

Update (highlights) of 2016 field results and science findings; preliminary 2017 plans

JAPAN



Shigeto Nishino (JAMSTEC)


Japanese activity completed in 2016

- R/V Mirai cruise (22 Aug to 5 Oct)

Japanese activities planed in 2017

- R/V Mirai cruise (23 Aug to 6 Oct or 21 Oct)
- T/S Oshoro-maru cruise (6 Jul to 2 Aug)





Summary of R/V Mirai Arctic Ocean Cruise in 2016 (MR16-06)

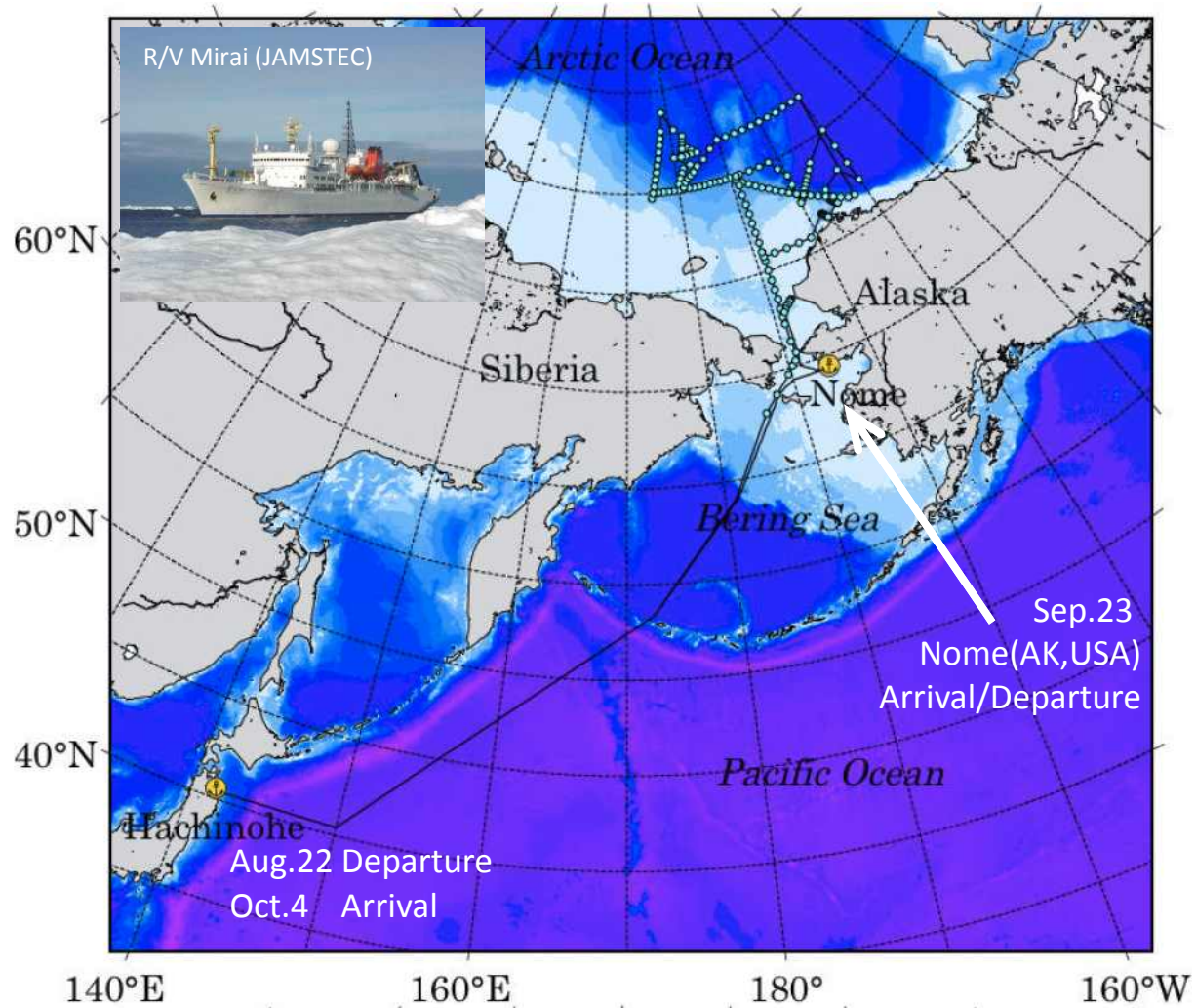
This cruise is conducted under the “Arctic Challenge for Sustainability Project (ArCS)” that is funded by Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

See more details: <http://www.arcs-pro.jp/en/index.html>

JAMSTEC HP
Weekly photo
See also blog

Schedule of MR16-06

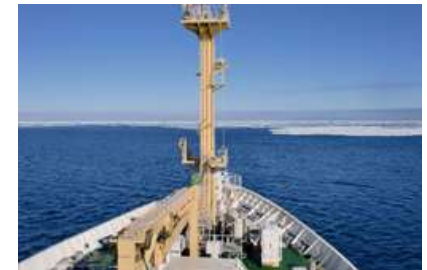
22 Aug. Hachinohe -> North Pacific Ocean/Bering Sea/Arctic Ocean
23 Sep. Nome -> Bering Sea/North Pacific Ocean
4 Oct. Hachinohe, 5 Oct. Sekinehama



Research themes of MR16-06

from JAMSTEC, NIPR, NIES, Hokkaido Univ., TUMSAT, etc.

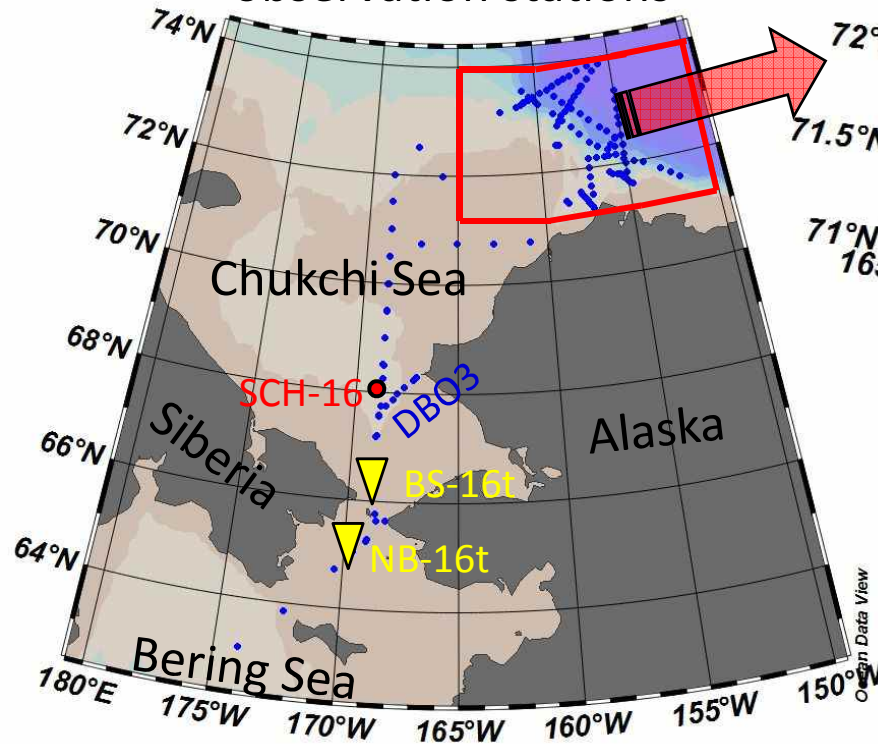
- ❑ Predictability study on weather and sea-ice forecasts linked with user engagement (meteorology, wave, droplets/spray icing)
- ❑ Ship-borne observations of trace gases/aerosols in the marine atmosphere
- ❑ Ship-board observations of atmospheric greenhouse gases and related species in the Arctic ocean and the western North Pacific
- ❑ How plankton responses to multi stressors such as ocean warming and acidification (Sediment trap mooring)?
- ❑ Primary production and transportation of organic materials in the northern Bering and the southern Chukchi Seas
- ❑ Comparison of zooplankton with differences in net mesh-size, and standing stock and material flux role of Appendicularia
- ❑ Seasonal distribution of short-tailed shearwaters and their prey in the Bering and Chukchi Seas
- ❑ Elucidation of the variability of freshwater in the Arctic Ocean
- ❑ Mooring observations in the Barrow Canyon and southern Chukchi Sea
- ❑ Observational study on the variability of physical and chemical environments in the Pacific Arctic Ocean
- ❑ and more . . .



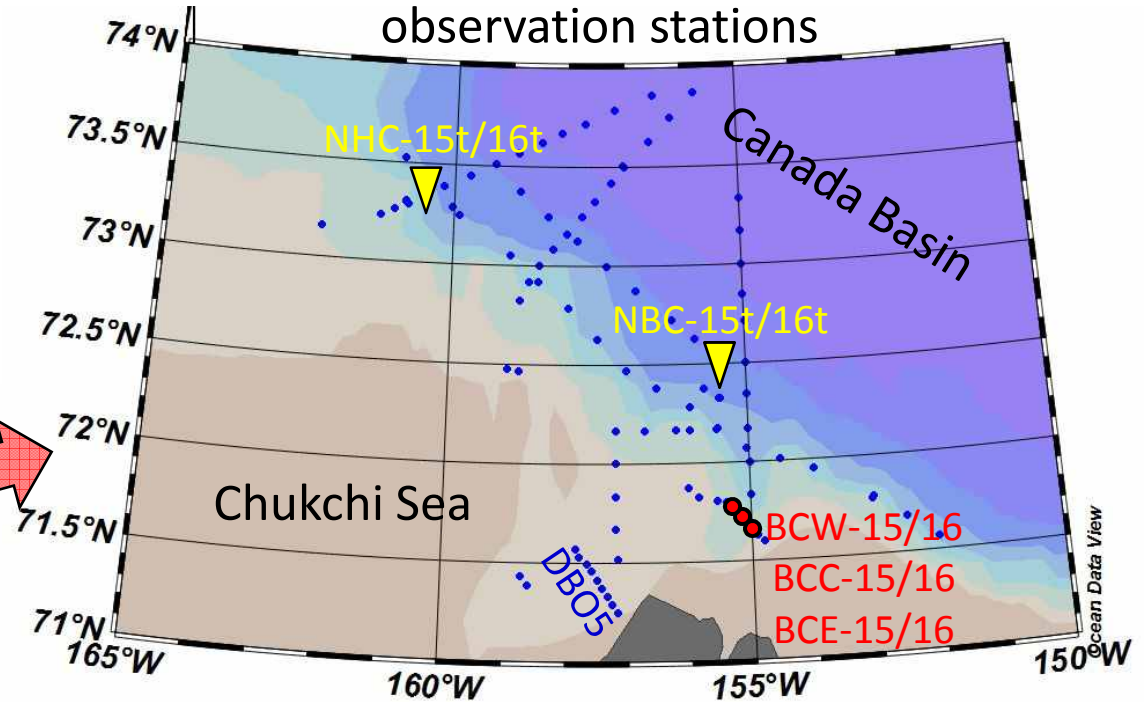
Observation stations of MR16-06



Bering/Chukchi Sea observation stations



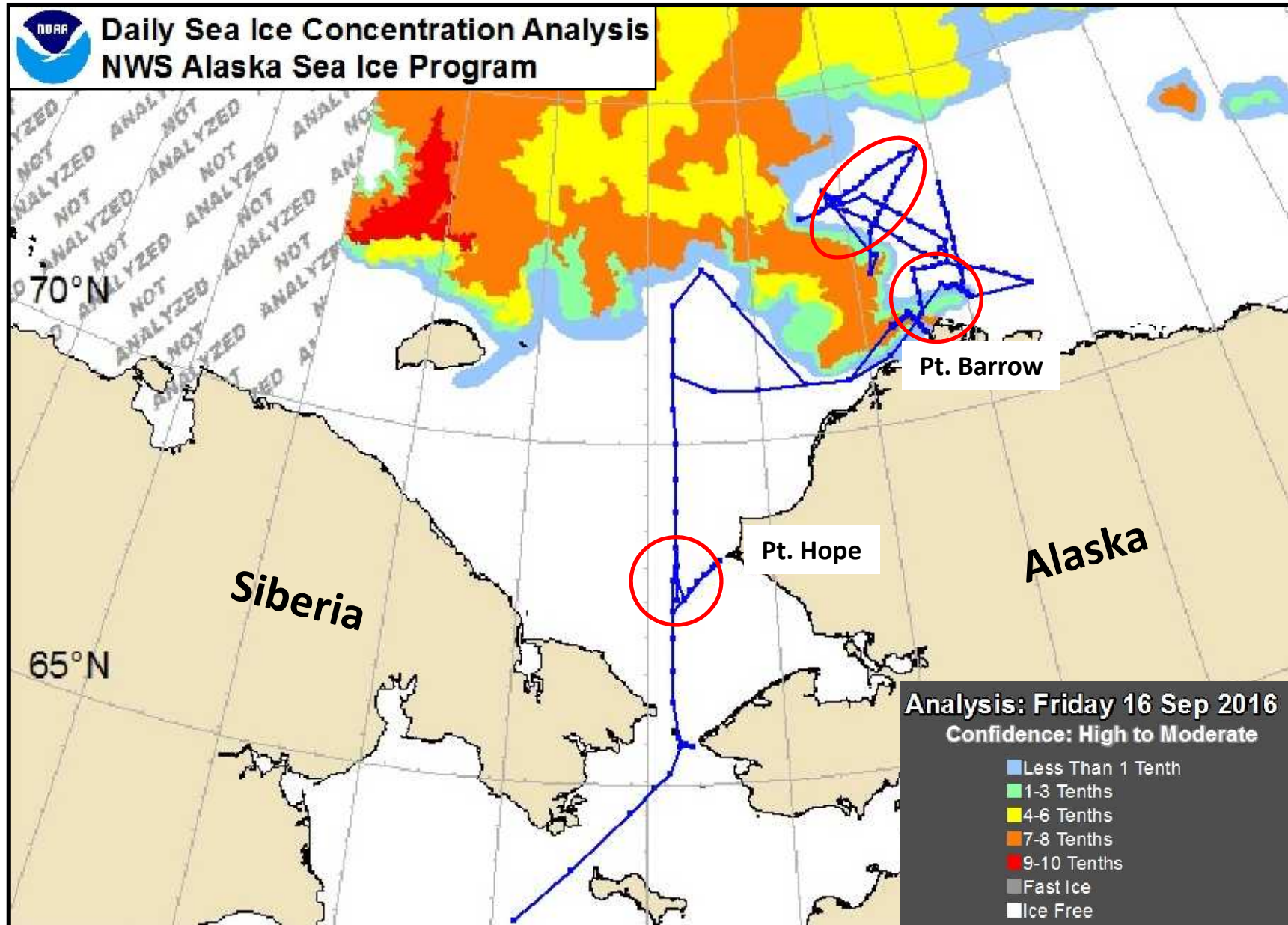
Chukchi Sea/Canada Basin observation stations



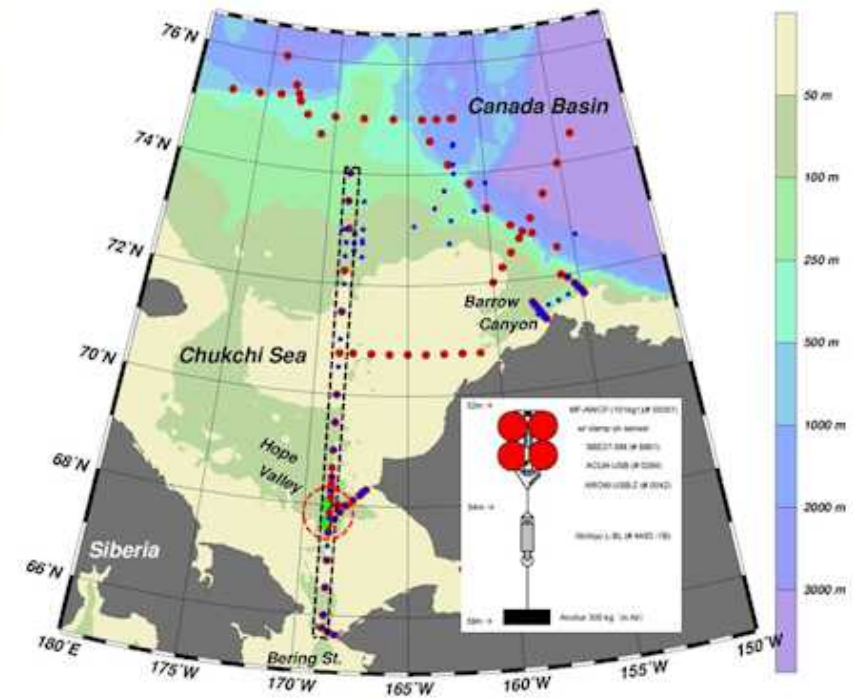
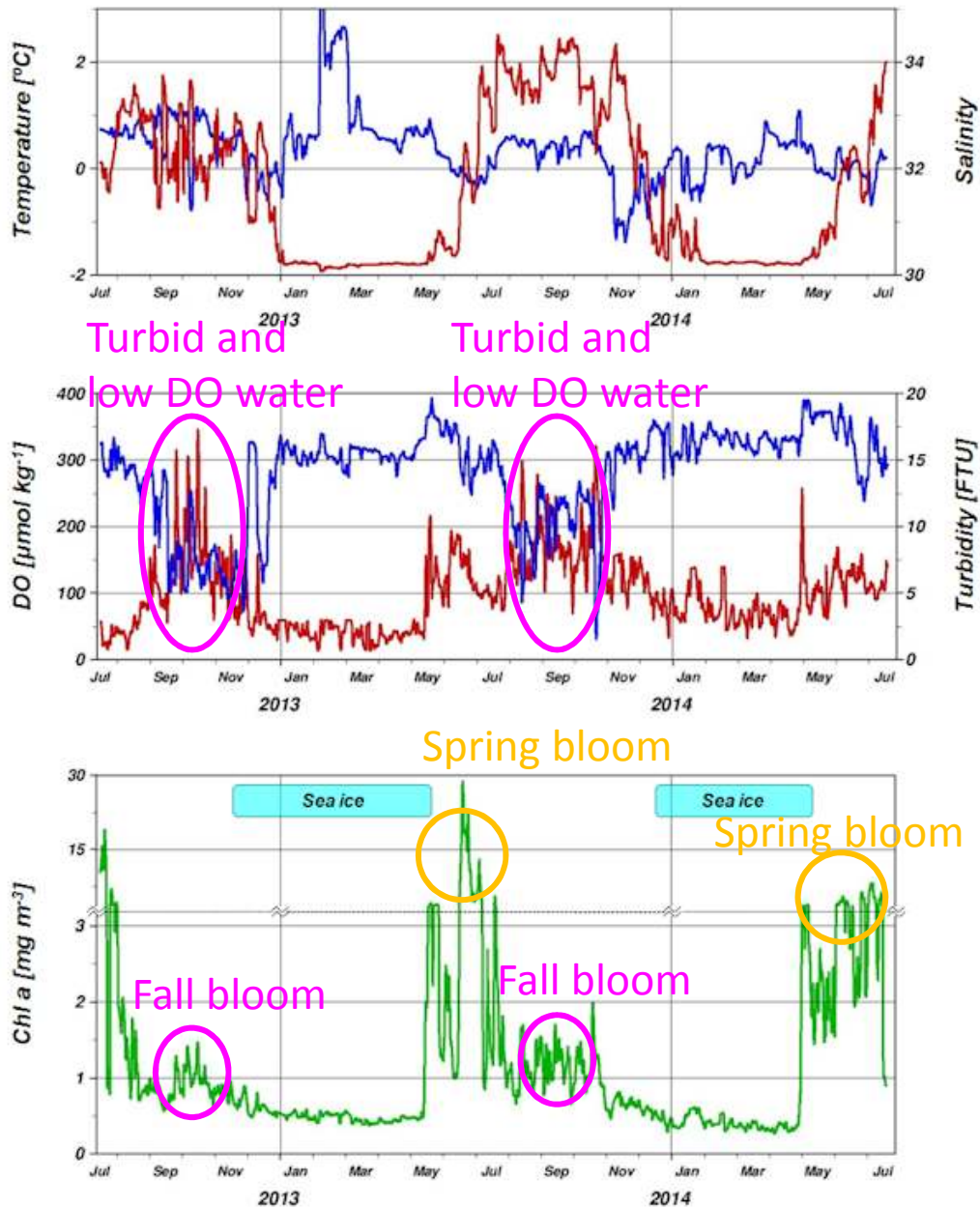
Activities

- : CTD/XCTD, Plankton net, S&M grab, Bio-optics observation
- : Mooring
- ▼ : Sediment trap
- DBO: Distributed Biological Observatory

Sea ice concentration and cruise tracks of MR16-06

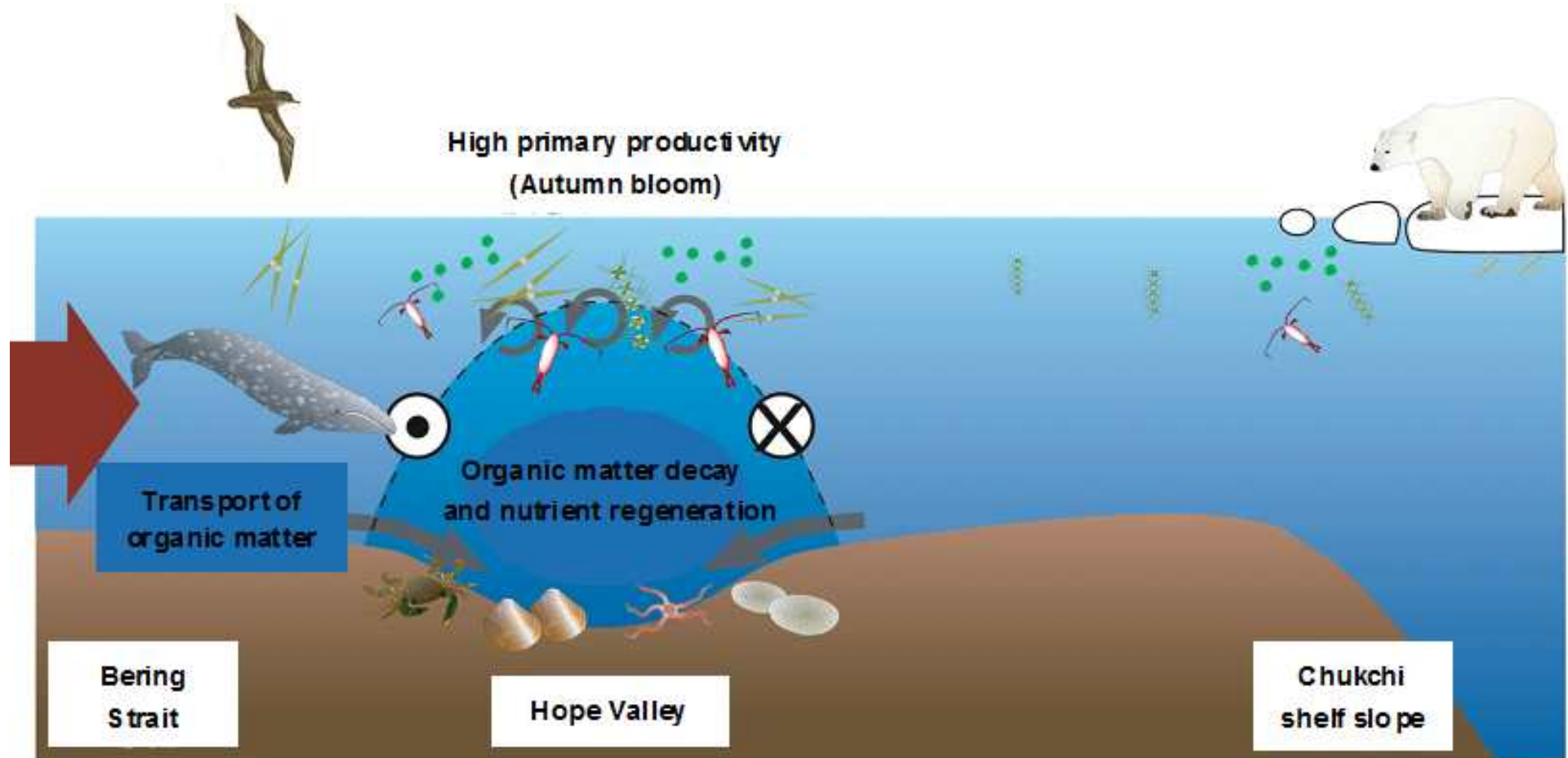


Mooring observation (Jul. 2012 – Jul. 2014) off Pt. Hope

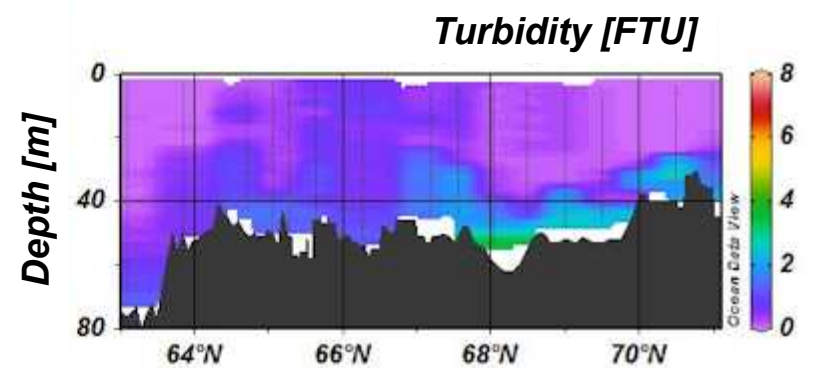
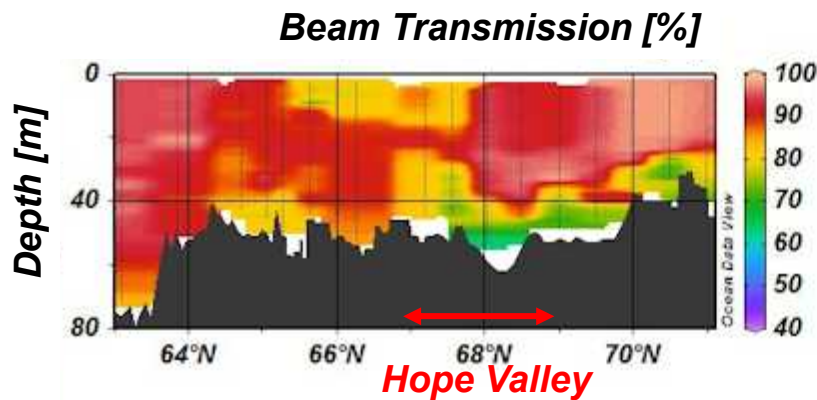
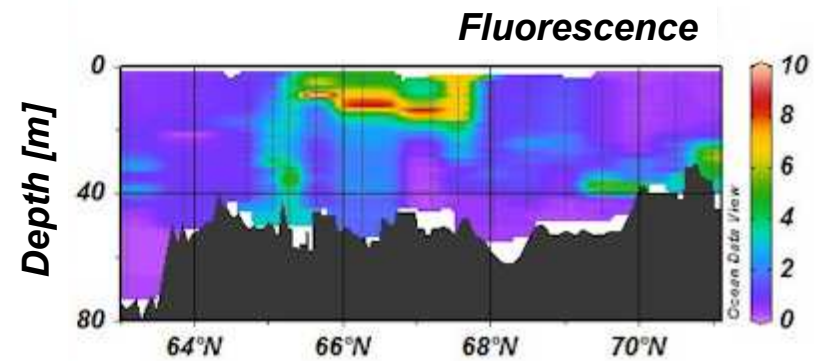
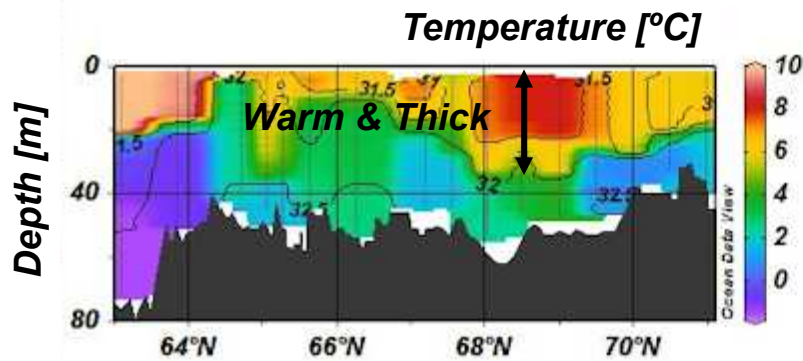
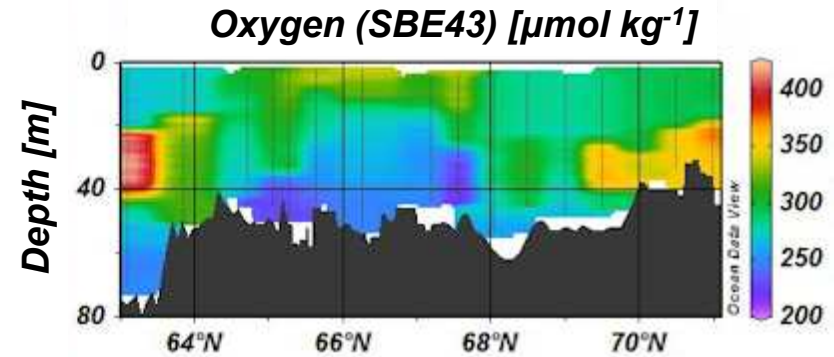
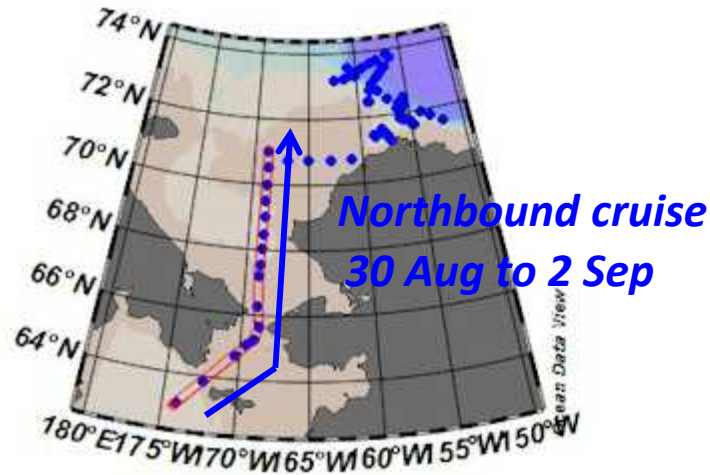


[Nishino et al., 2016]

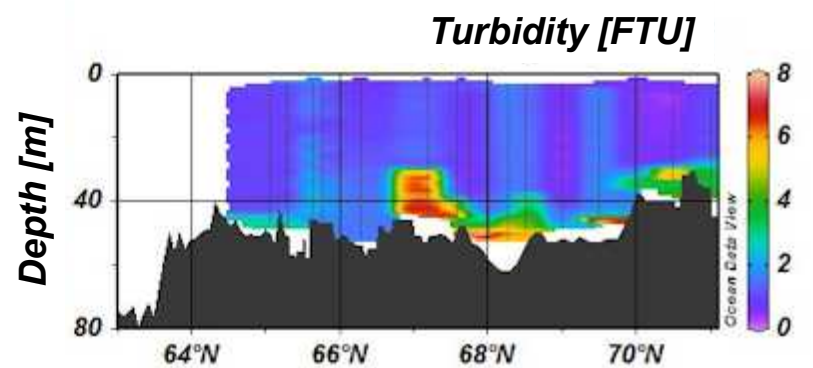
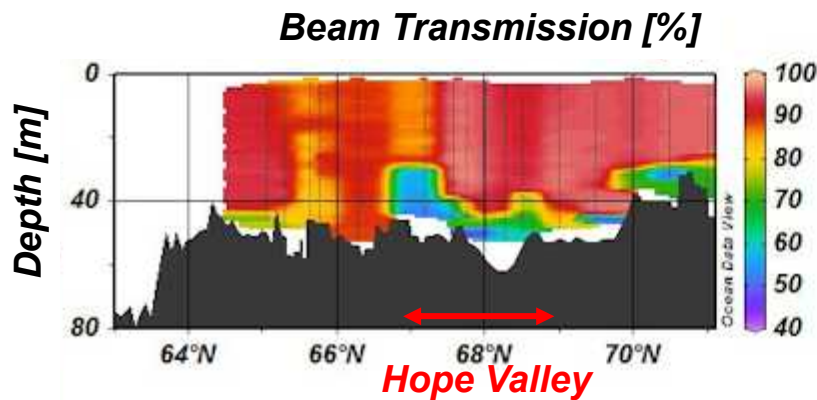
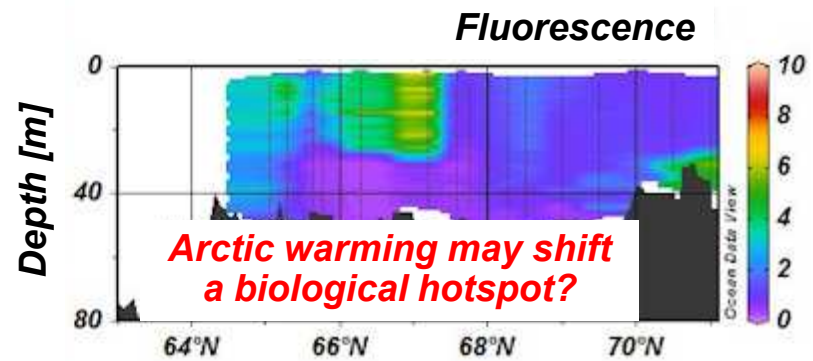
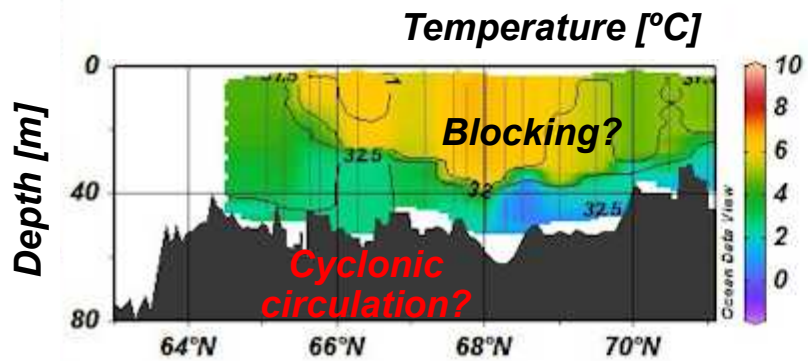
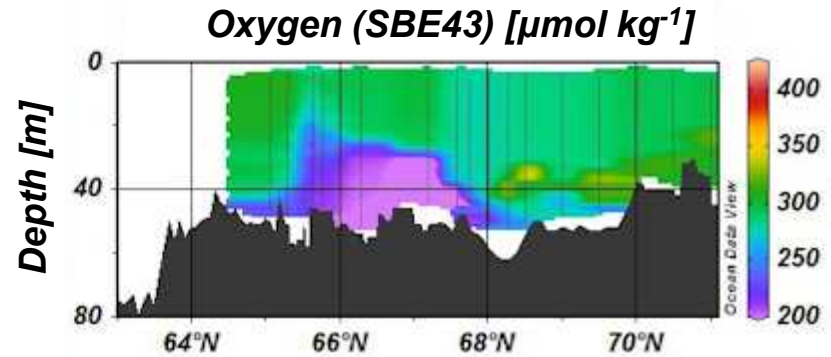
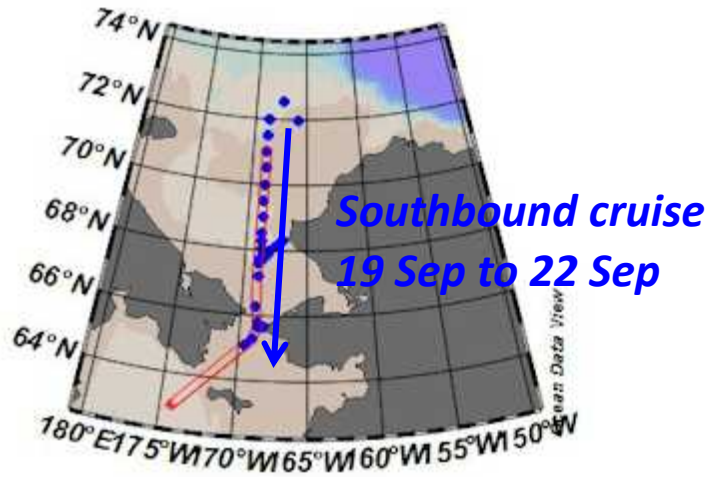
Schematic of fall bloom in Hope Valley in the southern Chukchi Sea



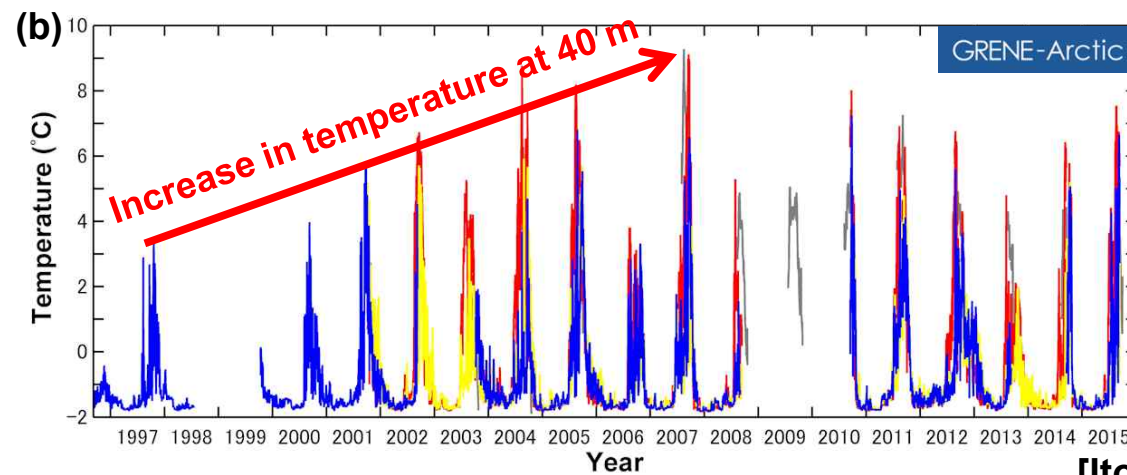
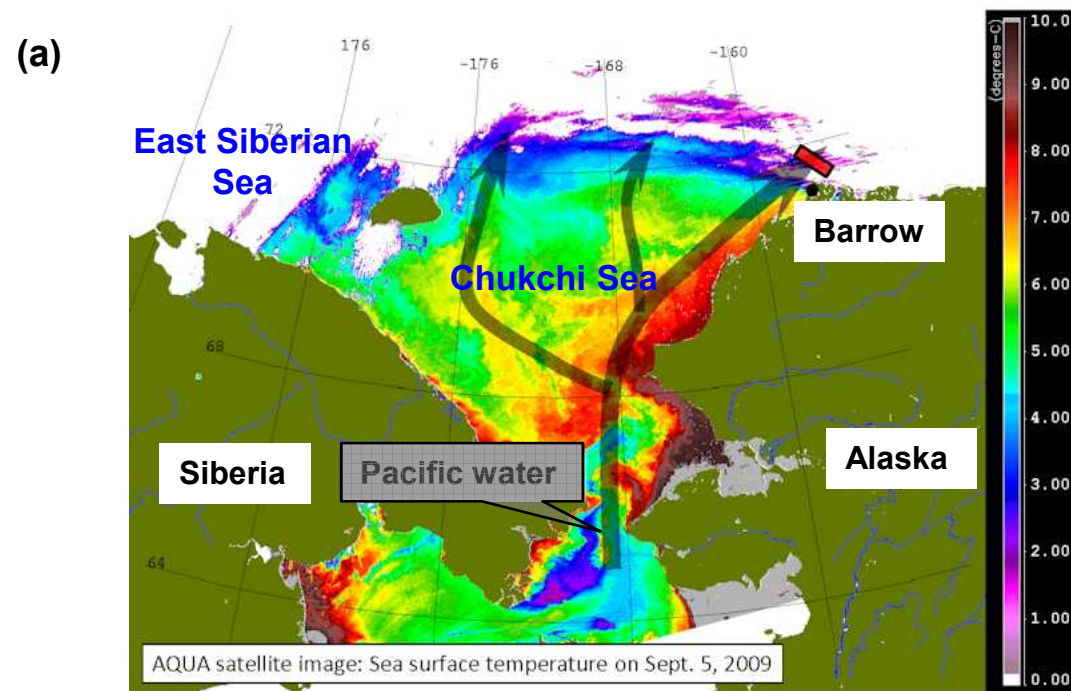
<2016 field results> Vertical sections of Bering and Chukchi seas



<2016 field results> Vertical sections of Bering and Chukchi seas

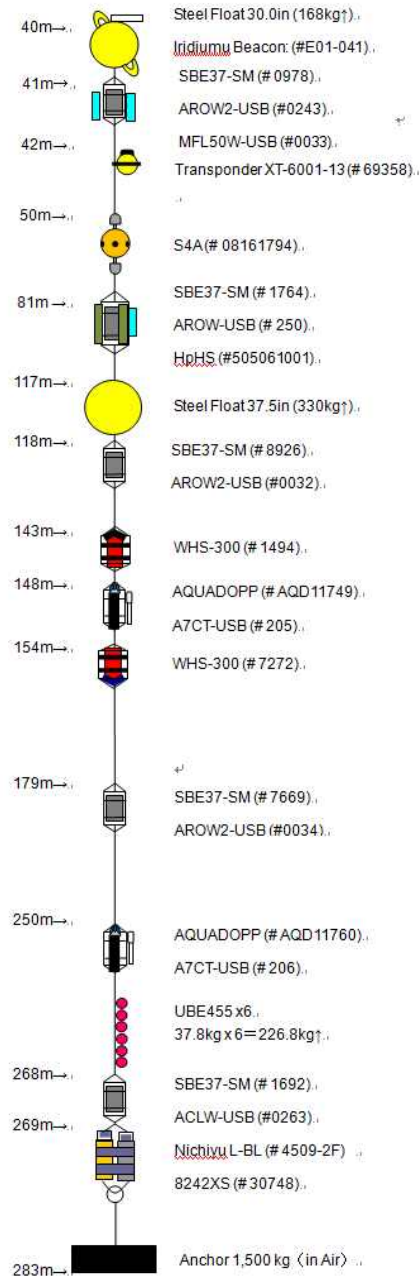


Mooring observation from the late 90s off Pt. Barrow



[Itoh *et al.*, 2013, updated]

Barrow Canyon mooring with chemical/biological sensors



INFINITY-ME

Multi-Exciter for the measurement of phytoplankton community structure

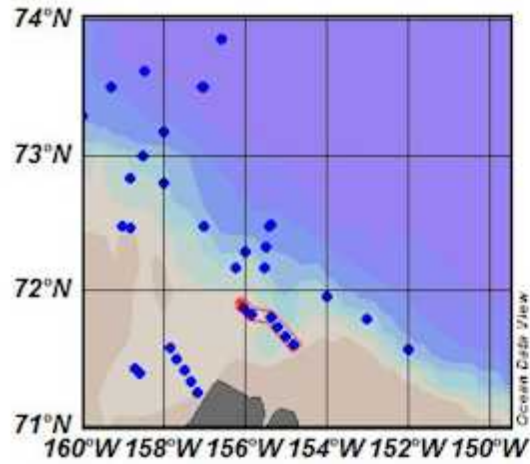


DO sensor

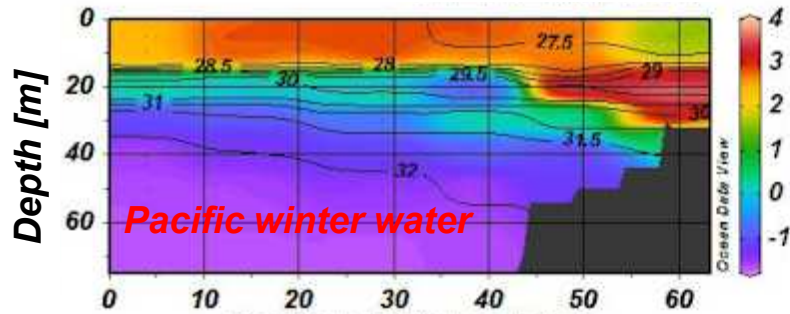


pH sensor

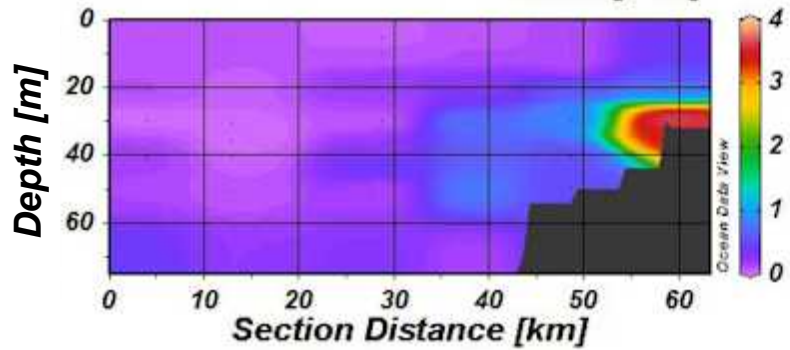
< 2016 field results > Vertical sections across Barrow Canyon



Temperature [°C]

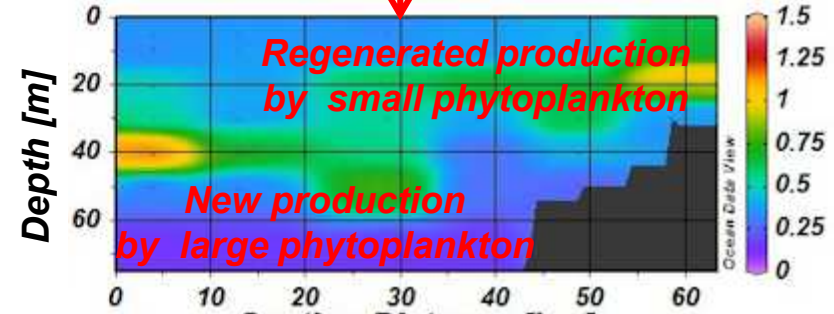


Turbidity [FTU]

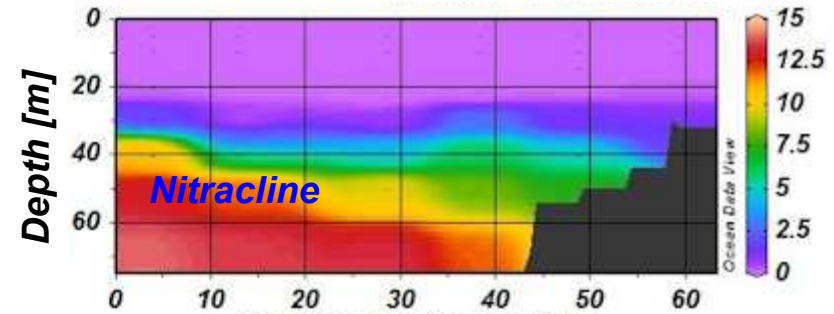


Mooring with DO and MFL sensors

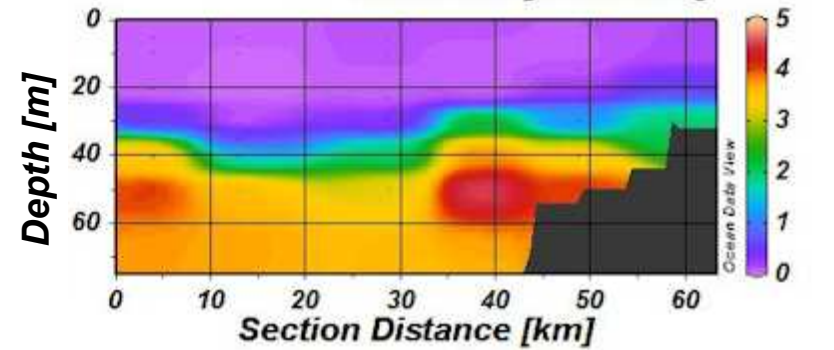
Chl-a [mg m⁻³]



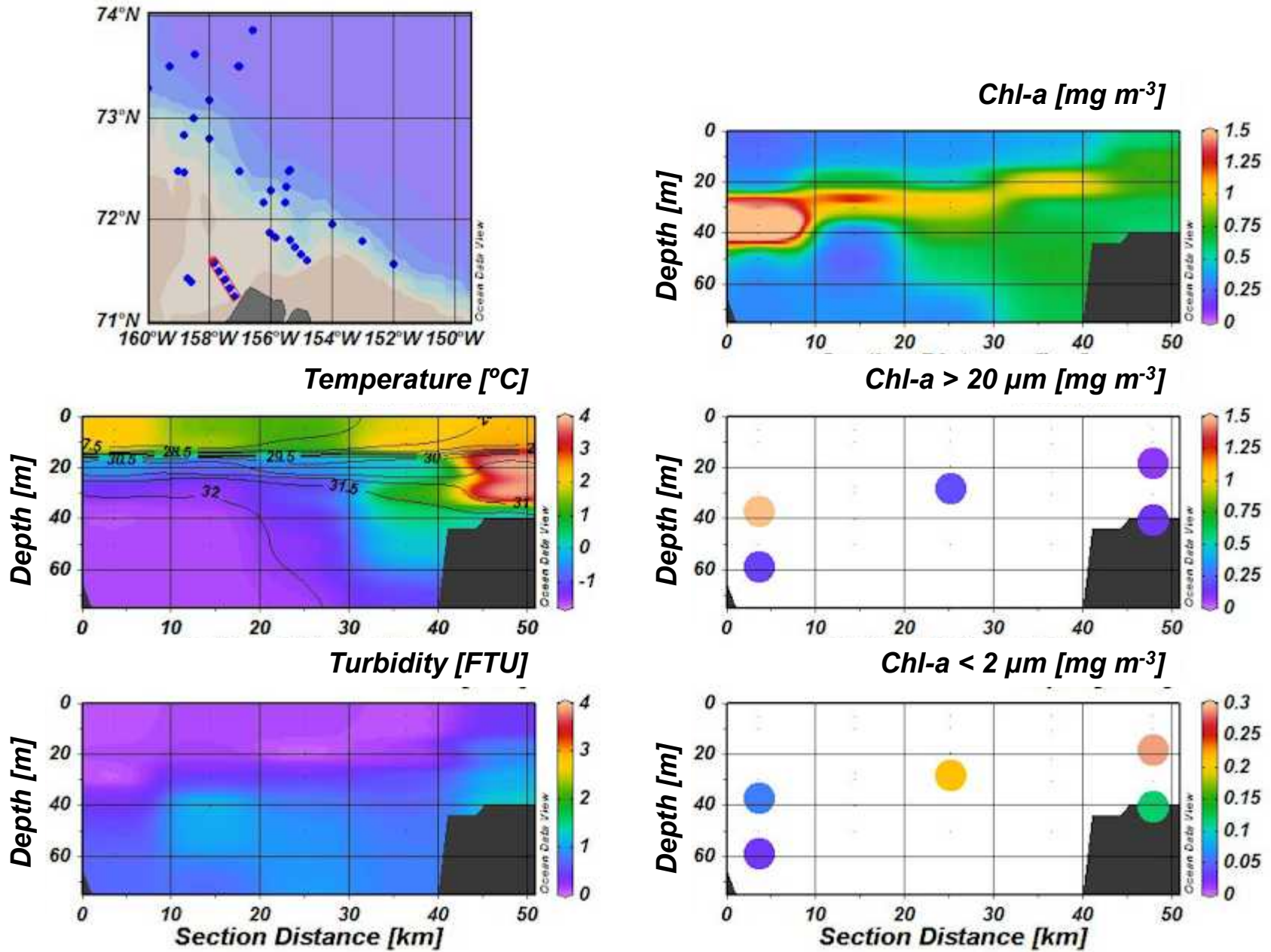
Nitrate [μmol kg⁻¹]



Ammonium [μmol kg⁻¹]

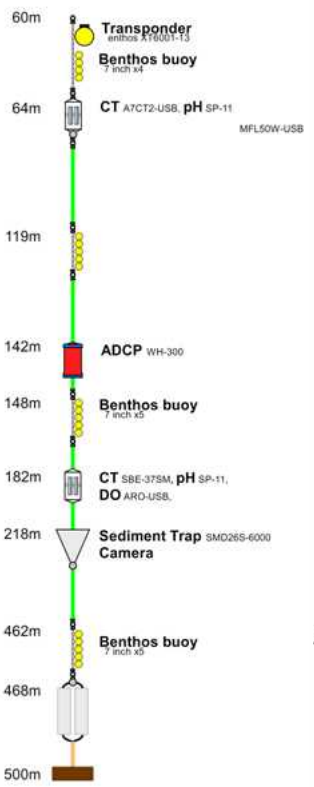


< 2016 field results > Vertical sections of DBO5

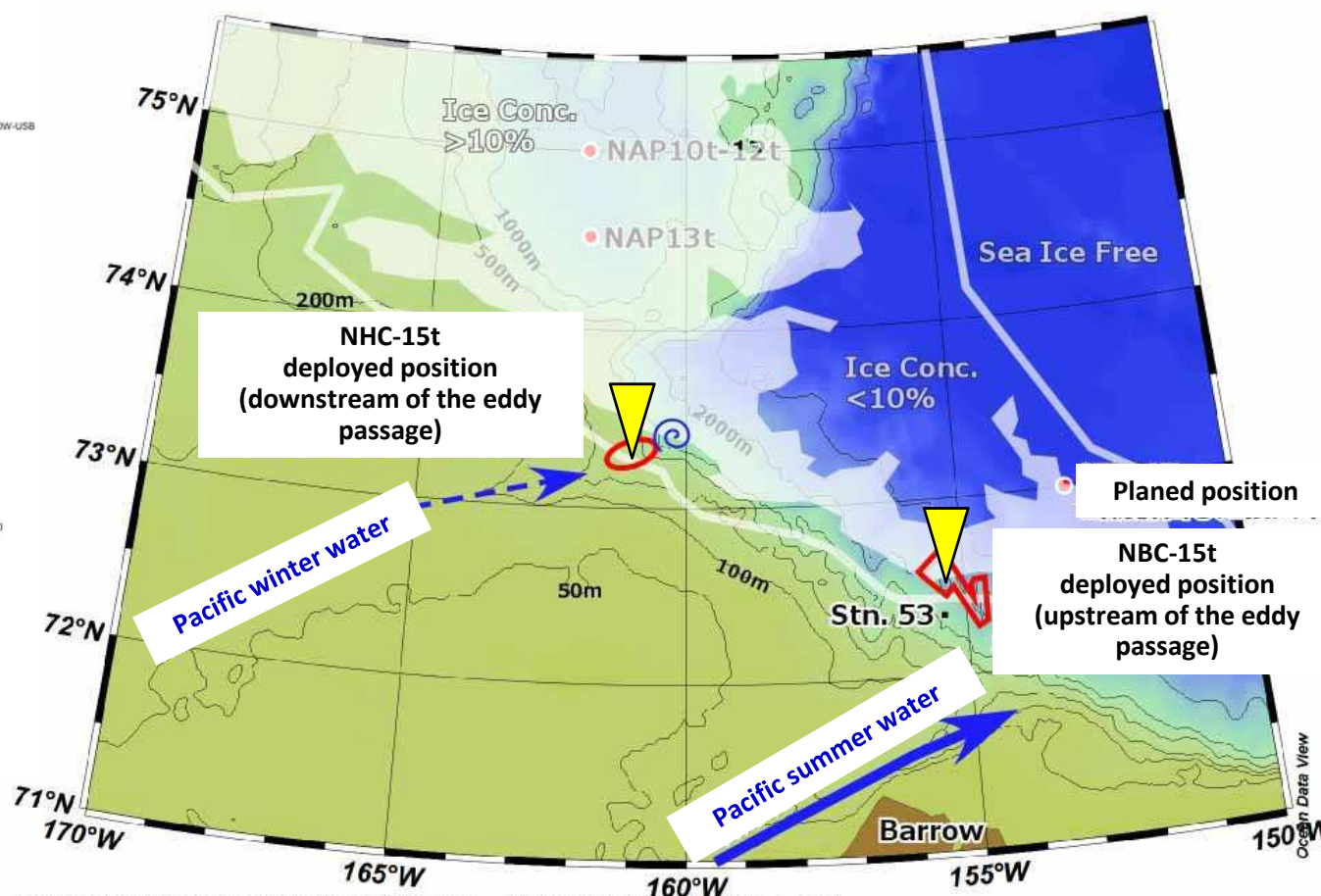


Sediment trap deployments to study the difference of particles between the upstream and downstream of the eddy passage

NHC-15t

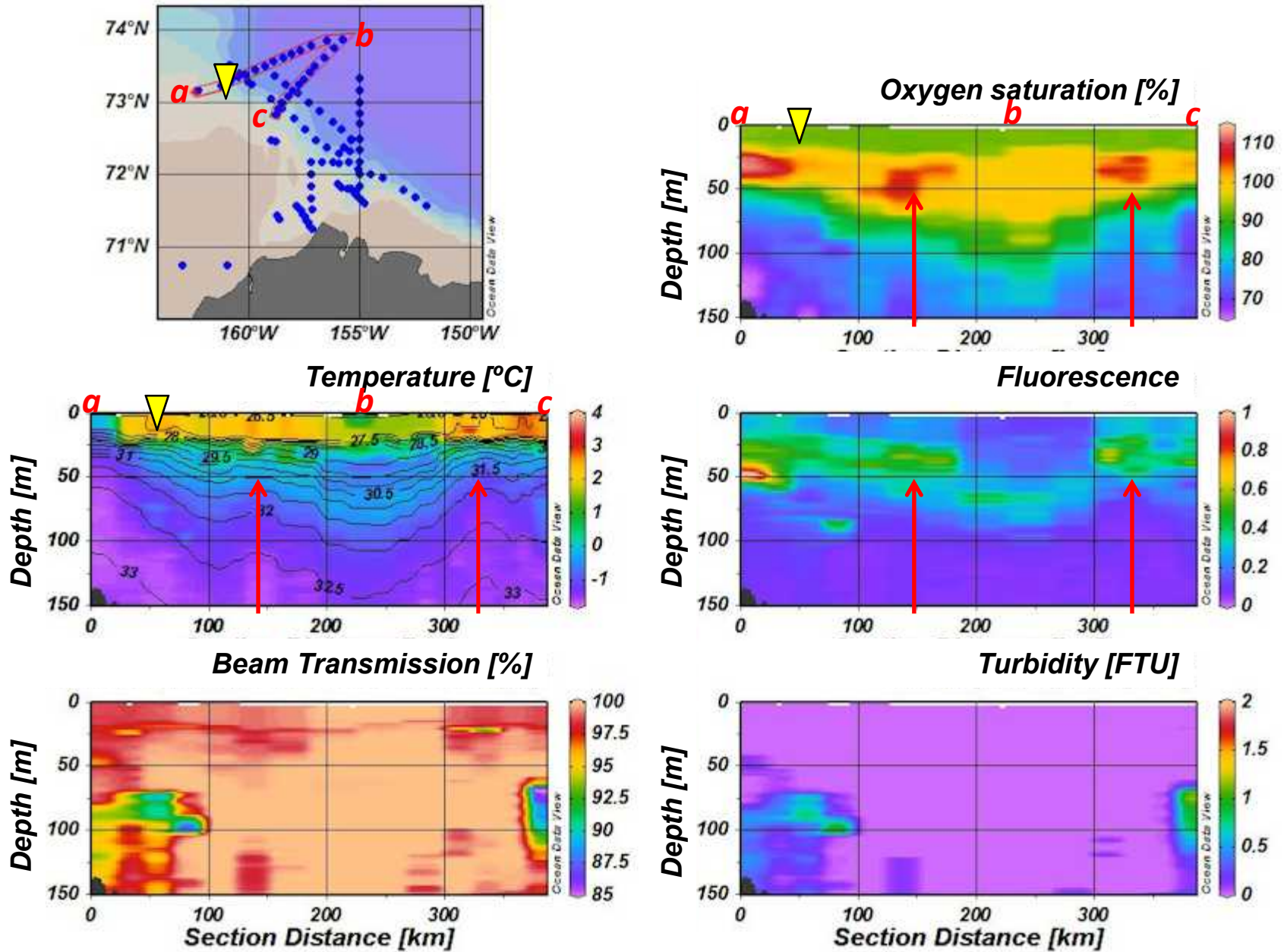


NBC-15t

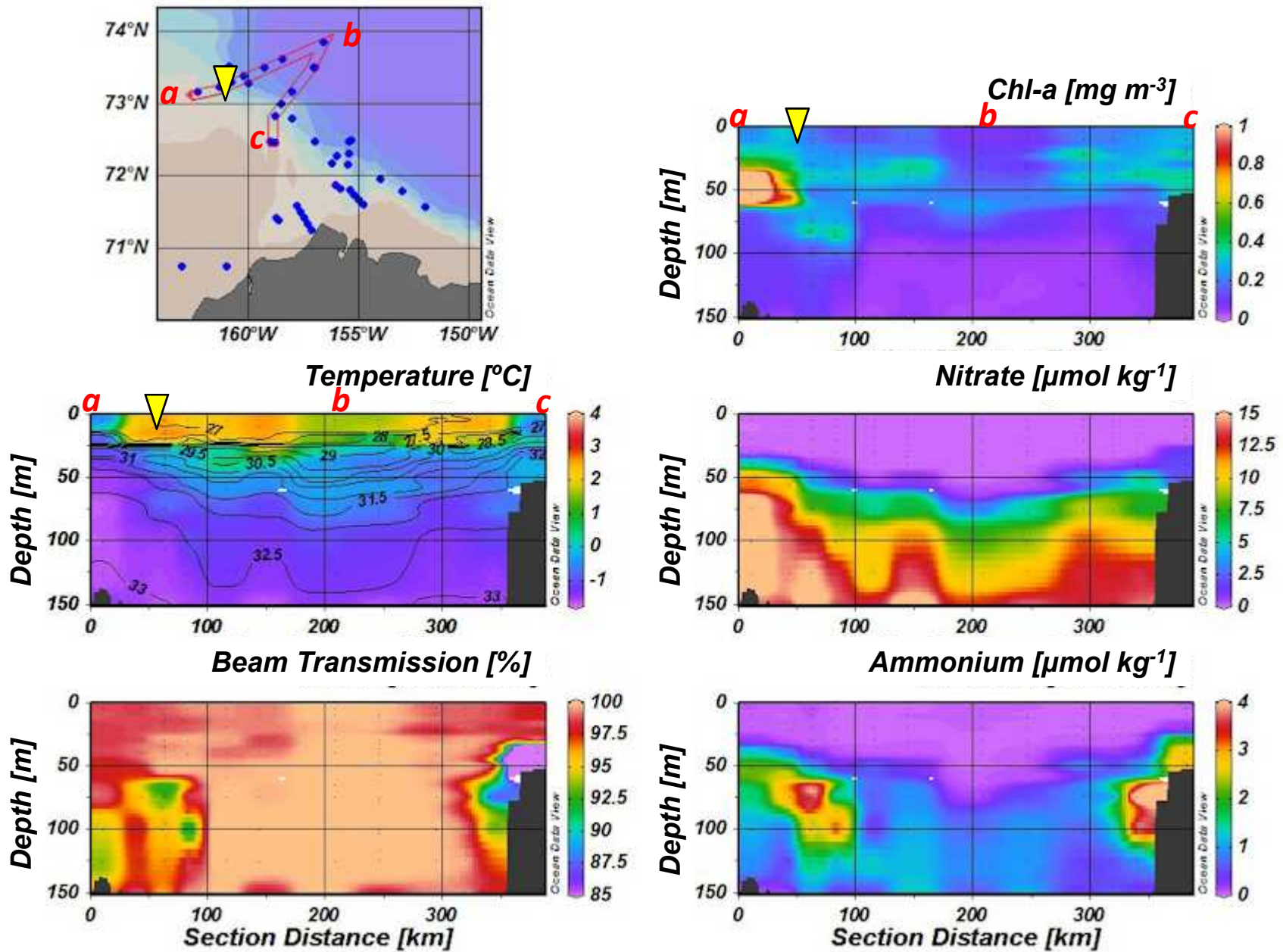


[From Dr. Onodera]

<2016 field results> Vertical sections from Chukchi shelf to Canada Basin



<2016 field results> Vertical sections from Chukchi shelf to Canada Basin



R/V Mirai 2017 Arctic Cruise Plan

Schedule

August 22 (Tue.) Embarkation at Dutch Harbor

August 23 (Wed.) Departure from Dutch Harbor

<45-days cruise in the Pacific Arctic Region>

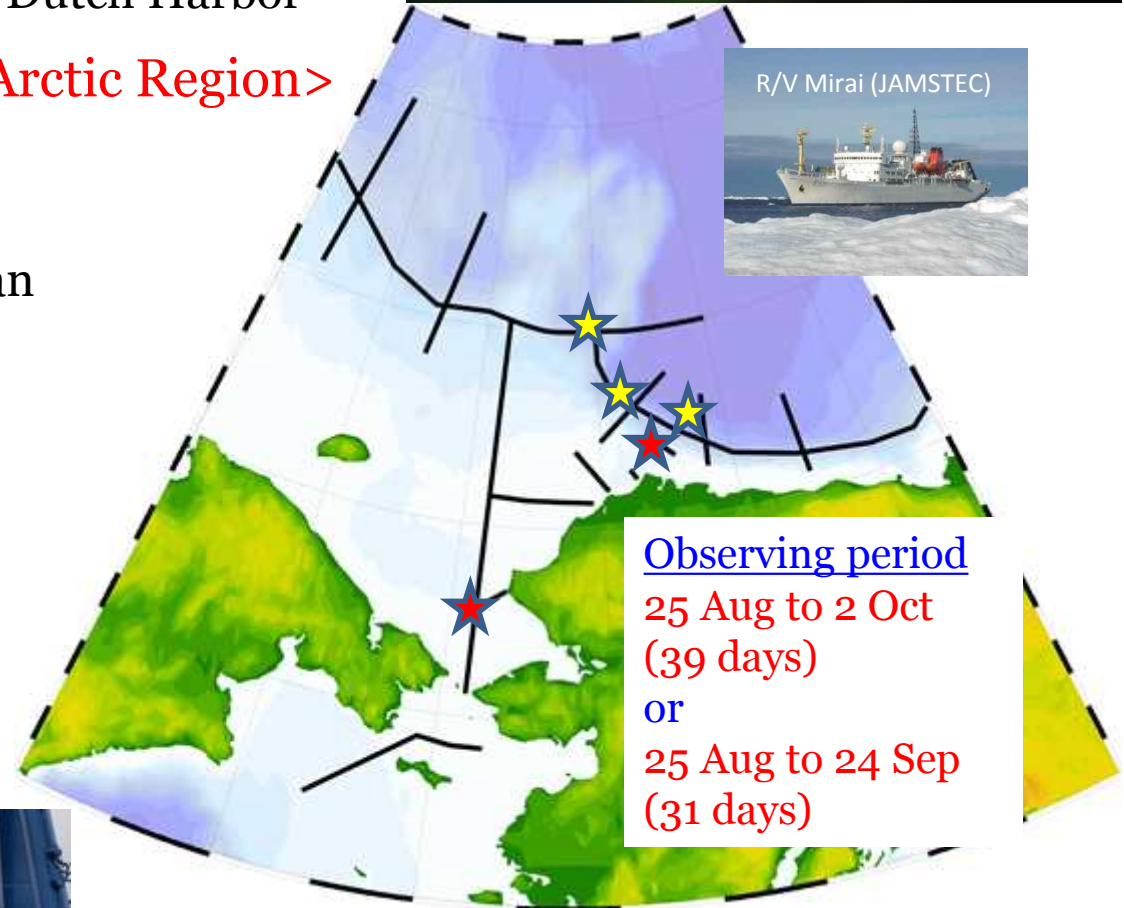
October 05 (Thu.)

Arrival at Dutch Harbor
and then moving back to Japan

or

Arrival at Hachinohe, Japan
(Directly moving back to Japan)

* It depends on the budget for this cruise.

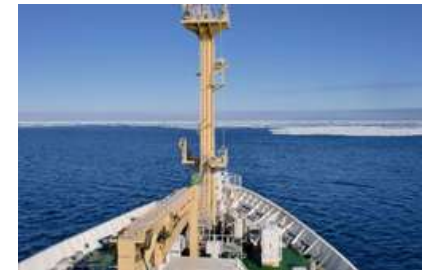


Tentative plan of
R/V Mirai 2017 Arctic cruise (as of Oct. 20, 2016)
Note that star marks show the location of moorings.

R/V Mirai 2017 Arctic Cruise Plan

Research on-board (as almost the same as 2016 cruise)

- ❑ Predictability study on weather and sea-ice forecasts linked with user engagement (meteorology, wave, droplets/spray icing)
- ❑ Ship-borne observations of trace gases/aerosols in the marine atmosphere
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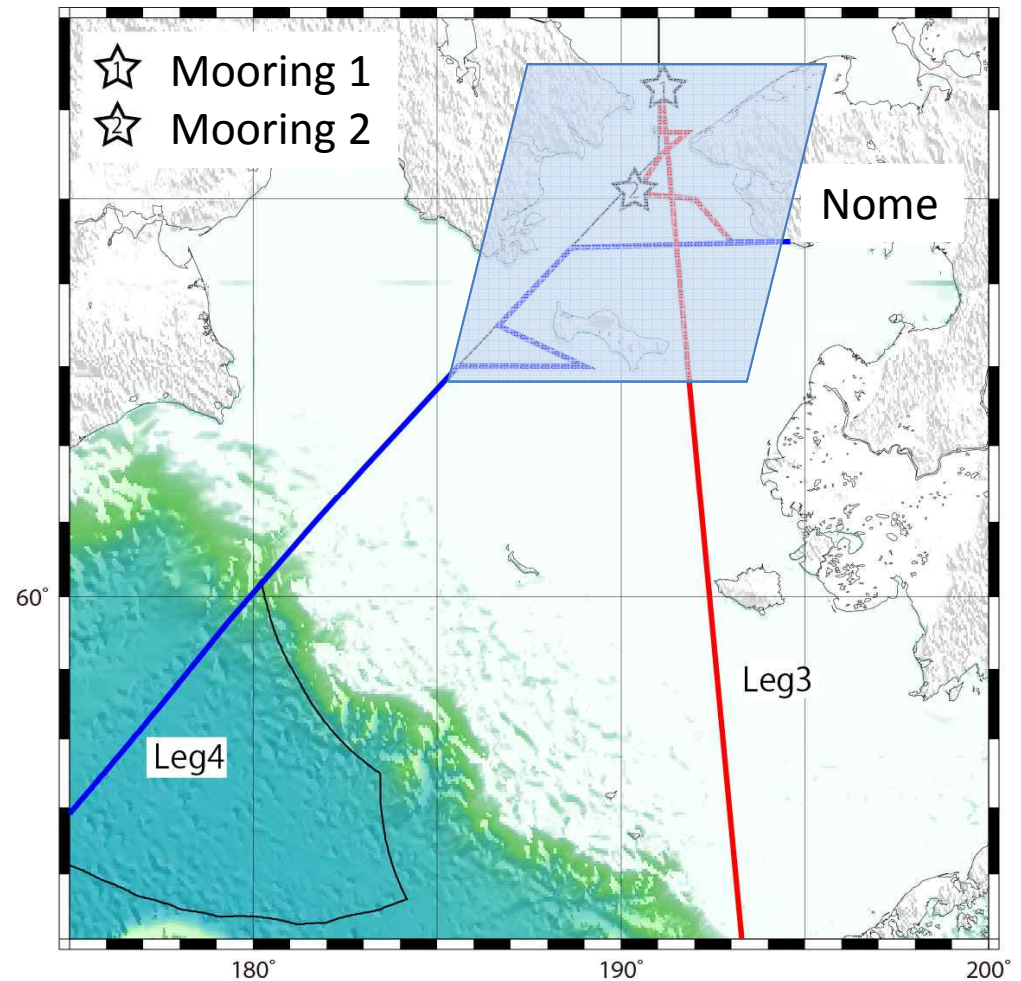


T/S Oshoro-maru 2017 Cruise Plan

- July 6 (Dutch Harbor) - July 14 (Nome)
- July 16 (Nome) - August 2 (Hakodate)



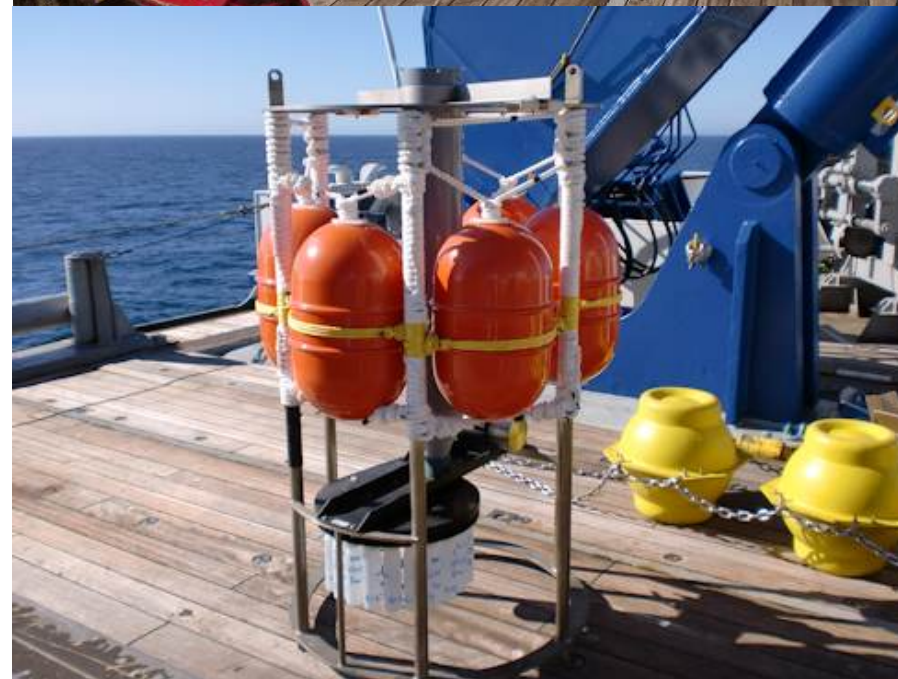
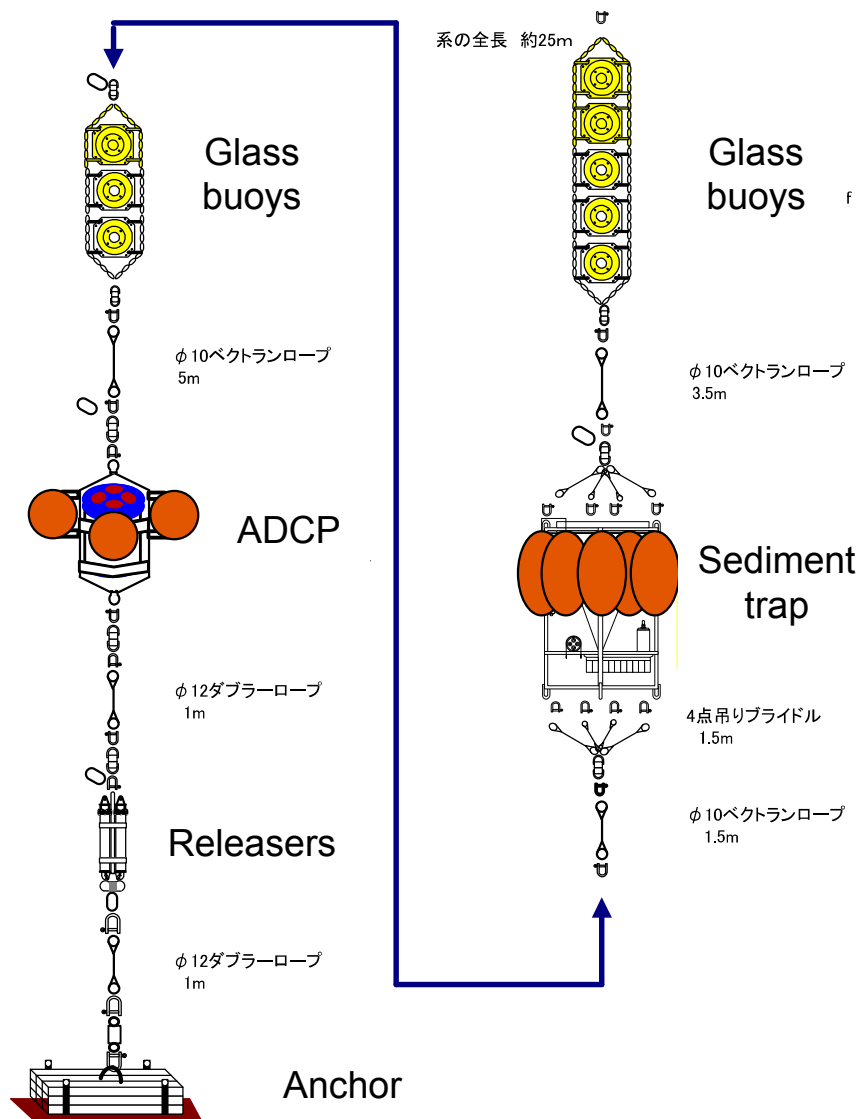
T/S Oshoro-maru V, Hokkaido University
Built in July 2014
This cruise will be her first foreign voyage.



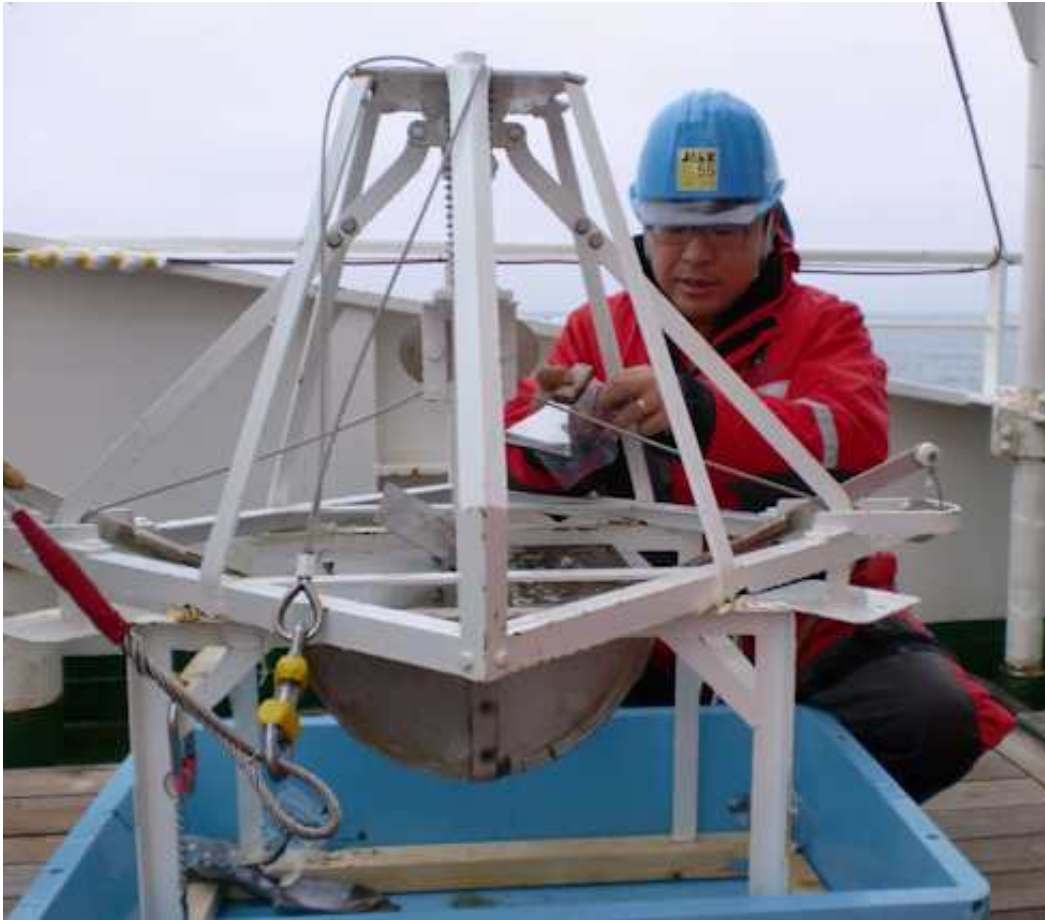
T/S Oshoro-maru 2017 Cruise Plan

- Nutrient supply mechanism to maintain high biological production
- Recovering/deployment of sediment trap and ADCP at two stations
- Distribution of carbonate, macro and micro nutrients, organic gas and their flux from sediment
- Primary productivity distribution related to water mass
- Water mass definition using dissolved organic carbon
- Relationship among productivities of fish, benthos, seabirds and planktons
- Transportation, accumulation and sources of contaminants in Arctic marine biology

Sediment trap diagram and photos



S&M grab and benthos



Japanese activity completed in 2016

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Japanese activities planed in 2017

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