere, Hokkaido University, 20-5 Benten-cho Hakodate, Hokkaido 040-0051, Japan*

**Corresponding author: tel/fax: +81 138 85 6625; e-mail: kou1114t@gmail.com*

Tsujii, K., Otsuki, M., Akamatsu, T., Matsuo, I., Amakasu, K., Kitamura, M., Kikuchi, T., Miyashita, K., and Mitani, Y. The migration of fin whales into the southern Chukchi Sea as monitored with passive acoustics. – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsv271.

Received 20 August 2015; revised 8 December 2015; accepted 21 December 2015.

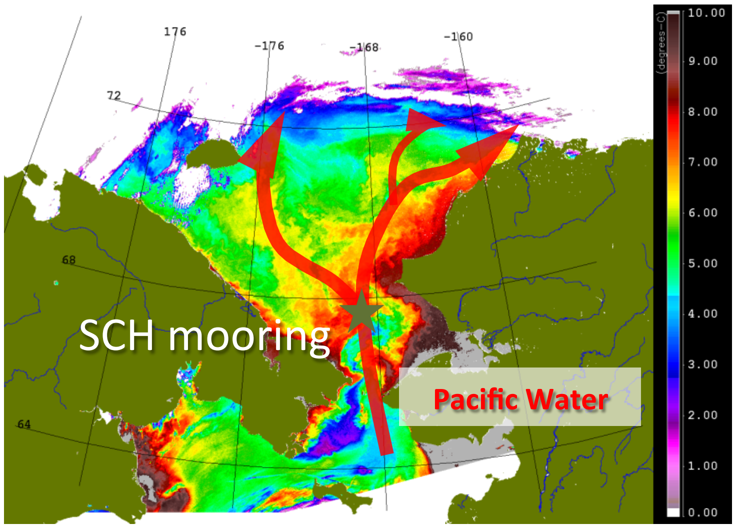
Fin whales (*Balaenoptera physalus*) undergo seasonal migration in the Arctic Sea. Because their migration and distribution is likely affected by changes in global climate, we aimed to examine the migration timing of fin whales, and the relationship with prey availability within the oceanographic environment of the Arctic Sea, using passive and active acoustic monitoring methods. Automatic Underwater Sound Monitoring Systems were deployed in the southern Chukchi Sea from July 2012 to 2014 to determine the acoustic presence of fin whales. Furthermore, water temperature and salinity were recorded by a fixed data logger. An Acoustic Zooplankton Fish Profiler was additionally deployed to estimate prey abundance through backscattering strength. Sea ice concentrations were obtained by remote sensing data. Fin whale calls were automatically detected using a custom-made software, and the per cent of half-hours containing calls were counted. Fin whale calls were detected from 4 August to 20 October 2012 (78 d) and 25 July to 1 November 2013 (100 d). The extended period of acoustic presence of fin whales during 2013 when compared with 2012 is likely related to a longer ice-free period during 2013. Furthermore, generalized linear model analyses showed that half-hour periods containing calls increased with a rise in water temperature and zooplankton abundance during the initial call presence period, while they decreased with a decrease in water temperature and salinity during the end of the call presence period. Our results suggest that the rise in water temperature and zooplankton abundance affect the timing of migration of fin whales in a way that is consistent with the expansion of their suitable habitats and the extension of their presence in the Arctic Sea.

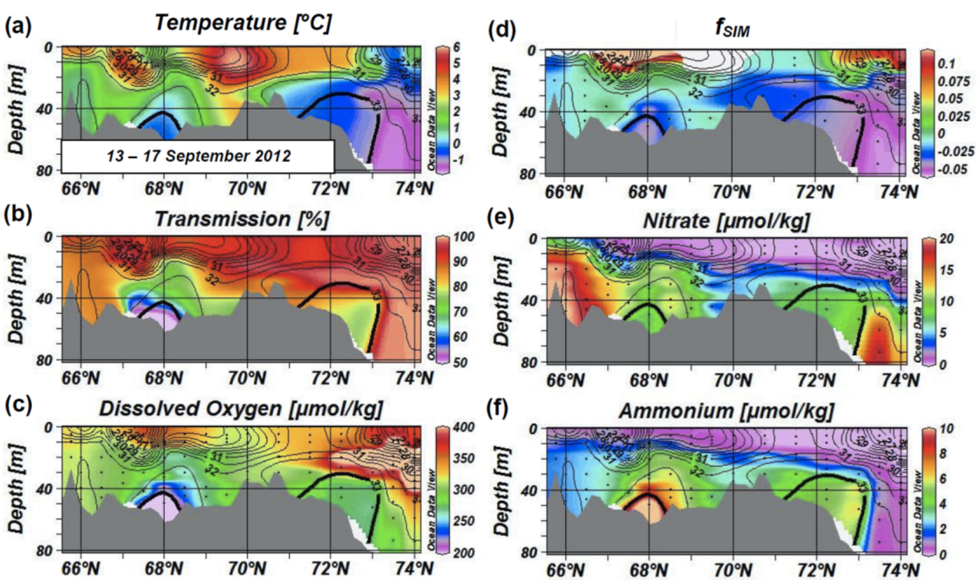
Keywords: Chukchi Sea, fin whale, migration, passive acoustic monitoring.

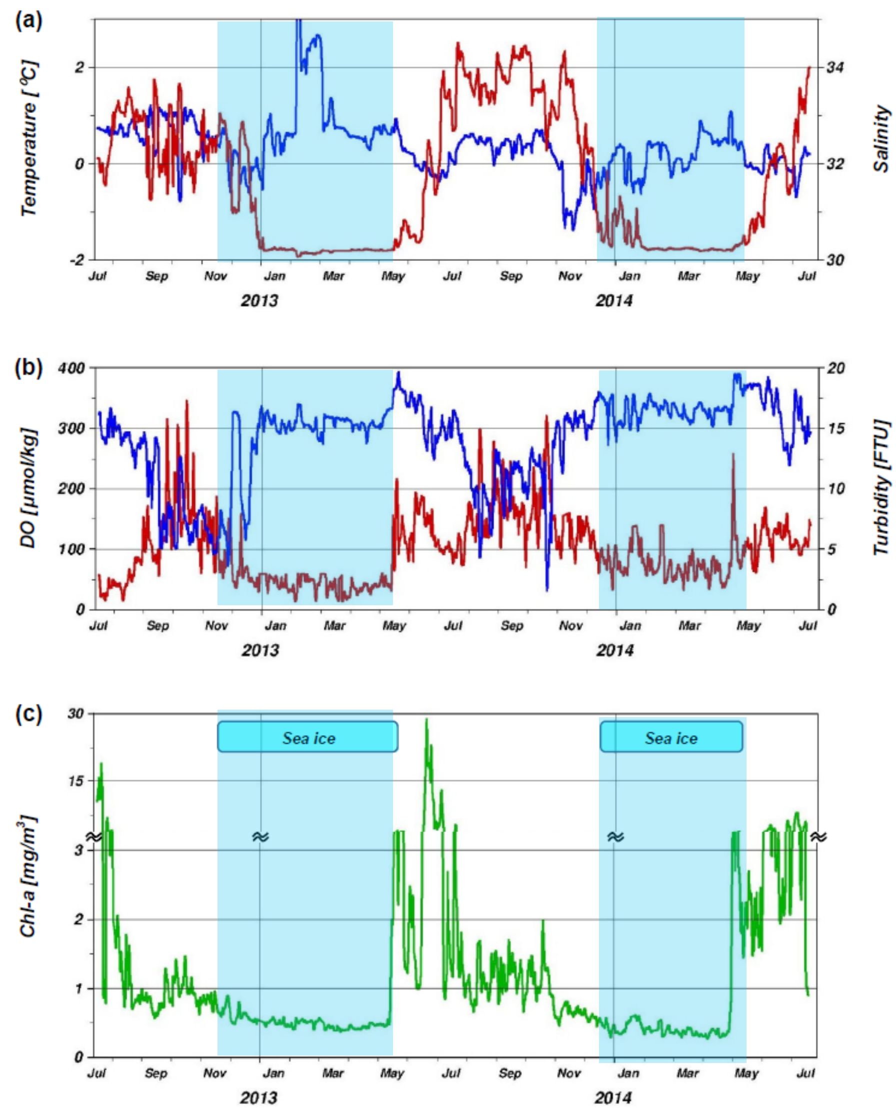
Mooring monitoring at DBO 3 & 5

- Publications

Nishino et al. (2015, *Biogeosciences Discussion*: under revision for *Biogeosciences*)







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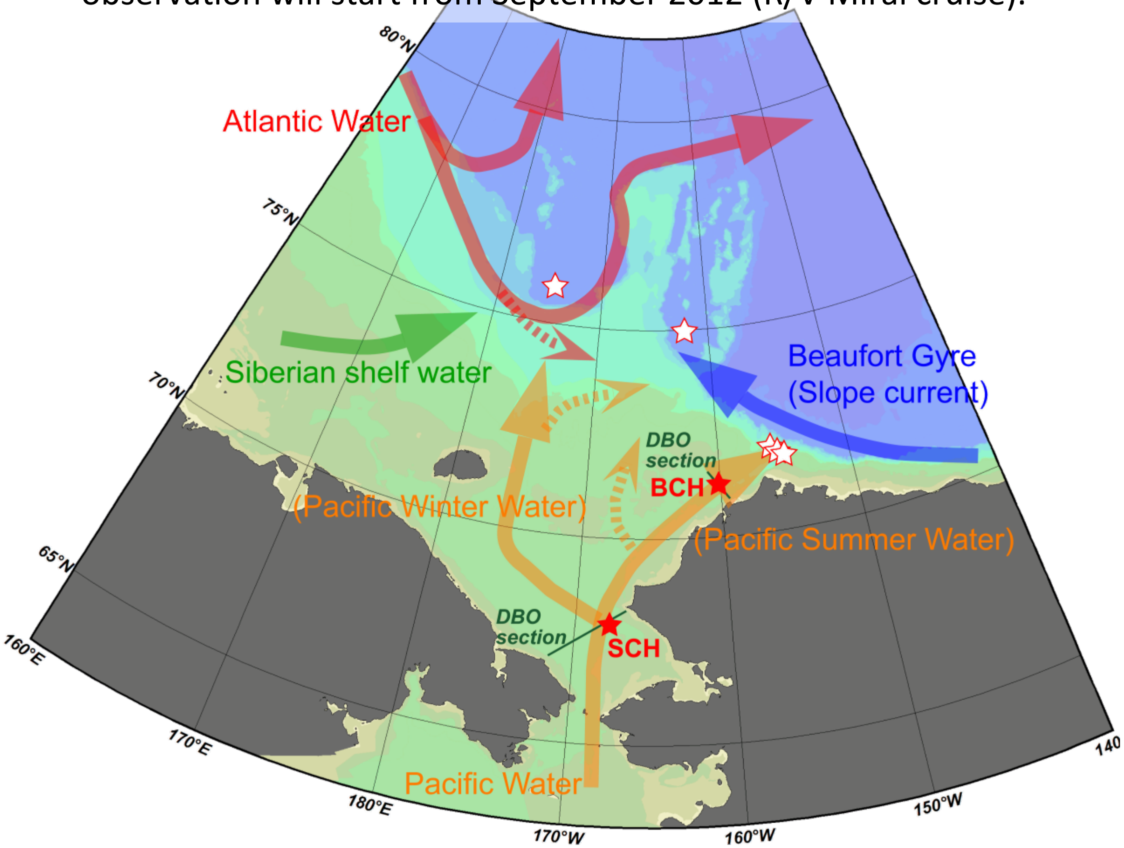

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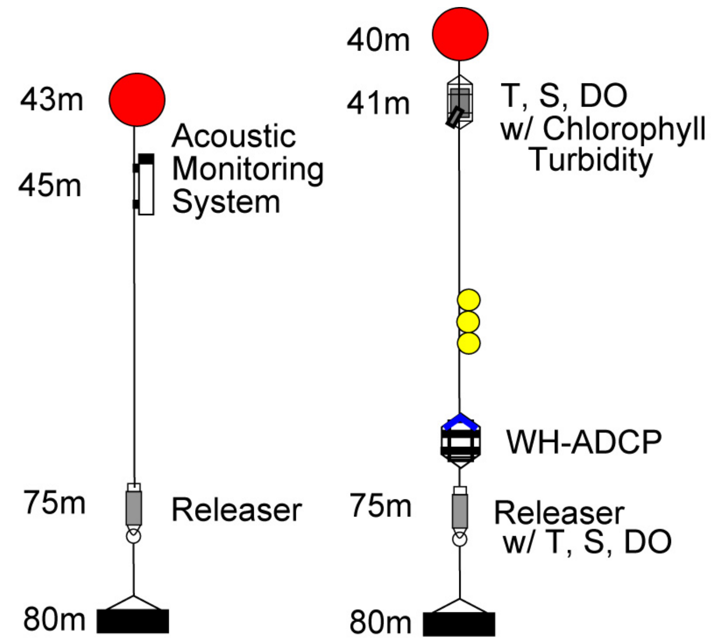

SCH ; Southern Chukchi Hotspot