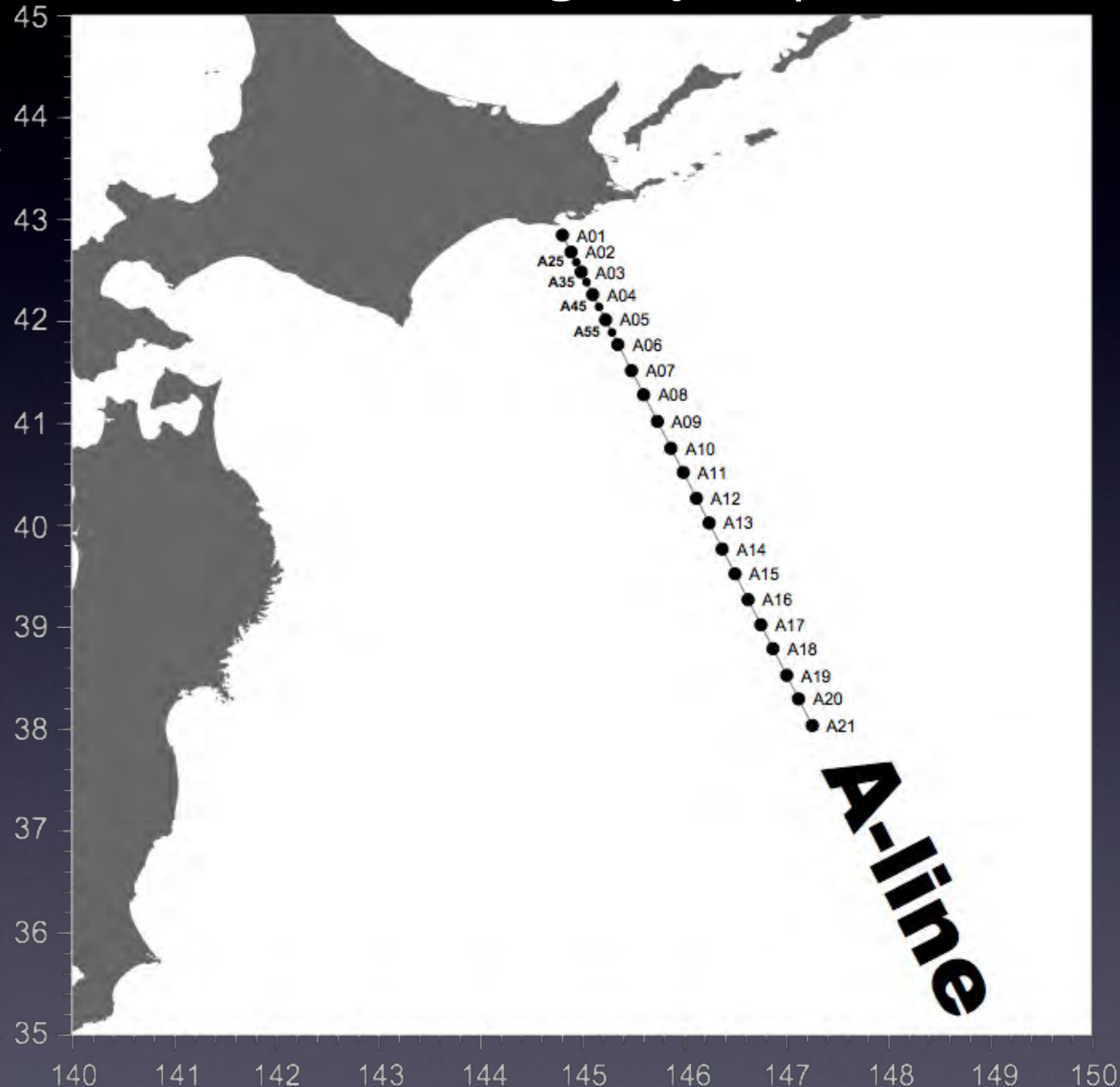
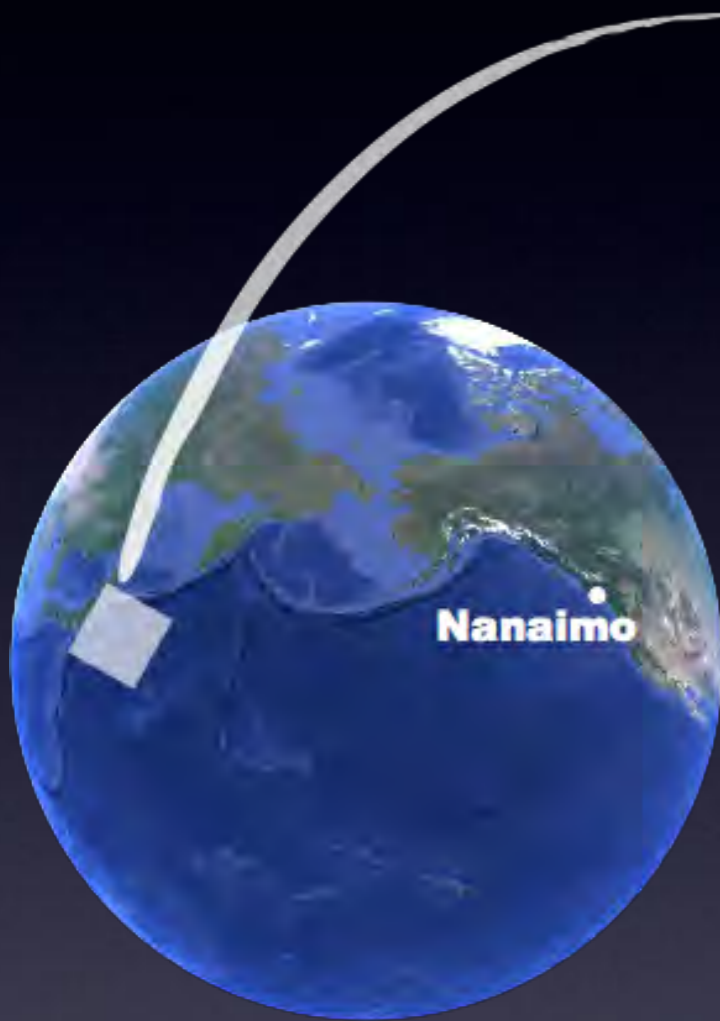


A-Line monitoring

Operated by Fisheries Research Agency, Japan



'A' is Akkeshi



Akkeshi Bay

Beautiful bridge

Tasty oyster

Sea birds

St. A1

All began in this year.

God father of A-line

1987



M. Kashiwai



Beyond Tsunami at 3.11

From Tohoku institute



Tsunami attacked Research vessel 'Wakataka' and Tohoku institute. However we did not stop A-Line.



Research vessels

Retired

Tankai-maru



Previous Hokko-maru



Running

Hokko-maru



Wakataka-maru



Crew Hokko



Crew Wakataka



A-line Scenes



FRA
Fisheries Research Agency

First cruise in 1987



FUJICOLORHR



FUJICOLORHR



FUJICOLORHR



FUJICOLORHR

CTD observation



Glider observation



Mooring system



Plankton sampling

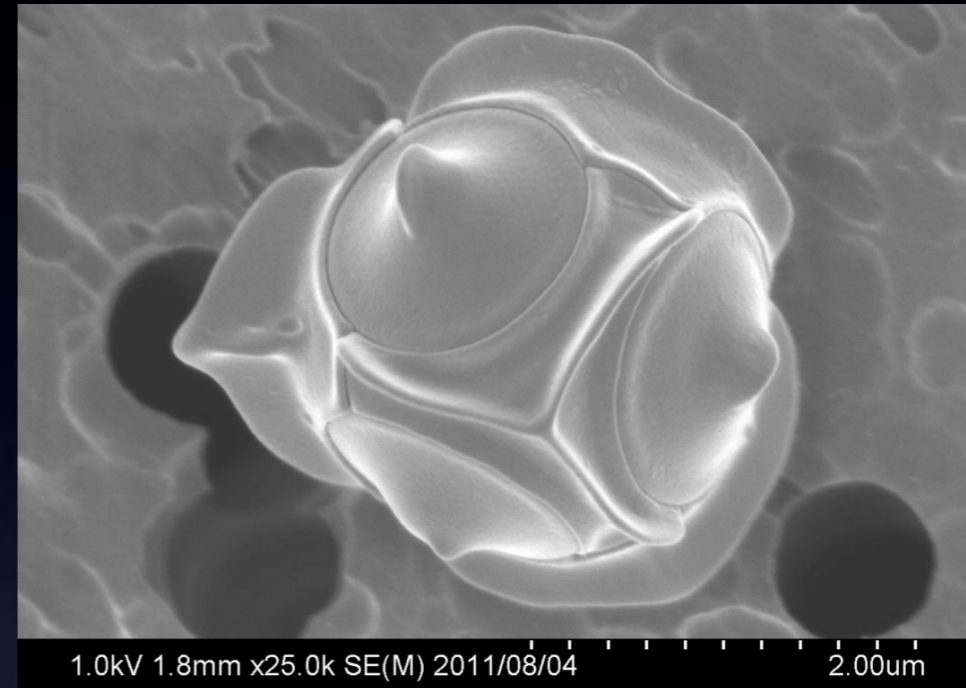
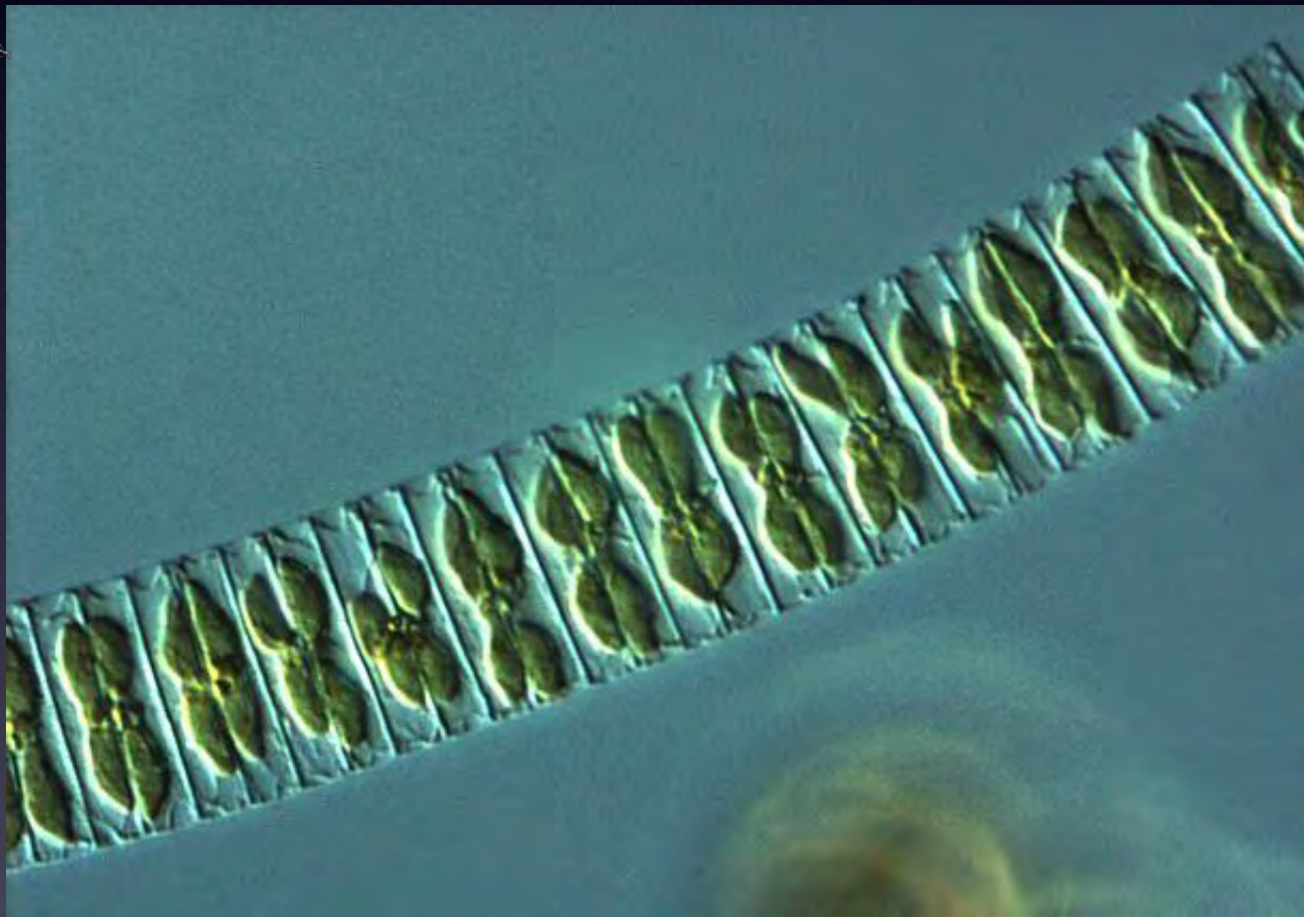
MOCNESS



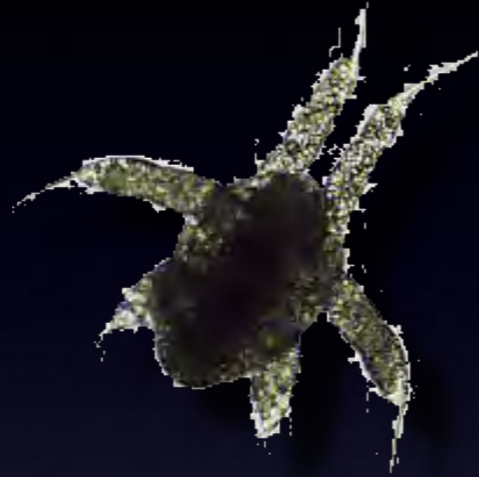
Winter observation



Phytoplankton



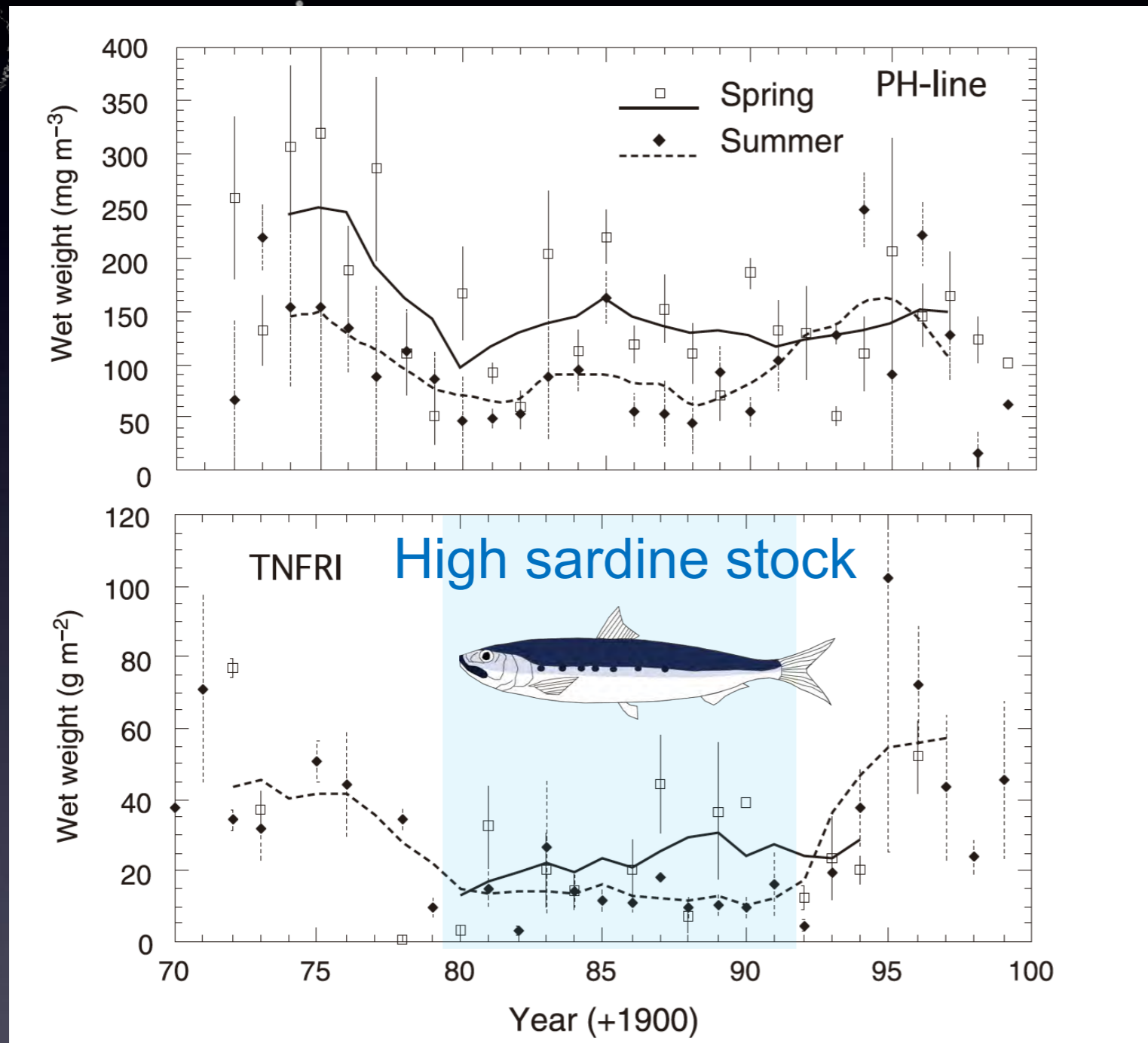
Zooplankton



Micro-nekton



Decadal scale variation of zooplankton biomass



Feeding pressure of Japanese sardine might decrease the zooplankton biomass in the Oyashio

NEMURO model

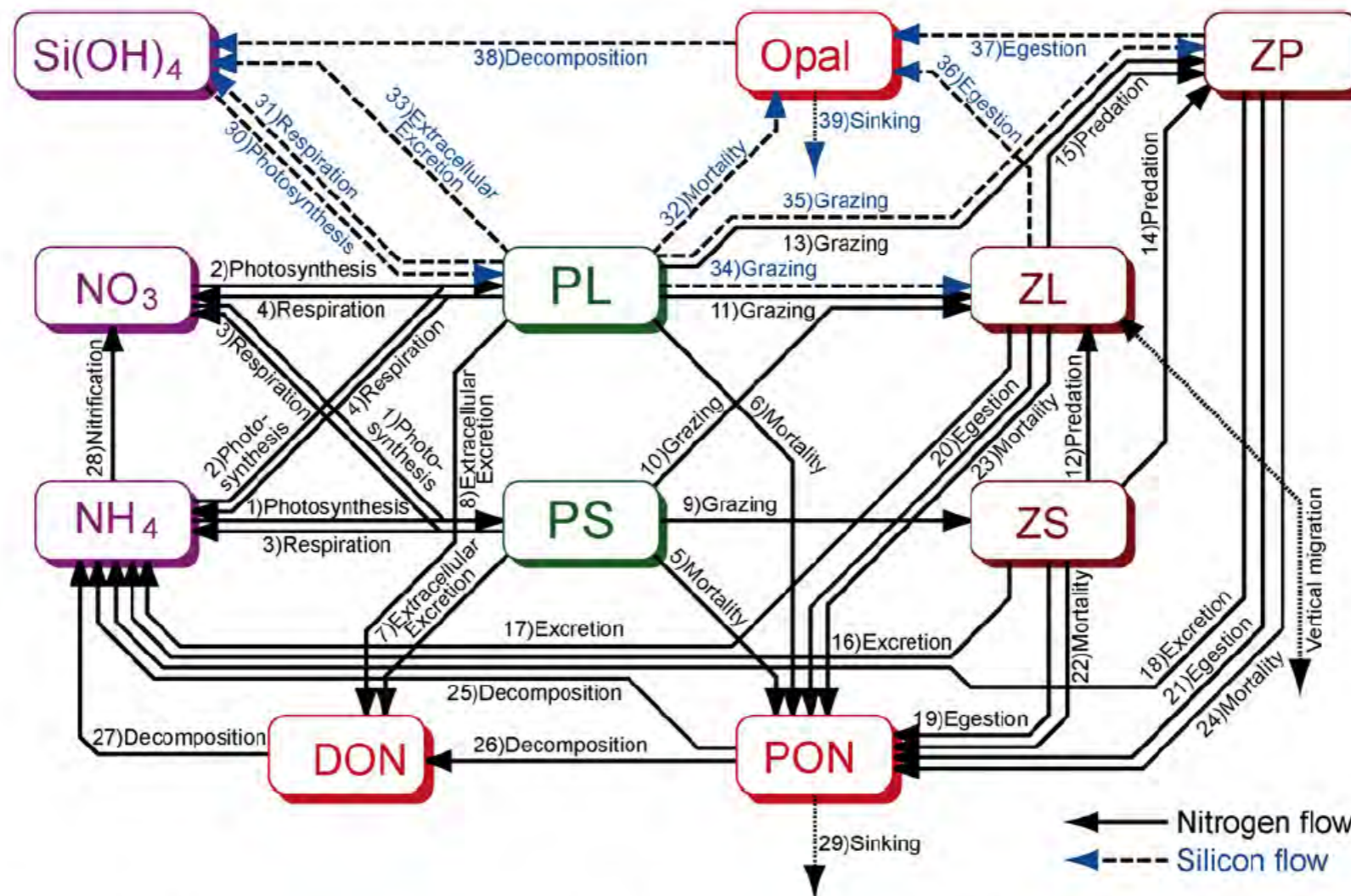
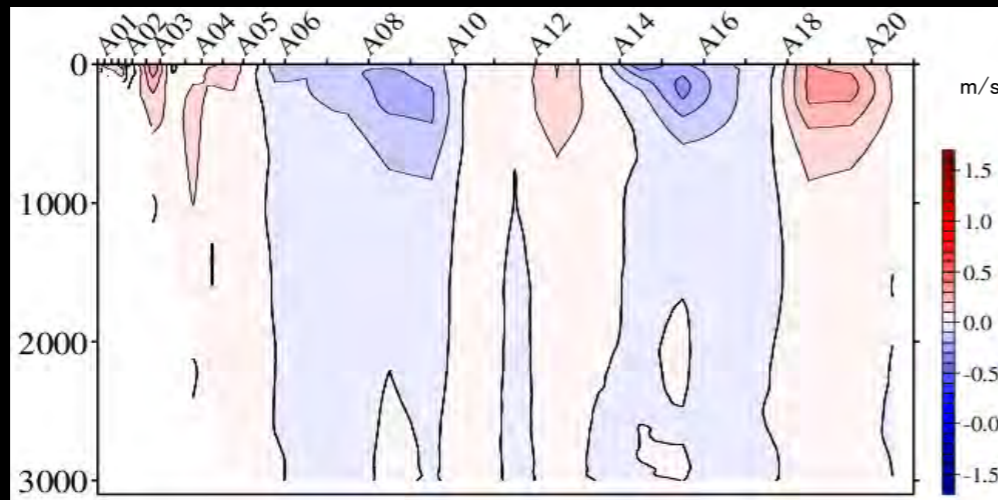


Fig. 1 – Schematic view of the NEMURO lower trophic level ecosystem model. Solid black arrows indicate nitrogen flows and dashed blue arrows indicate silicon. Dotted black arrows represent the exchange or sinking of the materials between the modeled box below the mixed layer depth.

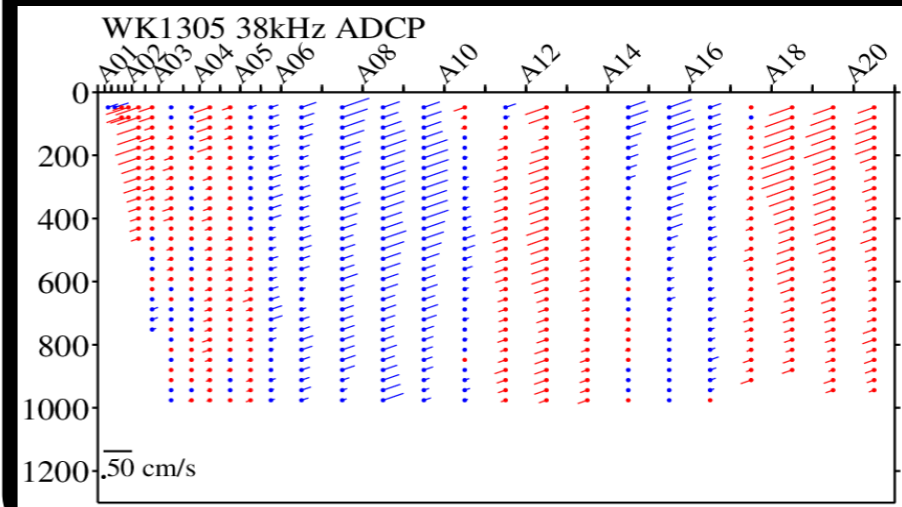
Geostrophic volume transport

CTD-derived geostrophic velocity
(3100-db/bottom reference)

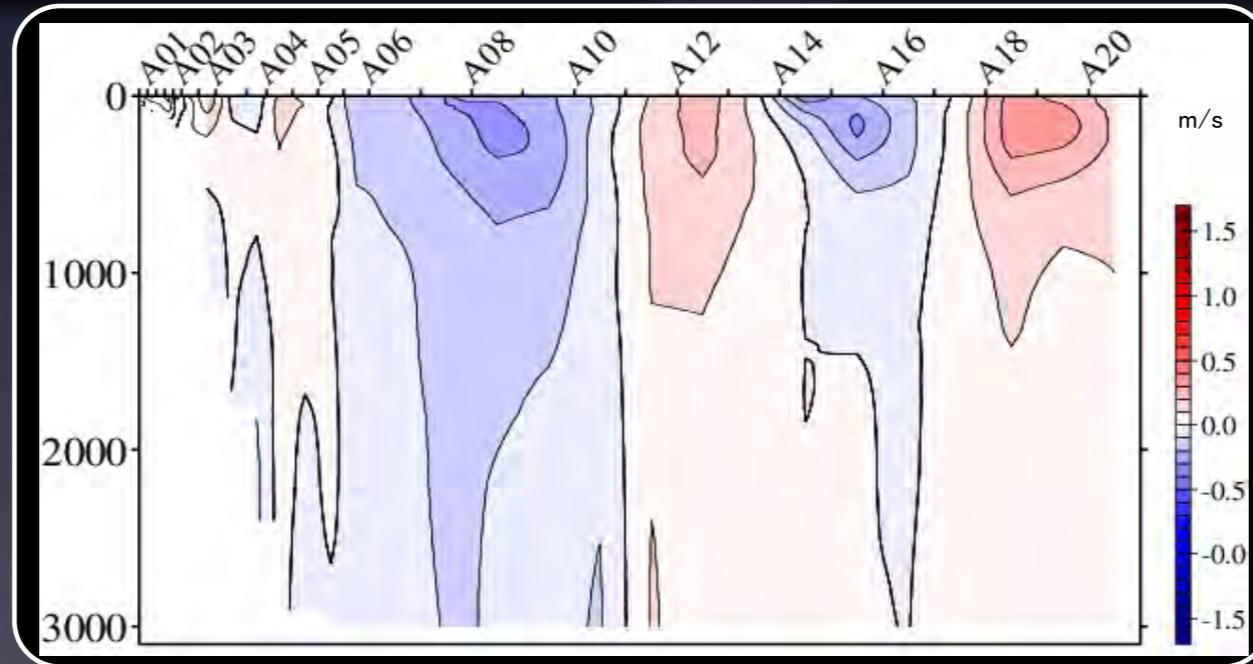


+

ADCP velocity component
normal to the A-Line



=



Life cycle of *Neocalanus*

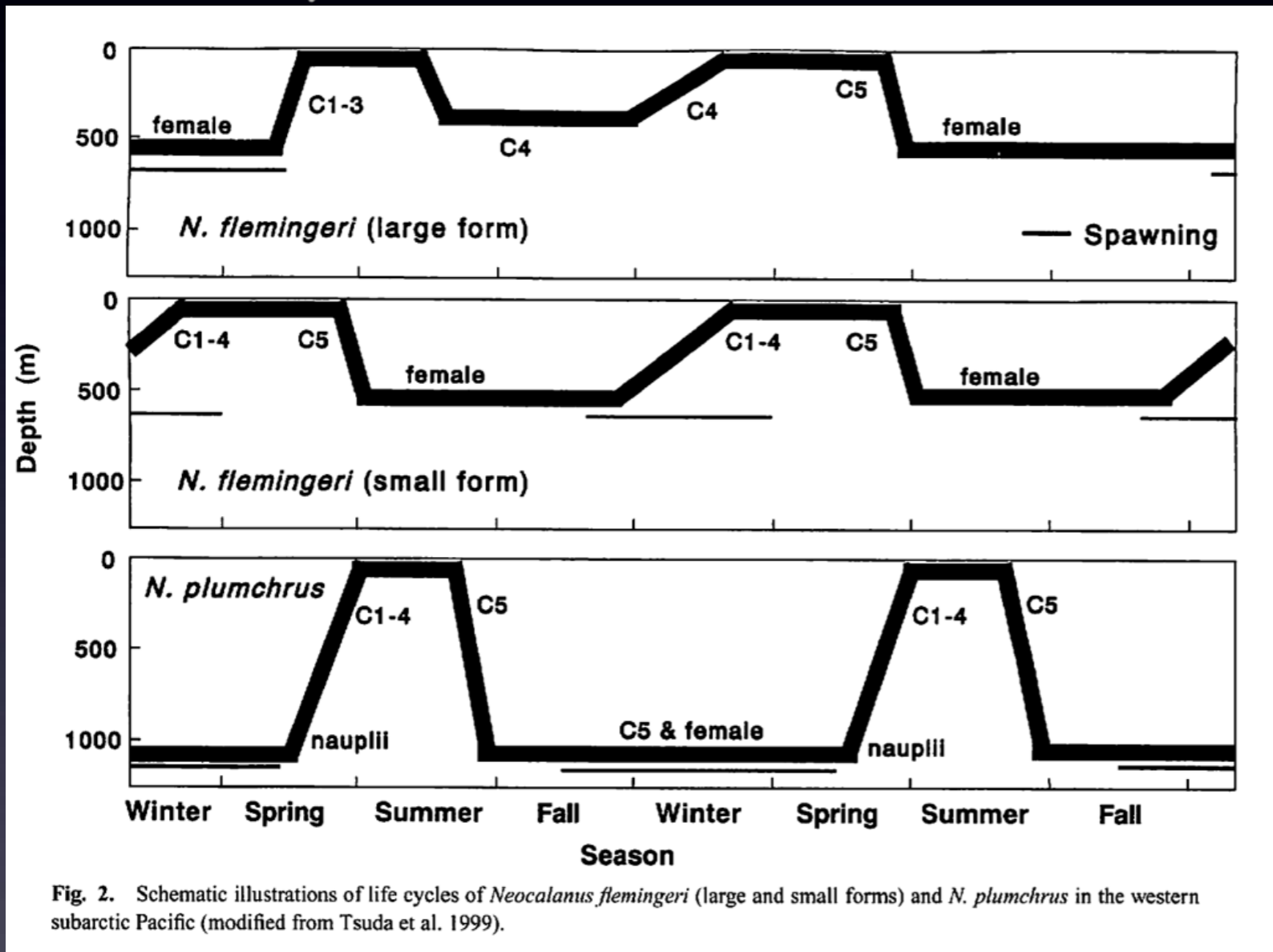


Fig. 2. Schematic illustrations of life cycles of *Neocalanus flemingeri* (large and small forms) and *N. plumchrus* in the western subarctic Pacific (modified from Tsuda et al. 1999).

Decadal scale variation of nutrients

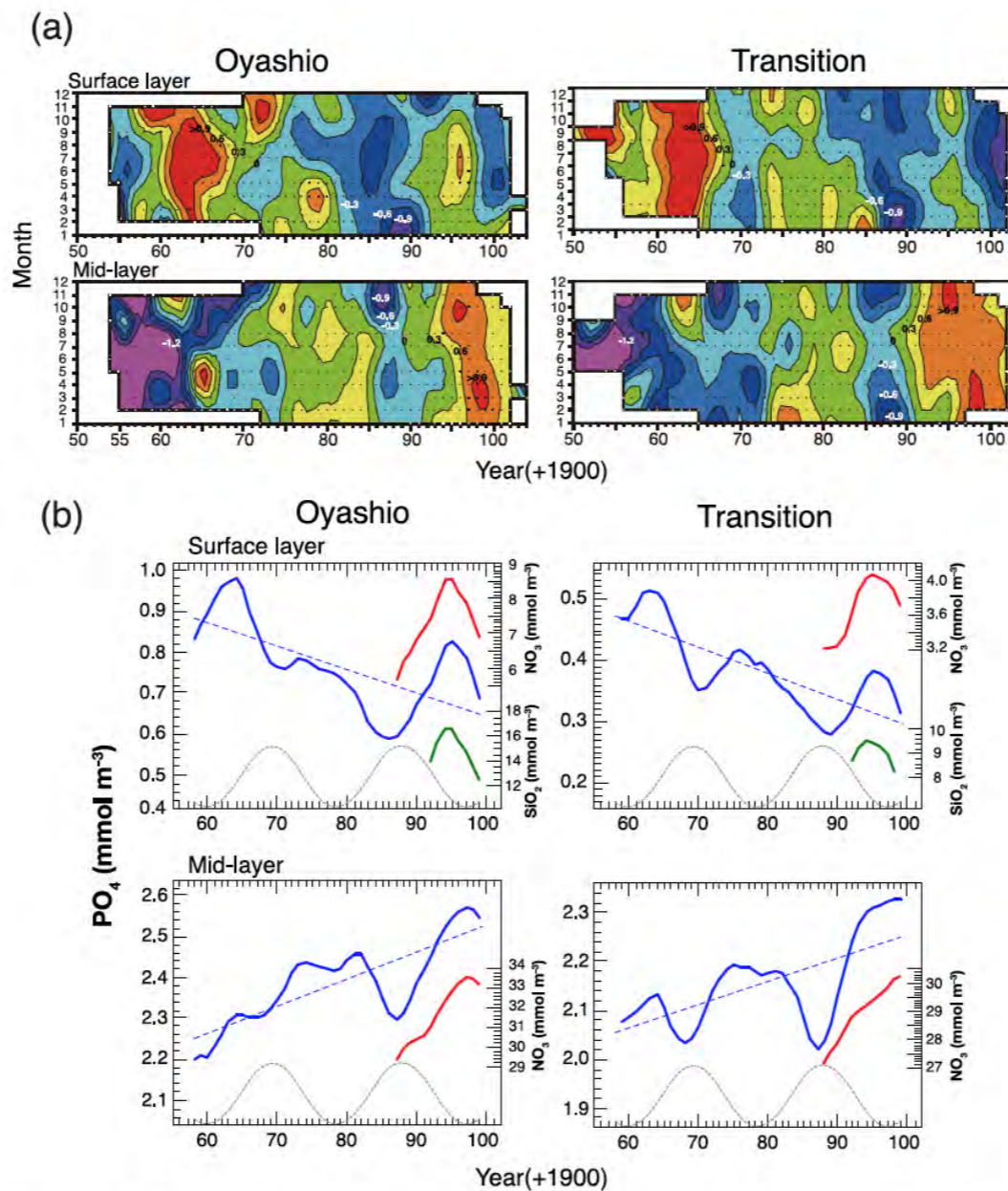


Figure 1. (a) Variations in the monthly mean normalized PO_4 concentration in the surface and mid-layers of the Oyashio and Transition from the mid-1950s to early 2000s. Black and white dots indicate months for which data were available. (b) Five-year running mean of the annual mean concentration ($mmol\ m^{-3}$) of PO_4 (blue lines), NO_3 (red lines), and SiO_2 (green lines) from the mid-1950s to early 2000s. Blue broken lines indicate statistically significant trends of PO_4 . Thin gray broken lines represent the index of diurnal tidal strength represented by the sine curve of the 18.6-yr cycle.

Iron cycle

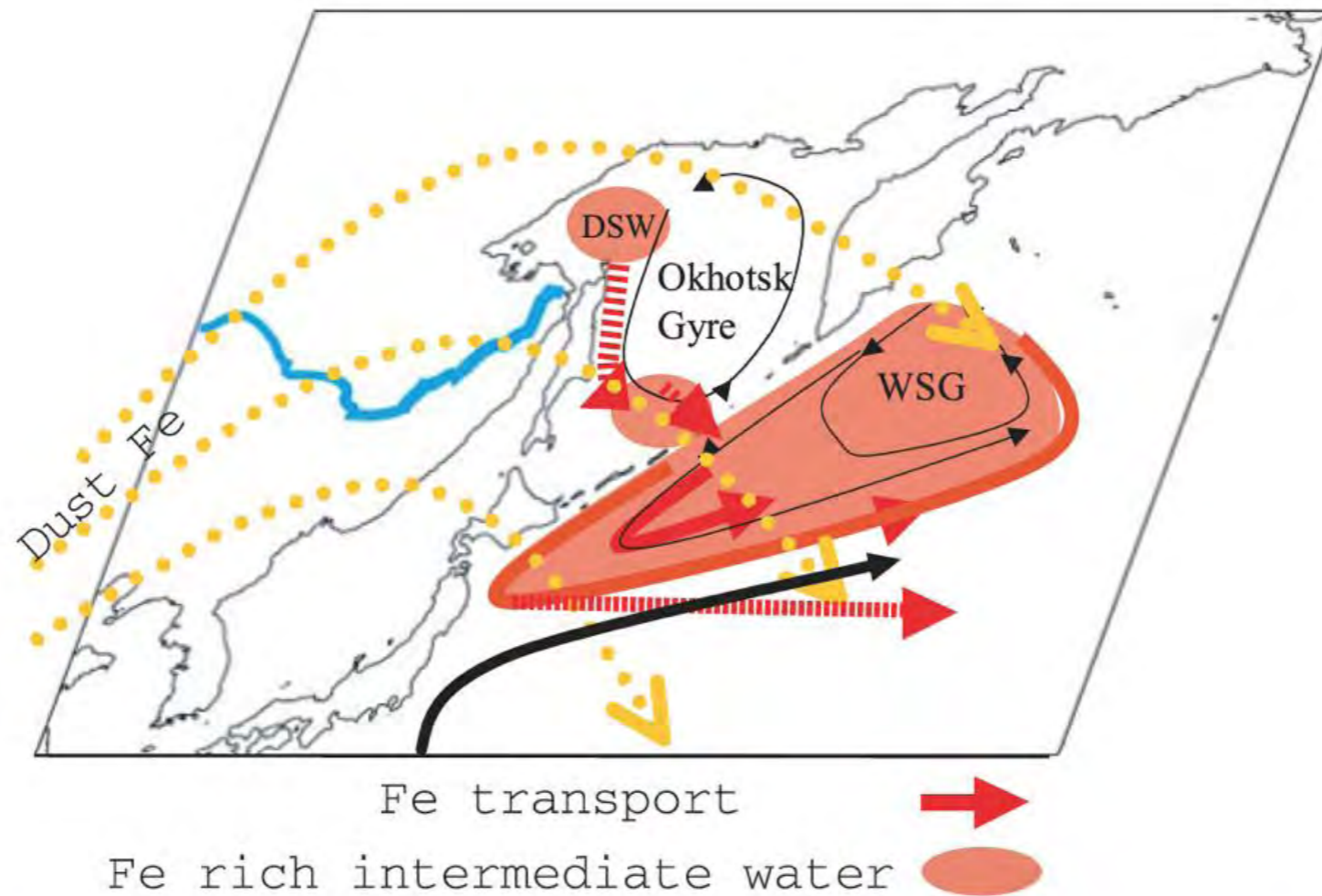


Figure 13. Schematic of iron supply process proposed in this study. Water ventilation processes in this region control the transport of dissolved and particulate iron through the intermediate water layer from the continental shelf of the Sea of Okhotsk to the wide area of the WSP.

Outstanding achievements

Multi-decadal decrease of net community production in western subarctic North Pacific
T. Odo,¹ K. Tadokoro,¹ T. Midorikawa,² J. Nishioka,³ and T. Saino^{1,4}
Received 6 November 2001; accepted 30 January 2002; published 18 April 2002

Life history strategies of subarctic copepods *Neocalanoides plumchris* and *N. plumchris*, especially concerning accumulation patterns
ATSUSHI TSUDA, HIROAKI SAITO & HIROMI KASAI
Hokkaido National Fisheries Research Institute, 116 Kusumoto, Kushiro 085-0802, Japan
Received 27 December 1999; accepted 21 August 2000

Iron supply to the western subarctic Pacific from the Sea of Okhotsk
Jim Nishioka,^{1,2} Tsuneo Ono,³ Hiroaki Saito,⁴ Takashi Shimizu,⁵ Takeshi Yoshimura,⁶ Koji Suzuki,⁷ Kazuki Kusaka,⁸ Naoki Yoshie,⁹ Daisuke Tsunune,¹⁰ Hamio Mitsuura,¹¹ W. Keith Johnson,¹² and Tetsuo Takai¹³
Received 12 December 2006; revised 25 May 2007; accepted 10 June 2007

Seasonal changes in micro-zooplankton phytoplankton assemblages in the western subarctic Pacific
AKIYOSHI SHIMADA¹, TRUTOMU IKEDA¹, SYUHEI HAN¹ & ATSUSHI TSUDA²
Hokkaido National Fisheries Research Institute, 116 Kusumoto, Kushiro 085-0802, Japan
Received 11 January 2000; accepted 29 March 2000

Possible mechanisms of decadal-scale variation in PO₄ concentration in the western North Pacific
Kazuki Tadokoro,¹ Tsuneo Ono,² Ichiro Yasuda,³ Satoshi Otsuie,⁴ Akihito Shimoto,⁵ and Hiroya Saito^{6,7}
Received 15 January 2009; revised 21 March 2009; accepted 1 April 2009; published 29 April 2009

Nutrient and plankton dynamics in the western subarctic Pacific Ocean
Hiroaki Saito*, Atsushi Tsuda, Hiroaki Saito, and Toshiro Saino^{1,4}
Deep-Sea Research II 49 (2002) 943-948
Received 30 January 2001; accepted 18 August 2001

Increased Stratification and Decreased Level Productivity in the Oyashio Region of the Pacific: A 30-Year Retrospective Study
SANAÉ CHIBA*, TSUNEO ONO*, KAZUAKI TADOKORO*, TAKASHI SHIMIZU*, HIROAKI SAITO*, HIROMI KASAI*, and TOSHIRO SAINO^{1,4}
Frontier Research System for Global Change, Hokkaido National Fisheries Research Institute, Kusumoto, Kushiro 085-0802, Japan
Received 11 August 2003; revised from 28 October 2003; accepted 14 November 2003

North Pacific Intermediate Water: Progress in the SubArctic Gyre Experiment and Related Studies
ICHIRO YASUDA*
Department of Earth and Planetary Science, Graduate School of Science, Hokkaido University, Sapporo 060-0810, Japan
Received 19 February 2003; revised from 8 October 2003; accepted 14 November 2003

Nutrient and Plankton Dynamics in the NE and NW Cores of the Subarctic Pacific Ocean
PAUL J. HARRISON*, FRANK A. WHITNEY*, ATSUSHI TSUDA*, HIROAKI SAITO*, and KAZUAKI TADOKORO*
JAMCCE Program, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, China
Received 3 October 2003; revised from 25 November 2003; accepted 14 December 2003

Seasonal dynamics of plankton chain in the Oyashio region, western subarctic Pacific
A. SHIMADA^{1,3}, T. IKEDA¹, S. HAN¹ AND A. TSUDA²
Hokkaido National Fisheries Research Institute, 116 Kusumoto, Kushiro 085-0802, Japan
Received 11 January 2000; accepted 29 March 2000

Influence of light intensity on diatom physiology and nutrient dynamics in the Oyashio region
Hiroaki Saito*, Atsushi Tsuda*
Hokkaido National Fisheries Research Institute, Kusumoto 116, Kushiro 085-0802, Japan
Received 10 January 2002; revised 3 March 2003; accepted 10 March 2003

Egg production and early development of the subarctic copepods *Neocalanoides plumchris* and *N. plumchris*
Hiroaki Saito*, Atsushi Tsuda, and Toshiro Saino^{1,4}
Deep-Sea Research I 47 (2000) 2141-2158
Received 4 June 1999; accepted 24 November 1999

Effects of decadal climate change on the last 50 years in the western subarctic Pacific
SANAÉ CHIBA*, KAZUAKI TADOKORO*, HIROAKI SAITO*, HIROMI KASAI*, and TOSHIRO SAINO^{1,4}
Frontier Research System for Global Change, Hokkaido National Fisheries Research Institute, Kusumoto, Kushiro 085-0802, Japan
Received 4 June 1999; accepted 24 November 1999

Response of *Eucalamus hungii* to oceanographic conditions in the western subarctic Pacific Ocean: Retrospective analysis of the Odate Collections
Toru Kobari*, Kazuki Tadokoro*, Hiroya Saito*, and Toshiro Saino^{1,4}
Aquatic Resource Science Division, Kagoshima University, 8-40-40 Korimoto, Kagoshima 890-0055, Japan
Received in revised form 25 June 2007; accepted 11 August 2007

Recent decrease of summer nutrients concentrations and future possible shrinkage of the subarctic North Pacific high-nutrient low-chlorophyll region
Tsuneo Ono,¹ Akihito Shimoto,² and Toshiro Saino^{1,4}
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Application of an automatic phytoplankton-zooplankton food web model in the Oyashio region
Shin-ichi Ito*, Naoki Yoshie*, Takeshi Okunishi*, Tsuneo Ono*, Yuji Okazaki*, Akira Kuwata*, Taketo Hashioka*, Kenneth A. Rose*, Michio J. Kishy*, Mwa Nakamura*, Yugo Shimizu*, Shigeo Kakehi*, Hiroaki Saito*, Kazutaka Takahashi*, Kazuki Tadokoro*, and Hiroaki Kasai*
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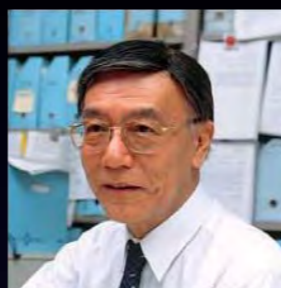
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Mutsuo Ichimizu*, Shinichi Tabuchi*, and Akira Kusuda*
Toboku National Fisheries Research Institute, 3-27-5, Shikamae-cho, Shikamae 985-0801, Japan

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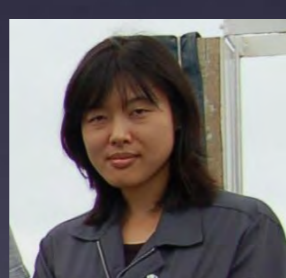
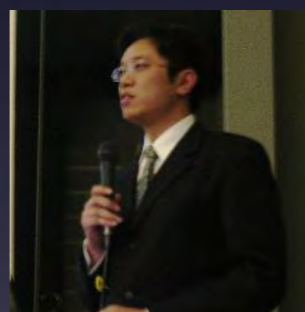
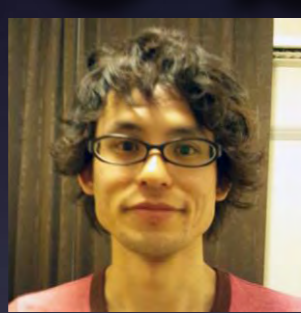
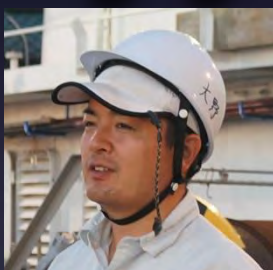
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We are born to observe!



A-Line

It will be inherited in future.

