Preliminarily results from the Oshoro-Maru IPY cruises in summer 2007 and 2008

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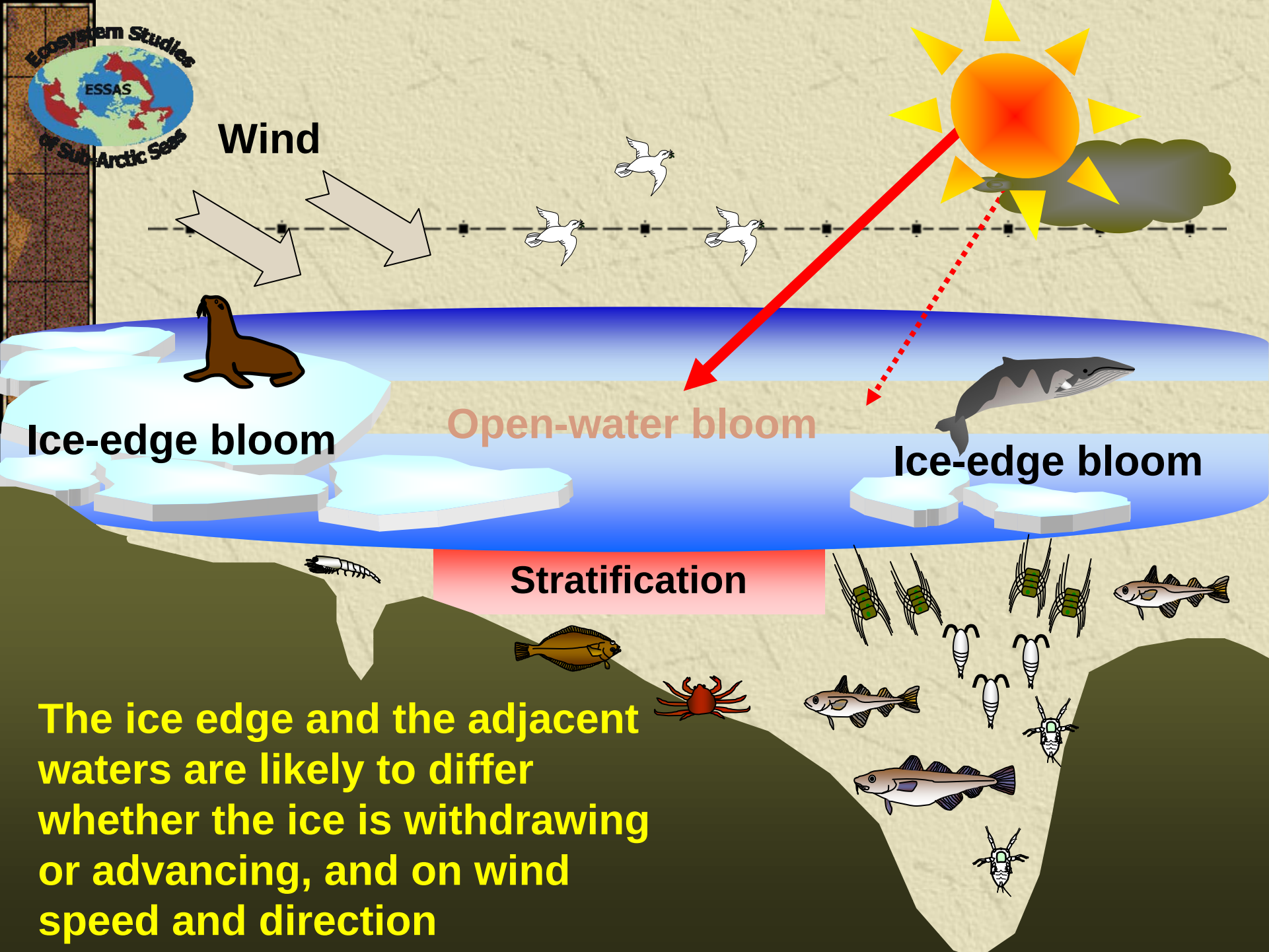
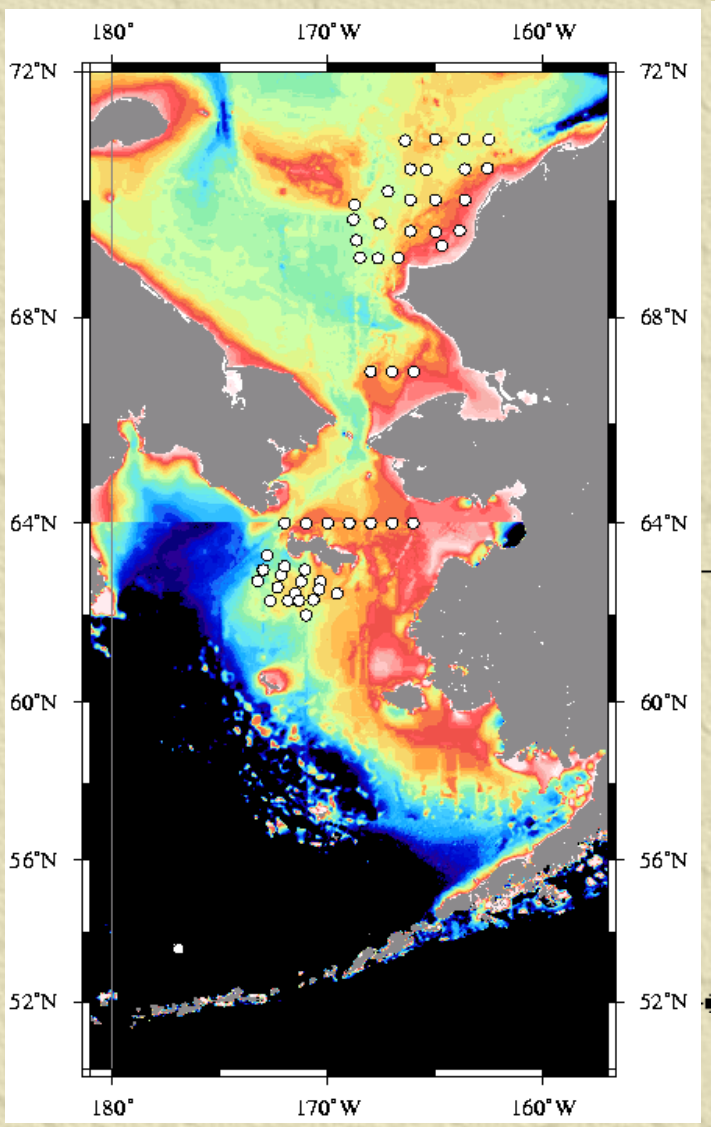
Fuclty of Fisheries Sciences

Hokkaido University

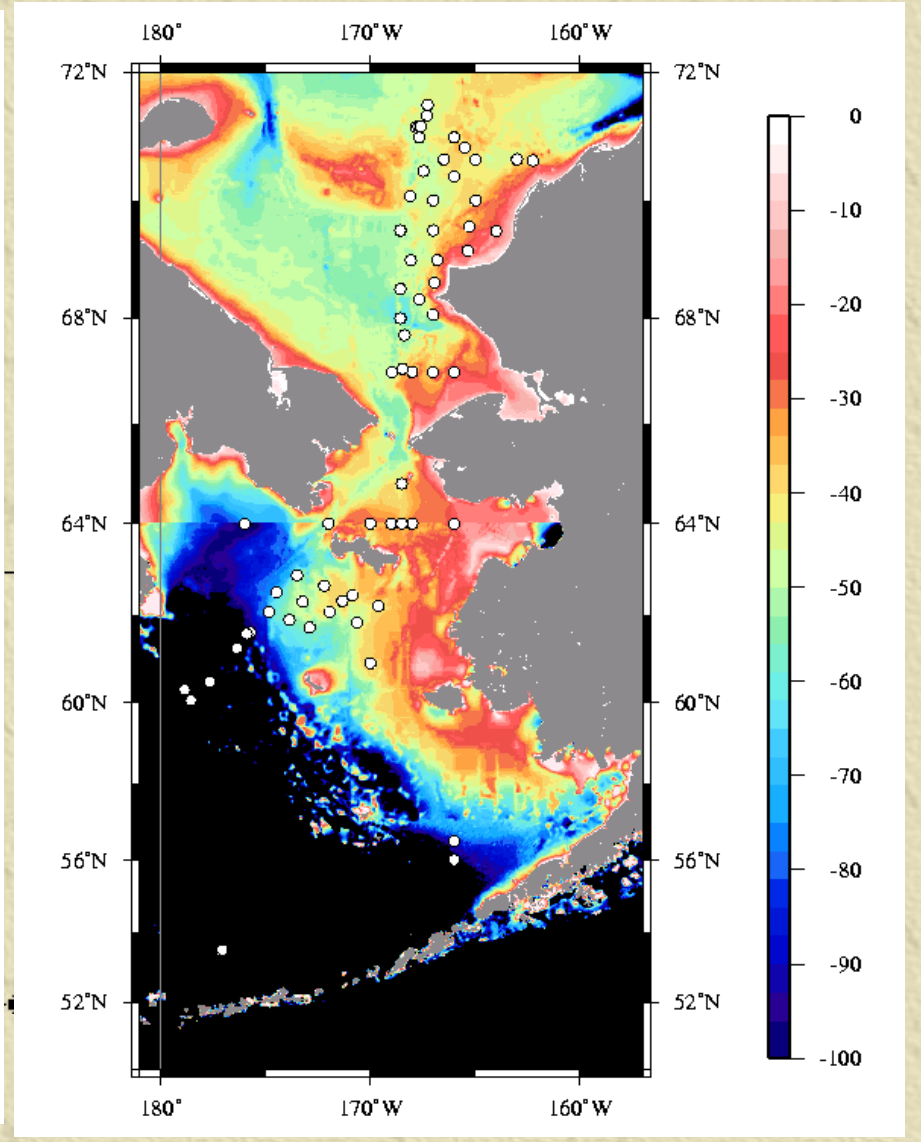
MONITOR/ESSAS Workshop (W3)
PICES-17 Dalian October 24, 2008


Ecosystem Studies of Sub-Arctic Seas
ESSAS
Wind
Ice-edge bloom
Open-water bloom
Ice-edge bloom
Stratification
The ice edge and the adjacent waters are likely to differ whether the ice is withdrawing or advancing, and on wind speed and direction

1991


180°
170°W
160°W
72°N
68°N
64°N
60°N
56°N
52°N

1992

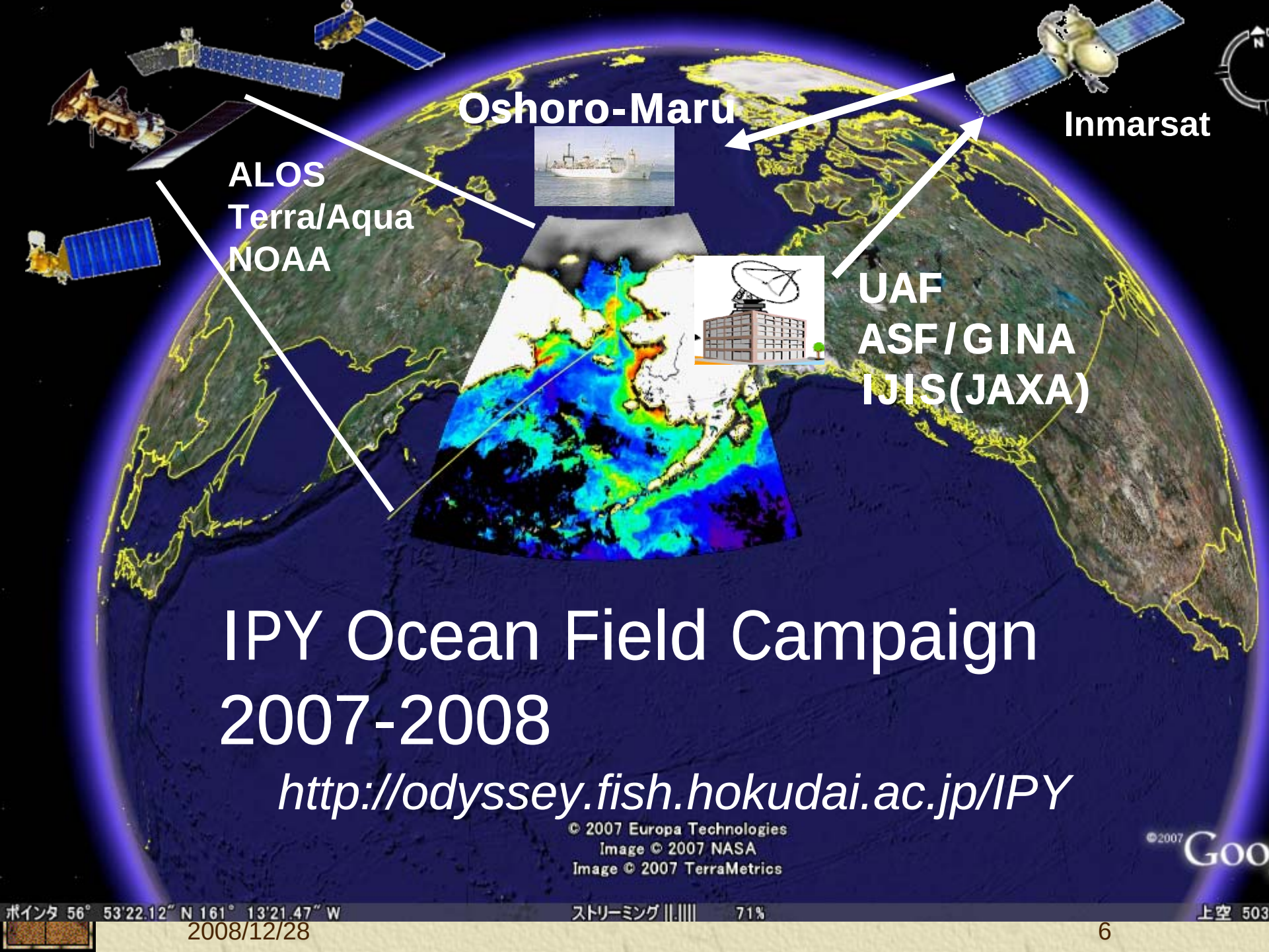

180°
170°W
160°W
72°N
68°N
64°N
60°N
56°N
52°N
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100

Questions?

- What are the relationships among productivity, the diversity of marine organisms, ocean environmental conditions, and sea ice conditions under global change?
- Has the distribution of fish species changed in relation to data collected in 1991 and 1992?
- How do marine ecosystems respond to global change?

Study Focus in IPY Cruises

- Fish Communities/Biodiversity (Arctic cod)
- Oceanography and Bio-Optics (Chukchi Sea and Bering Sea)
- Biogeochemistry (Iron)
- Coccolithophores Bloom (Bering Sea)

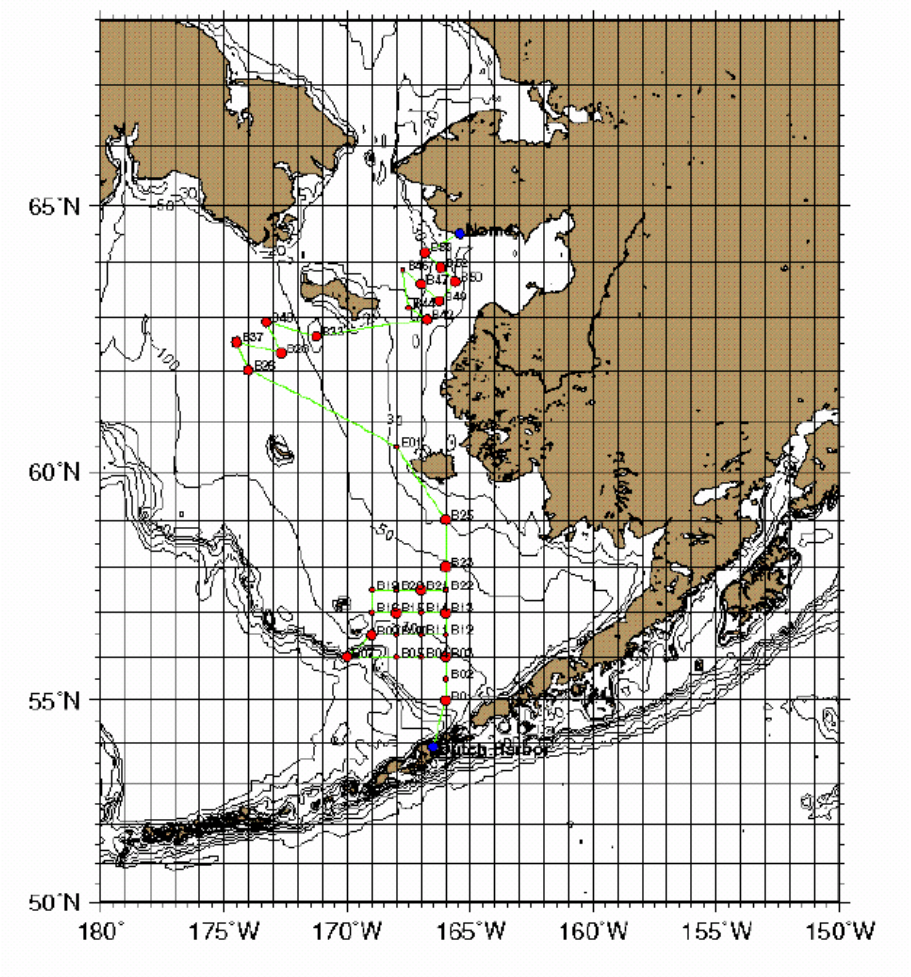

Oshoro-Maru
Inmarsat
ALOS
Terra/Aqua
NOAA
UAF
ASF/GINA
IJIS(JAXA)
IPY Ocean Field Campaign
2007-2008
http://odyssey.fish.hokudai.ac.jp/IPY
© 2007 Europa Technologies
Image © 2007 NASA
Image © 2007 TerraMetrics
©2007 Goo
ポインタ 56° 53'22.12" N 161° 13'21.47" W
ストリーミング 71%
上空 503

Oshoro-Maru IPY Cruises

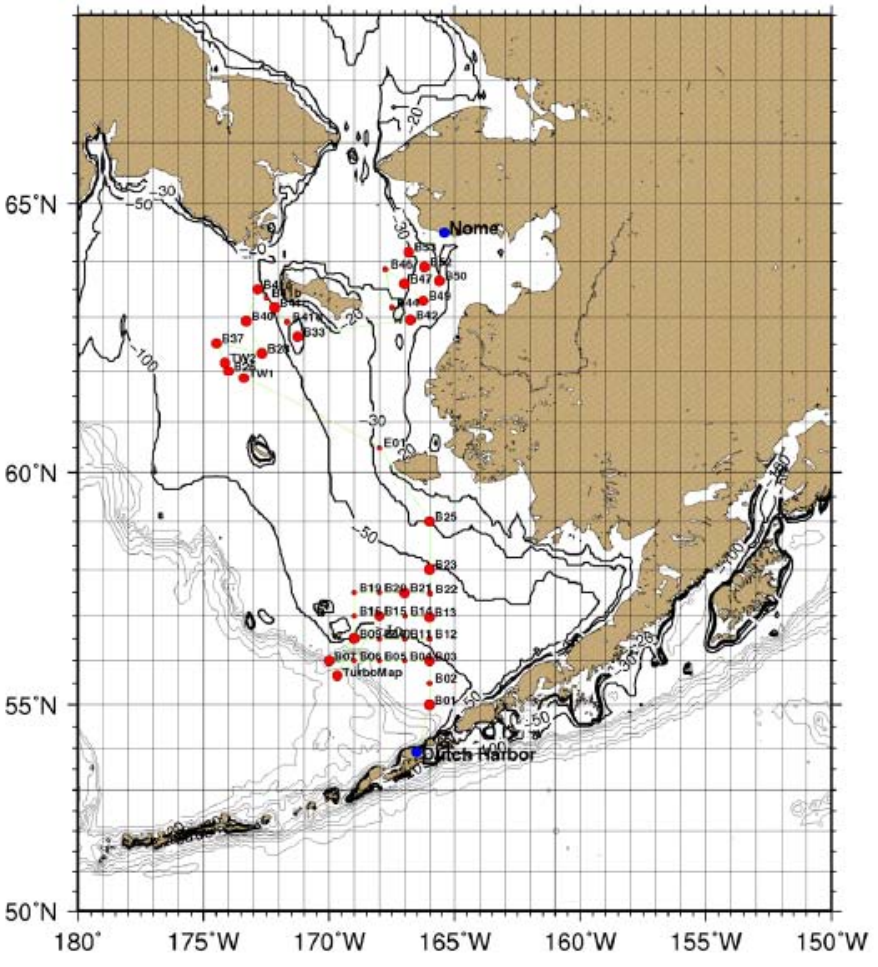
- Those cruises were partly supported by Grant-in-Aid for Scientific Research No.19405002 and the IARC-JAXA (IJIS) program
- Those were authorized as a part of the "Ecosystem Studies of Subarctic and Arctic Regions (ESSAR)" activity for IPY 2007-2008 by ESSAS/GLOBEC (Activity ID No: 155).

Bering Sea (Leg.2)

July 24-August 3 2007

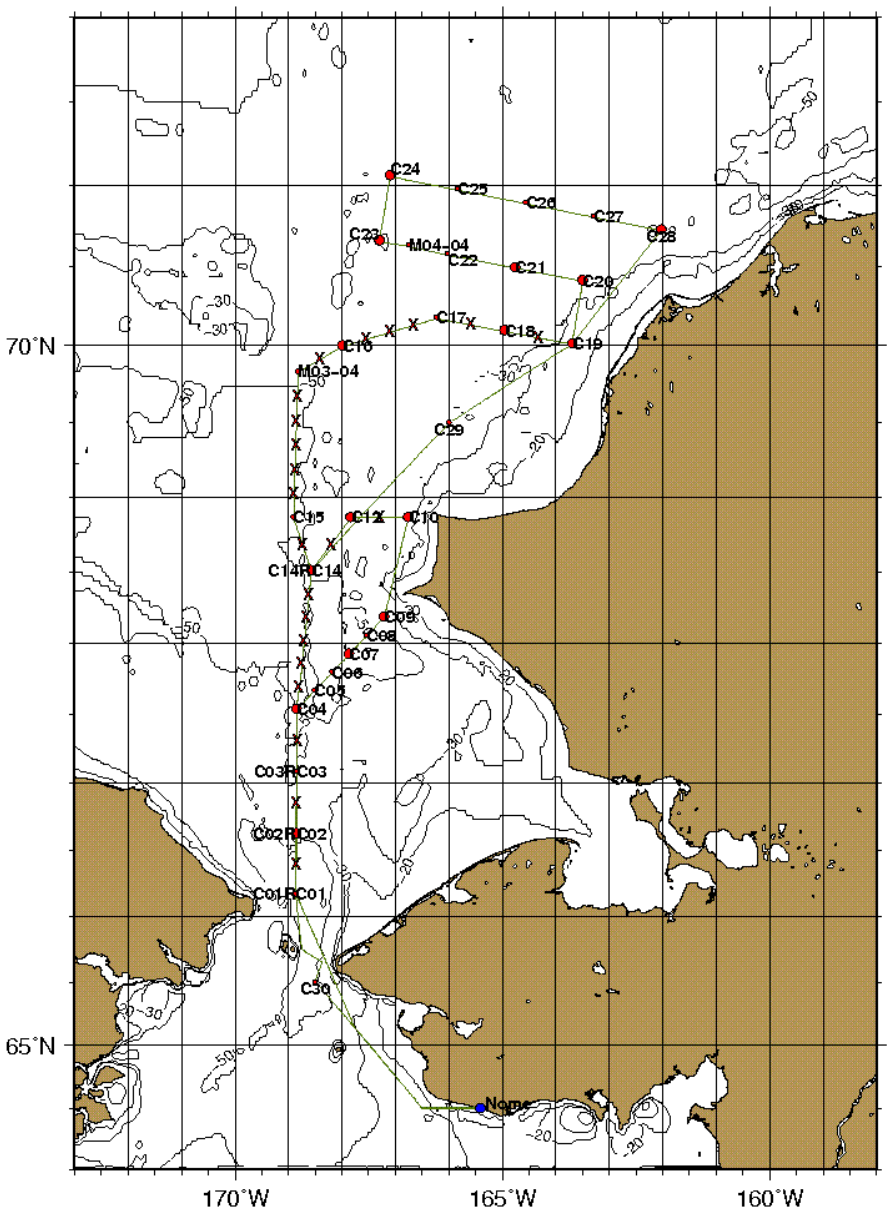


June 24-July 3 2008

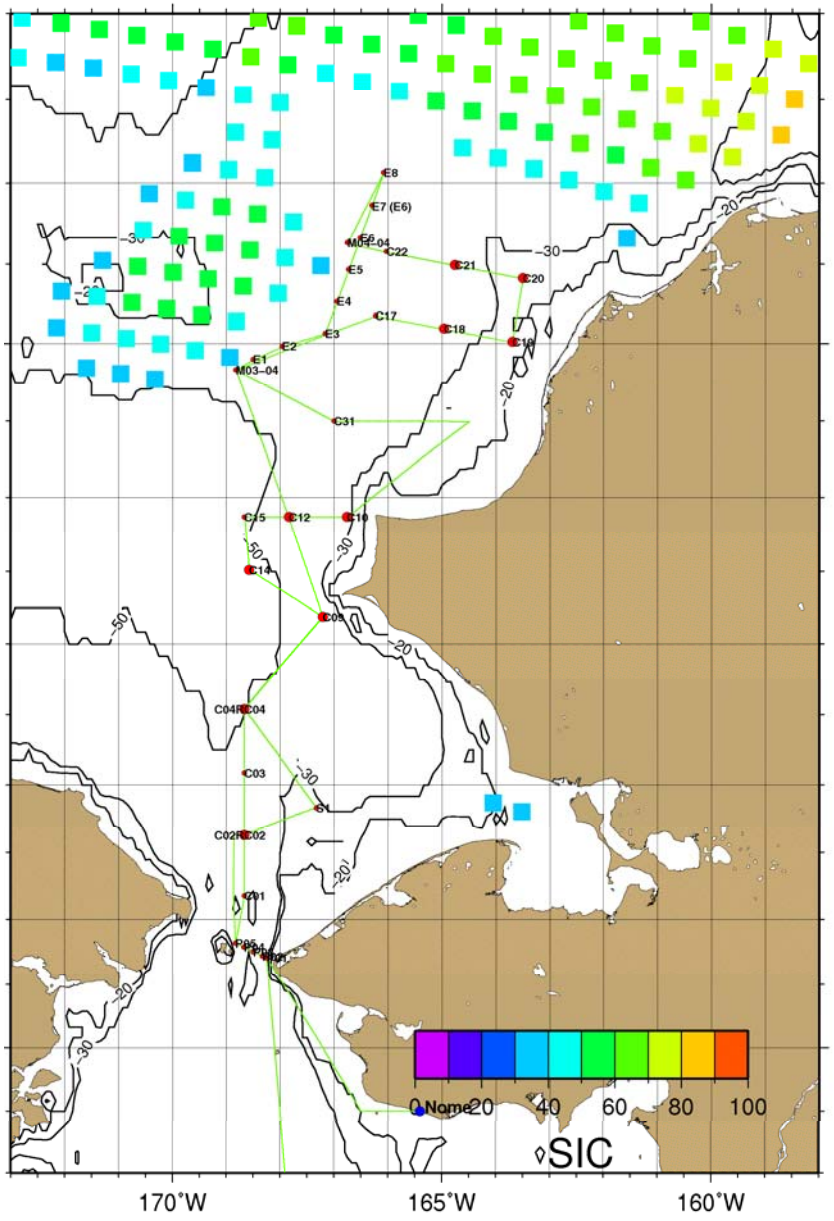


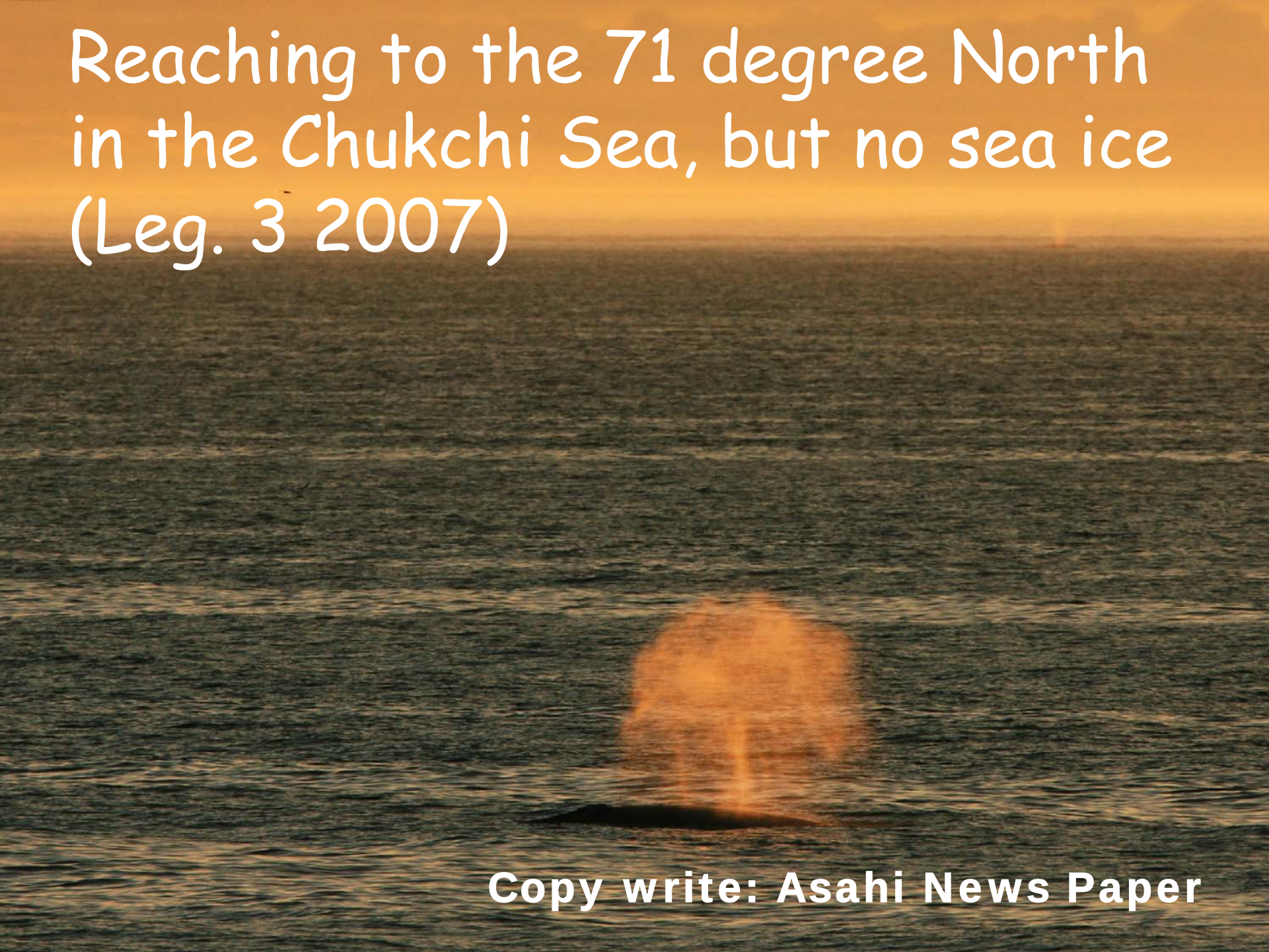
Chukchi Sea (Leg.3)

August 5-15 2007



July 6-17 2008



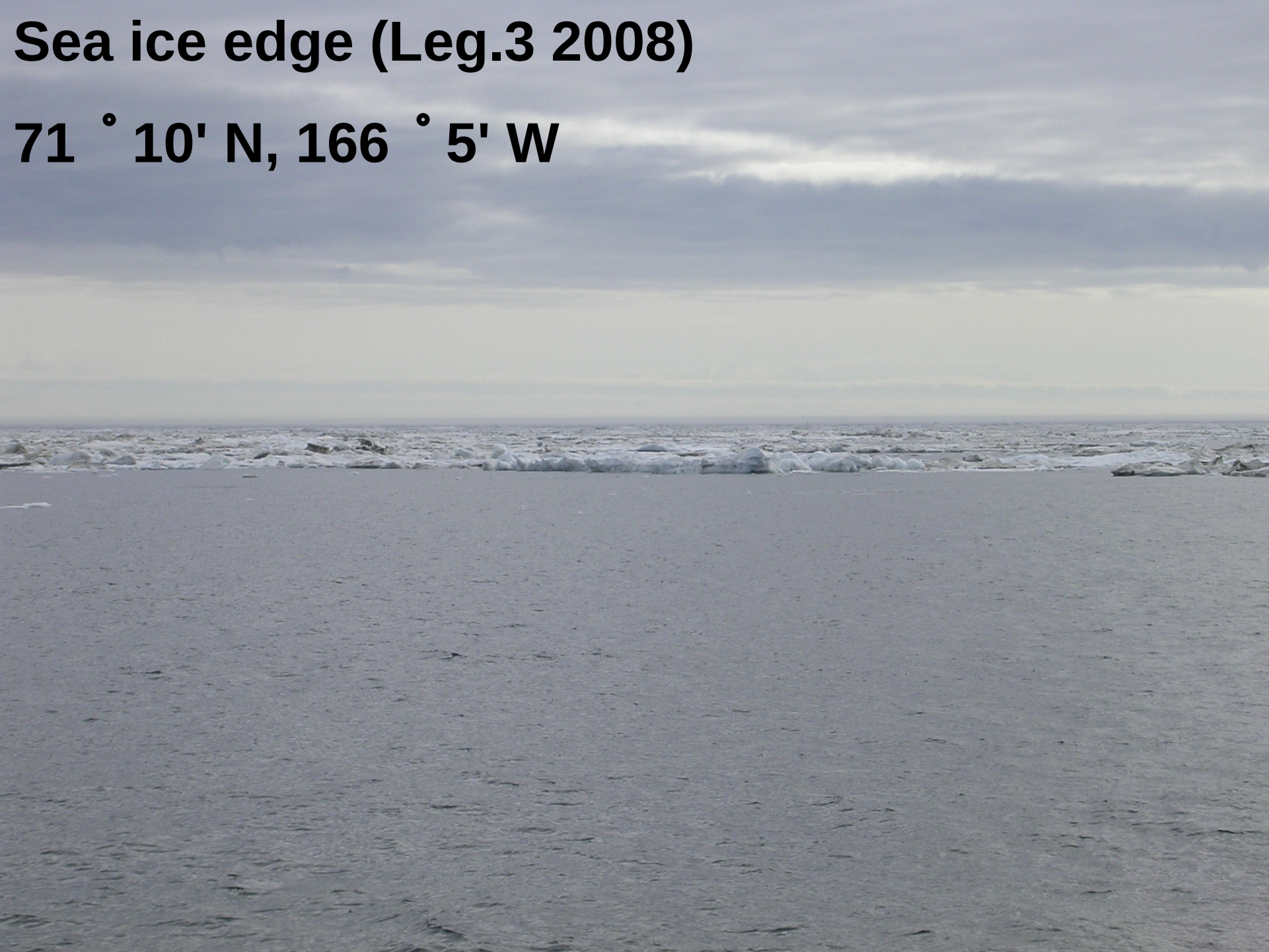

Reaching to the 71 degree North
in the Chukchi Sea, but no sea ice
(Leg. 3 2007)
Copy write: Asahi News Paper

Survival for foraging to the Arctic (Leg. 3 2007)

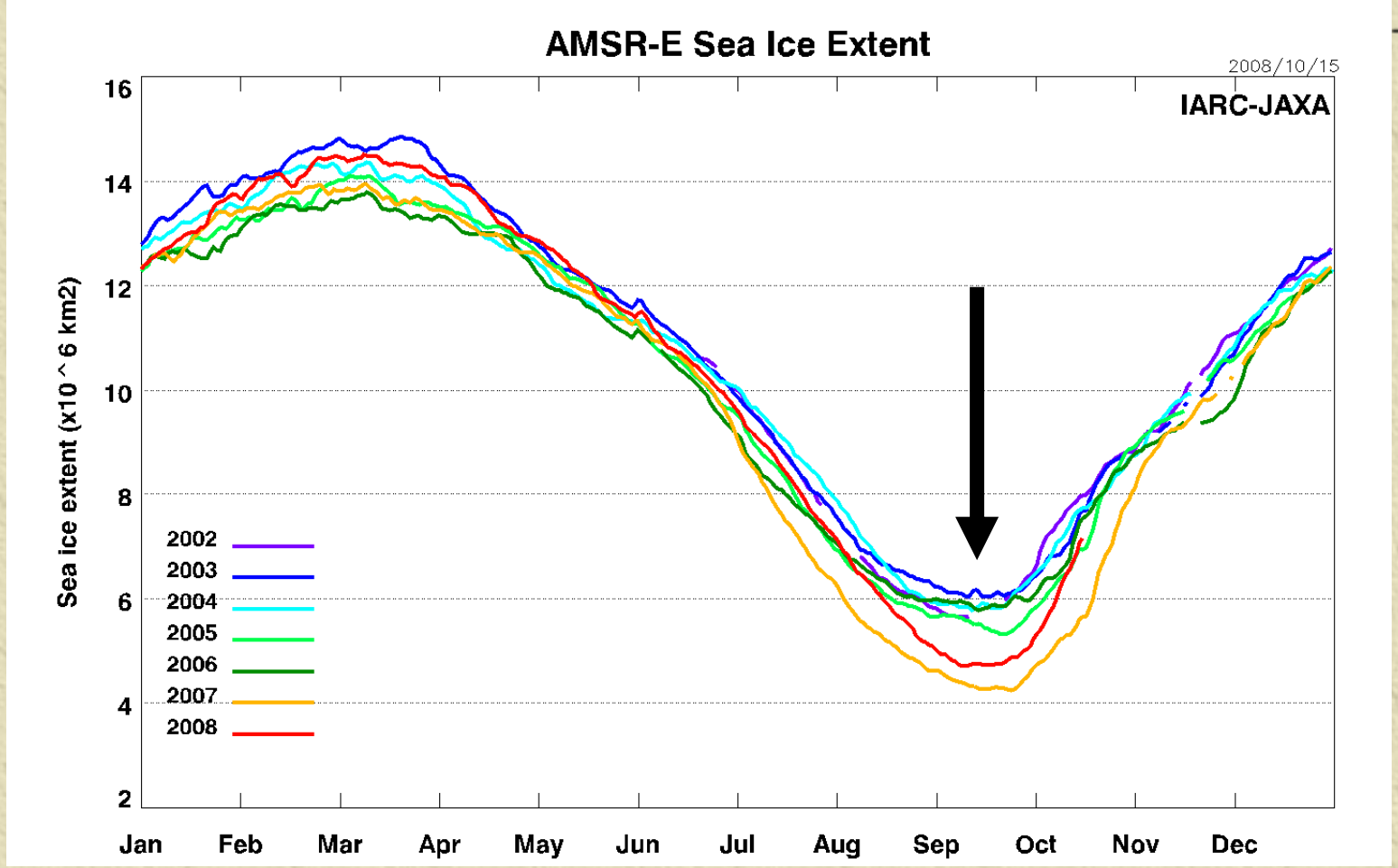
Copy write: Asahi News Paper

Sea ice (Leg.3 2008)

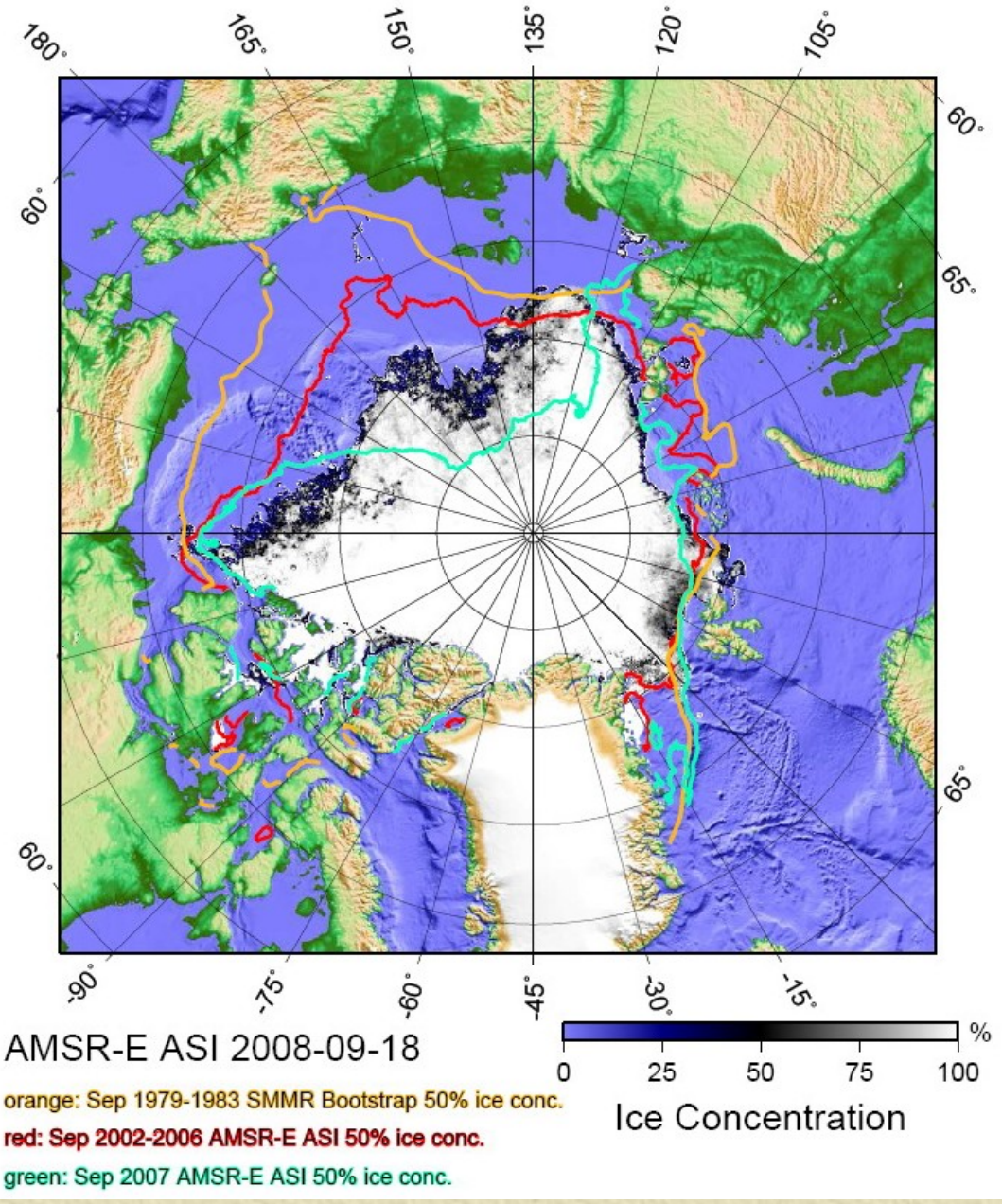
Sea ice (Leg.3 2008)

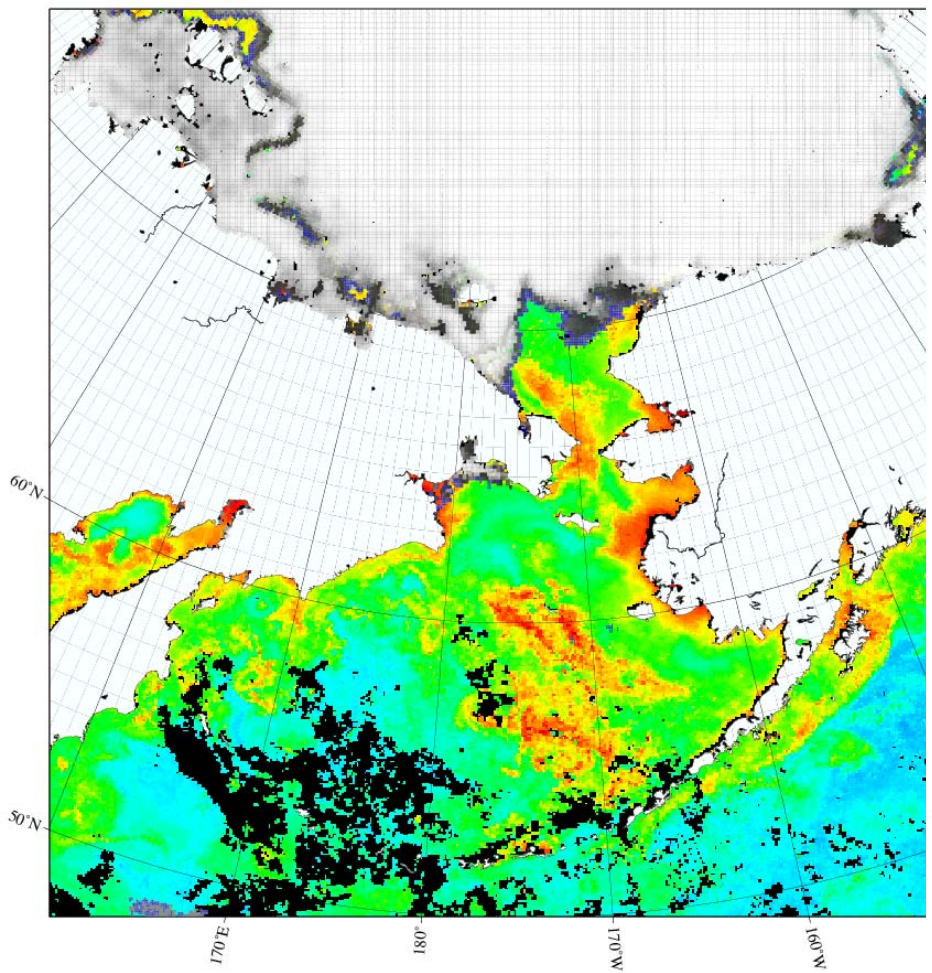

Sea ice edge (Leg.3 2008)
71 ˚ 10' N, 166 ˚ 5' W

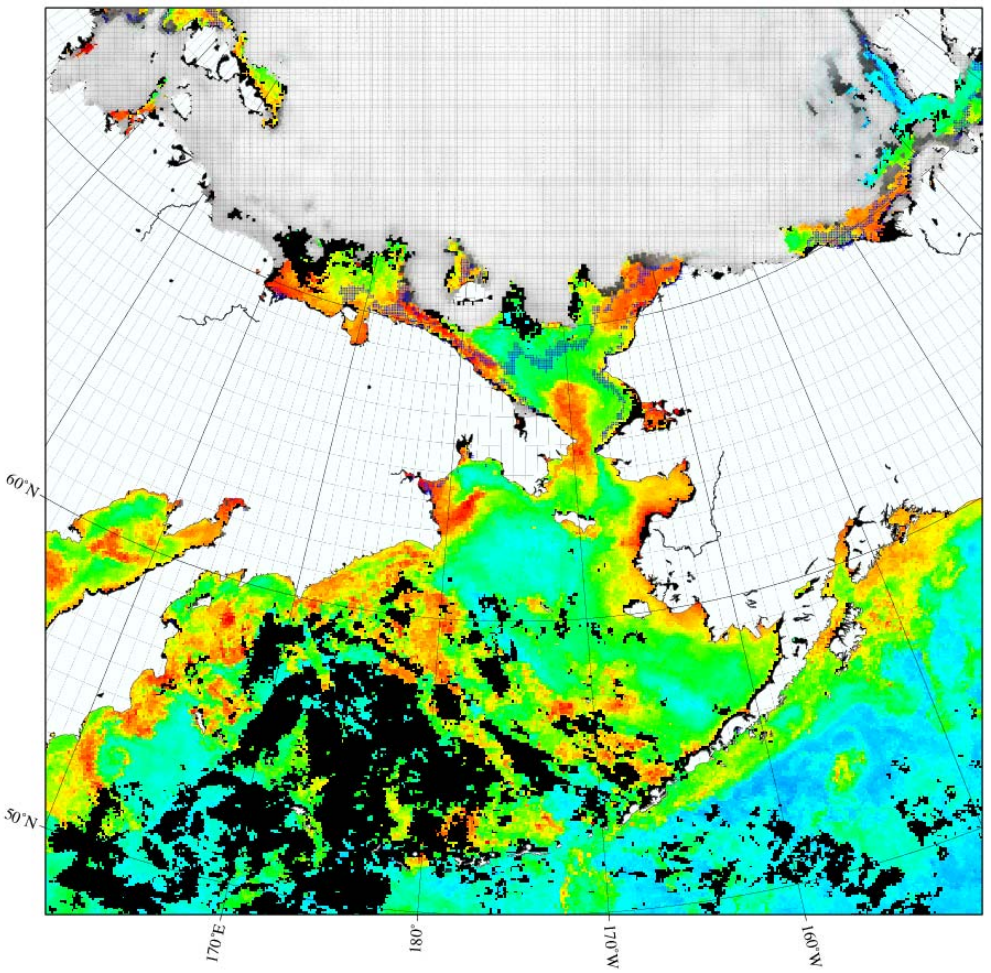
AMSR-E Sea Ice Extent



2008 Minimum Sea Ice Extent



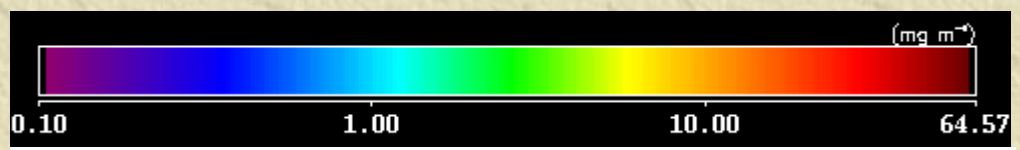




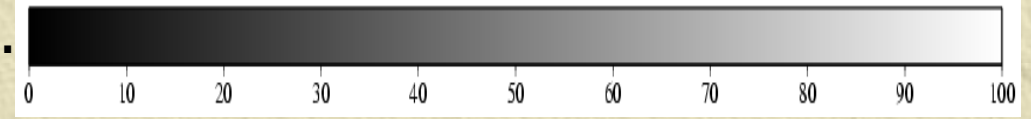
June 2002

June 2007

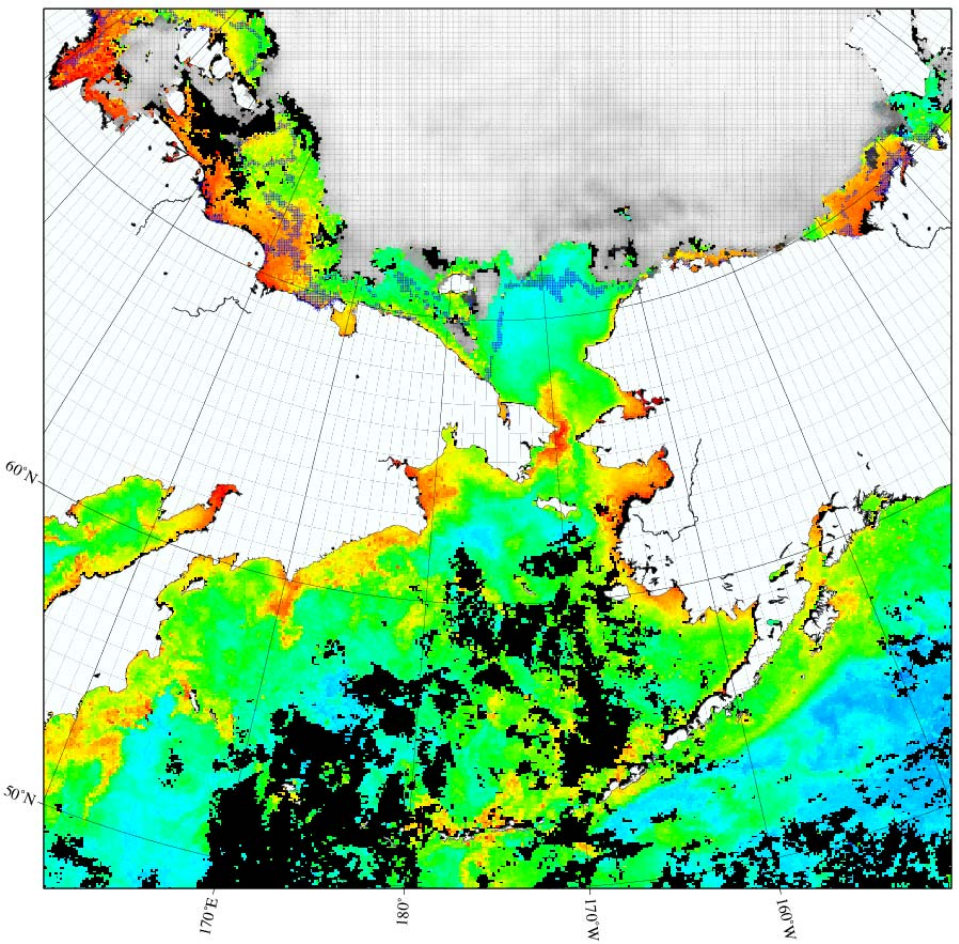
Chl-*a*

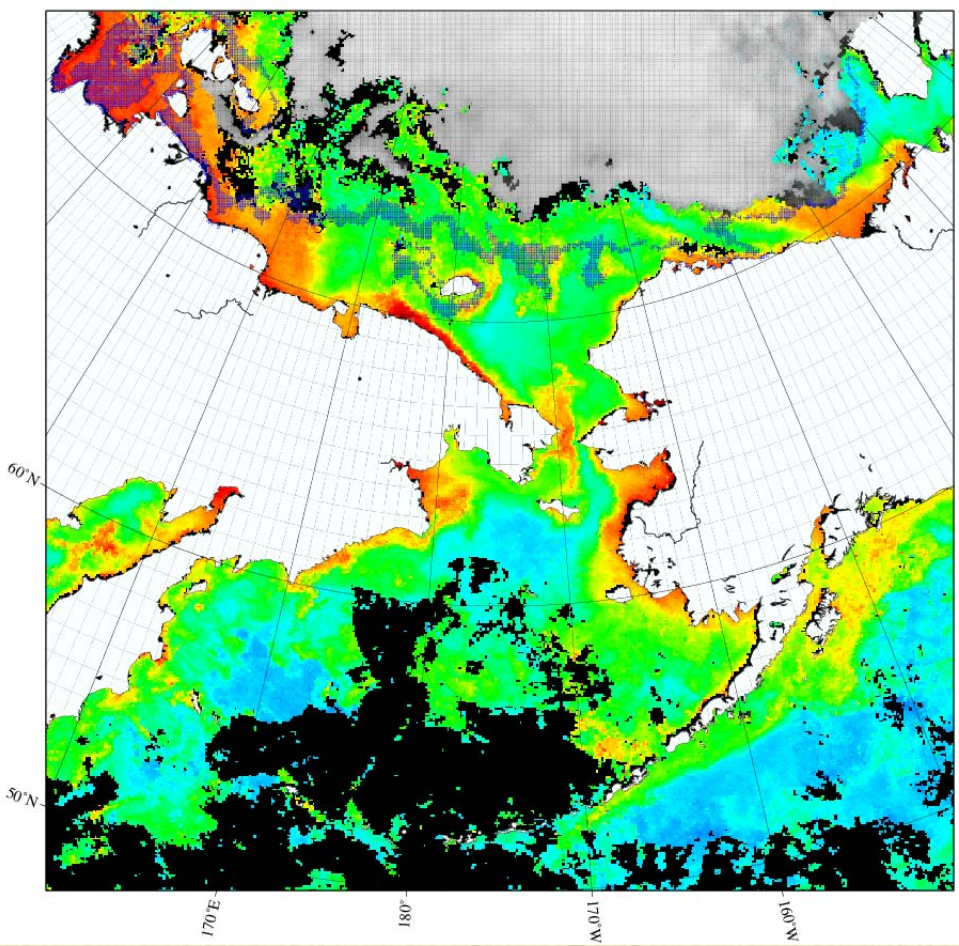


Sea Ice Cons.



(%)



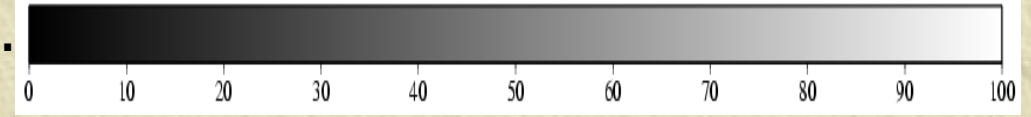


July 2002

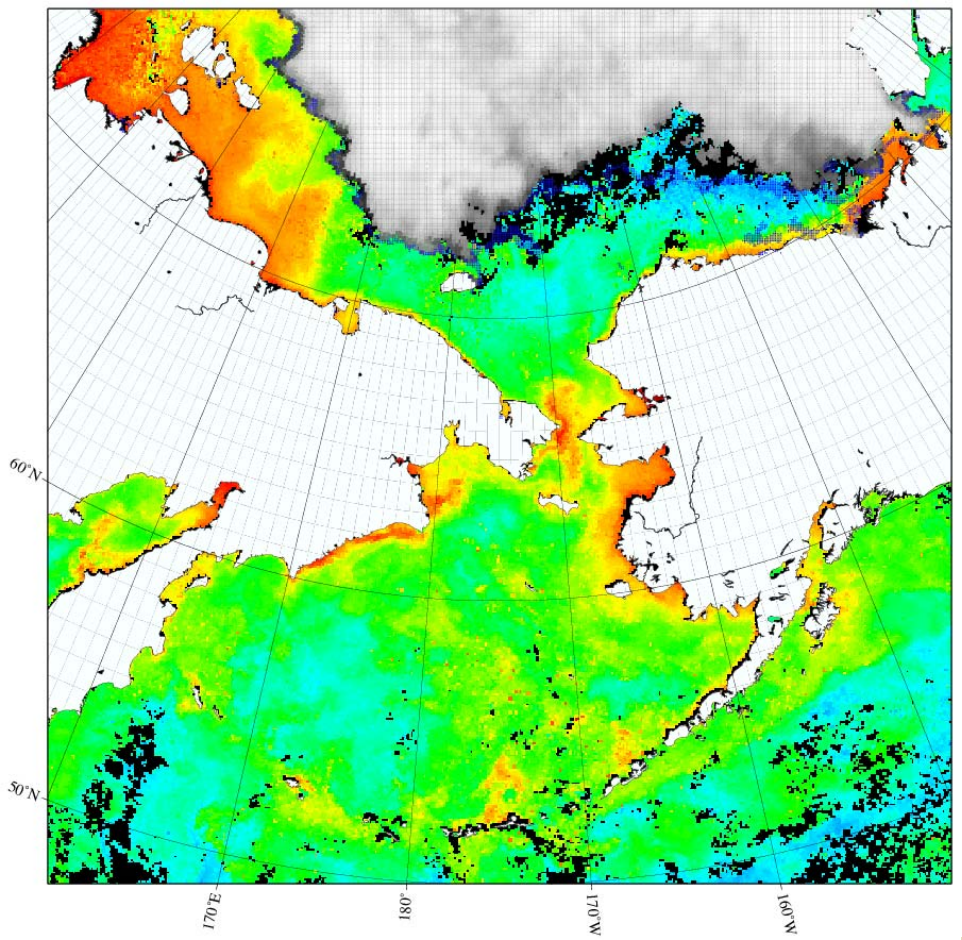
July 2007

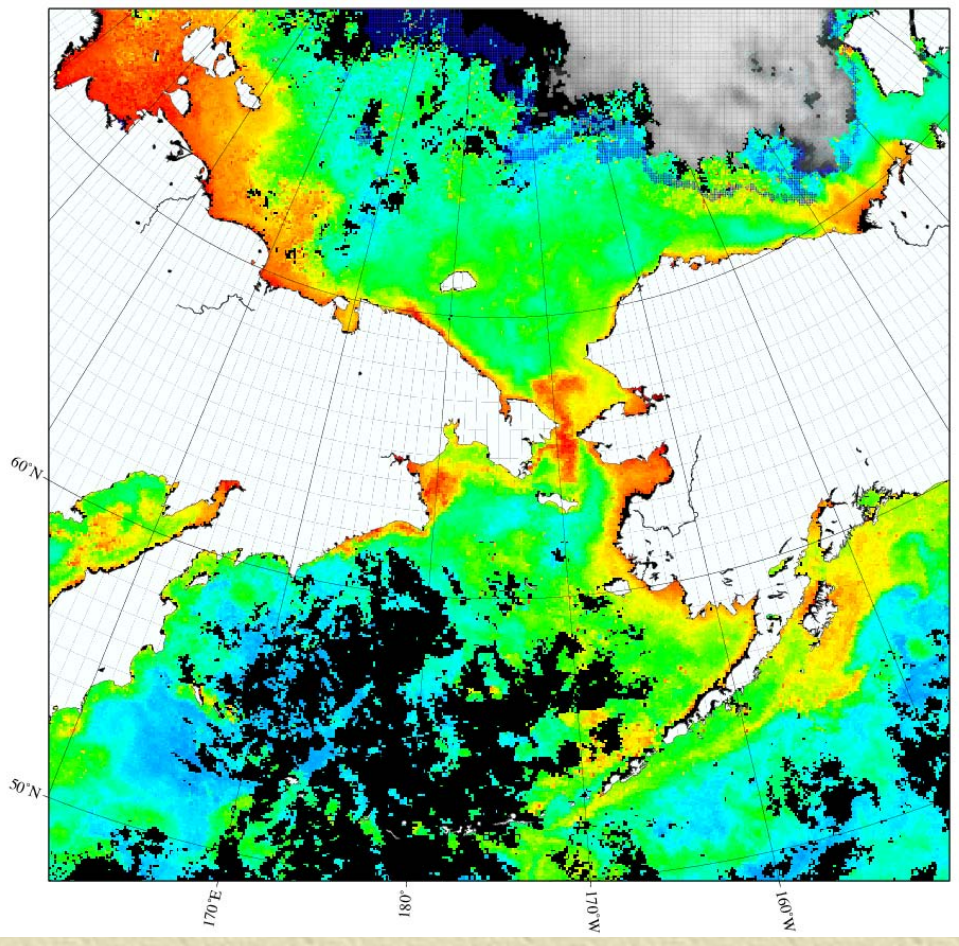
Chl-*a*

Sea Ice Cons.



(%)

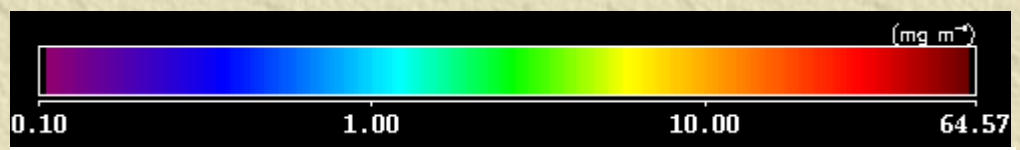




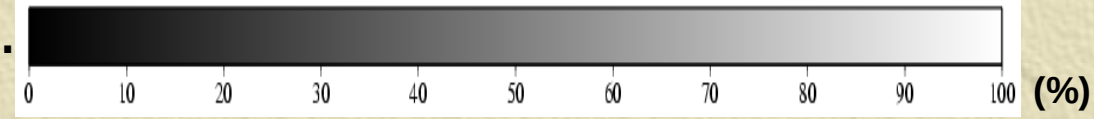
Aug. 2002

Aug. 2007

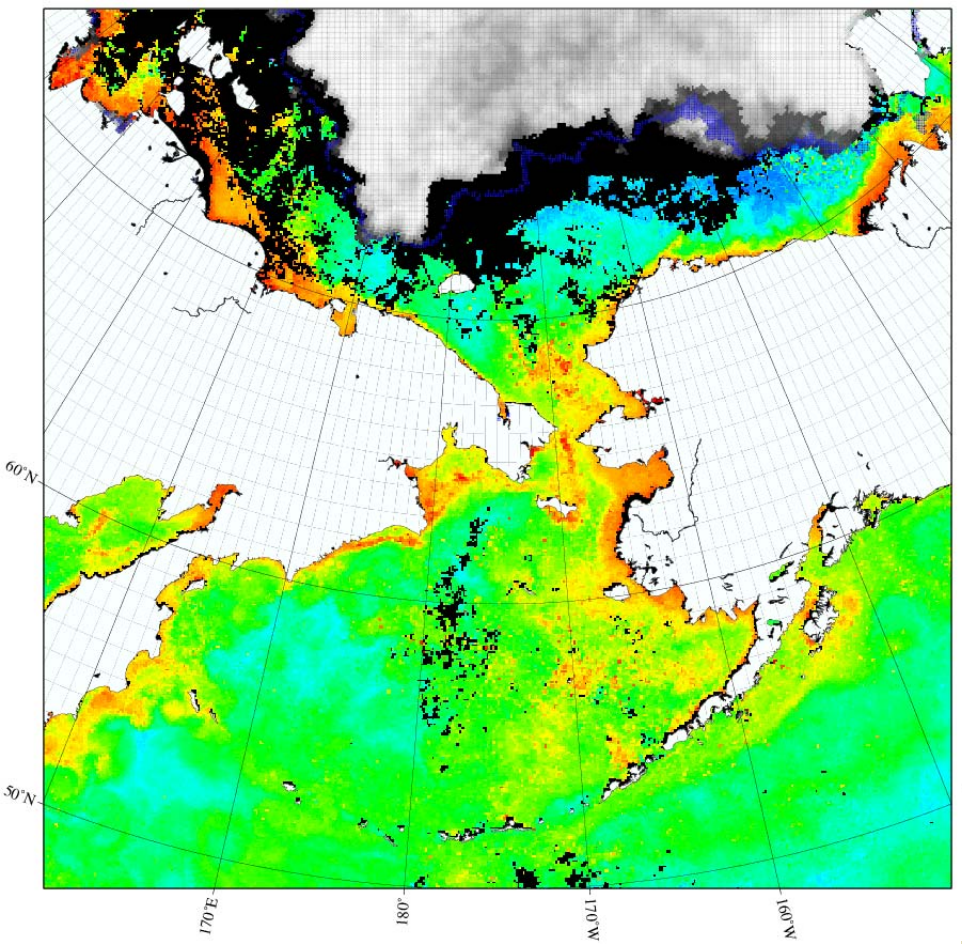
Chl-*a*

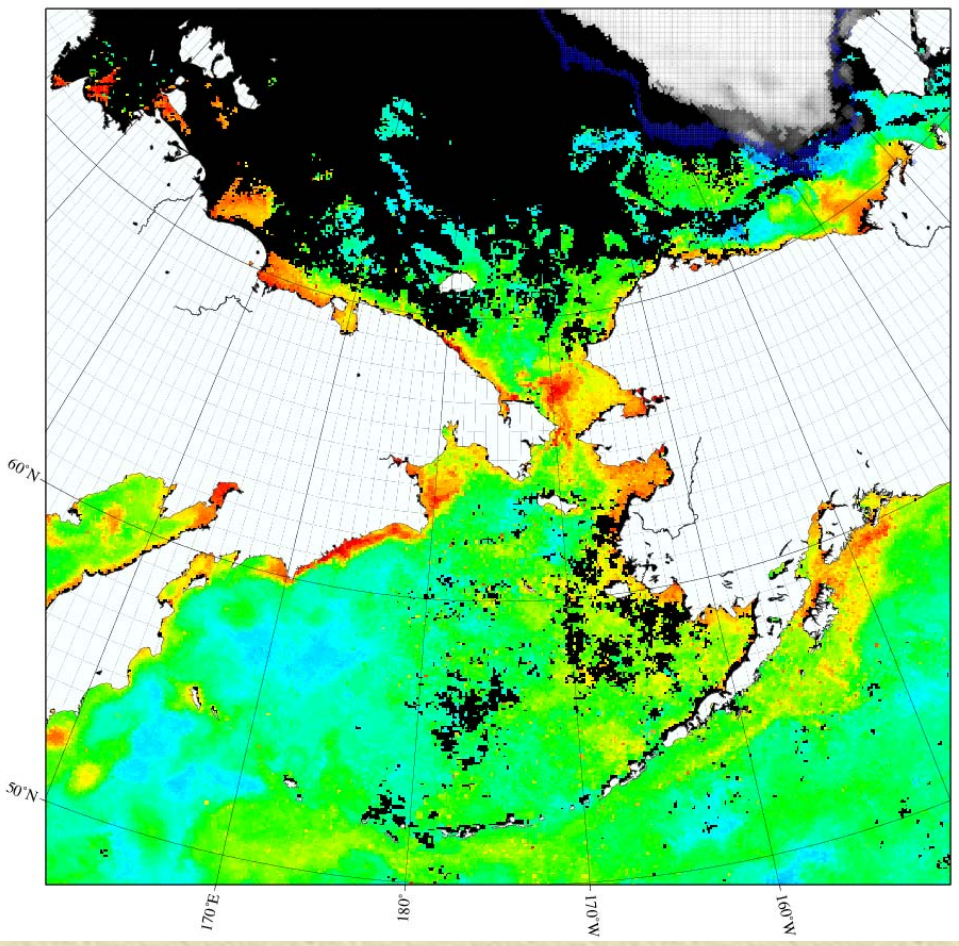


Sea Ice Cons.



(%)

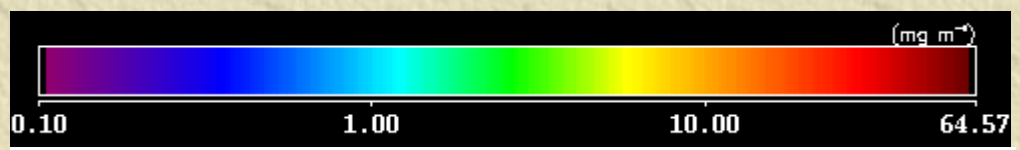




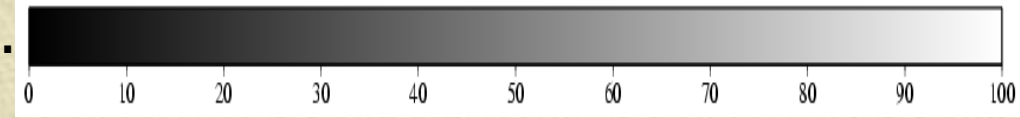
Sept. 2002

Sept. 2007

Chl-*a*



Sea Ice Cons.



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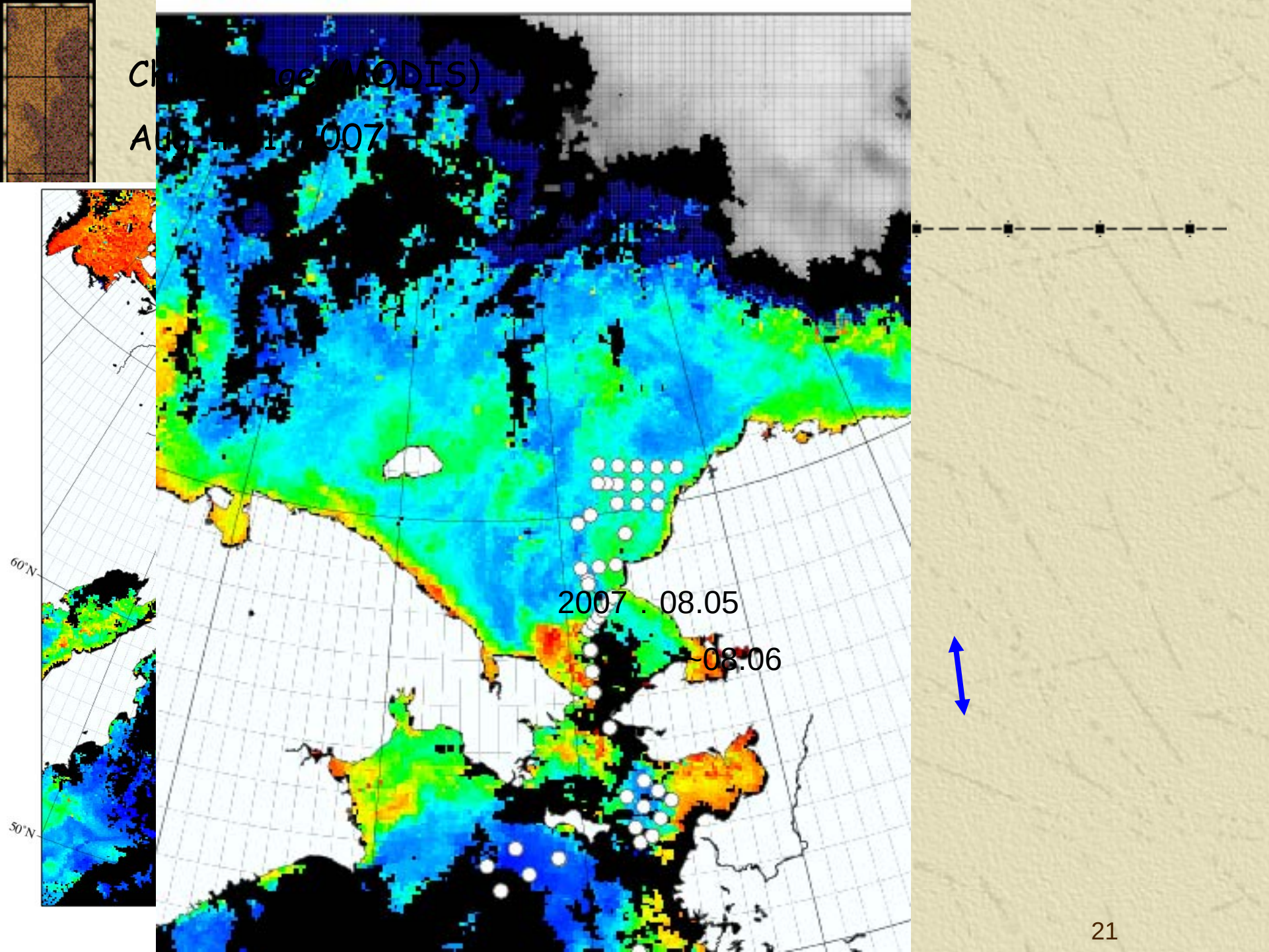
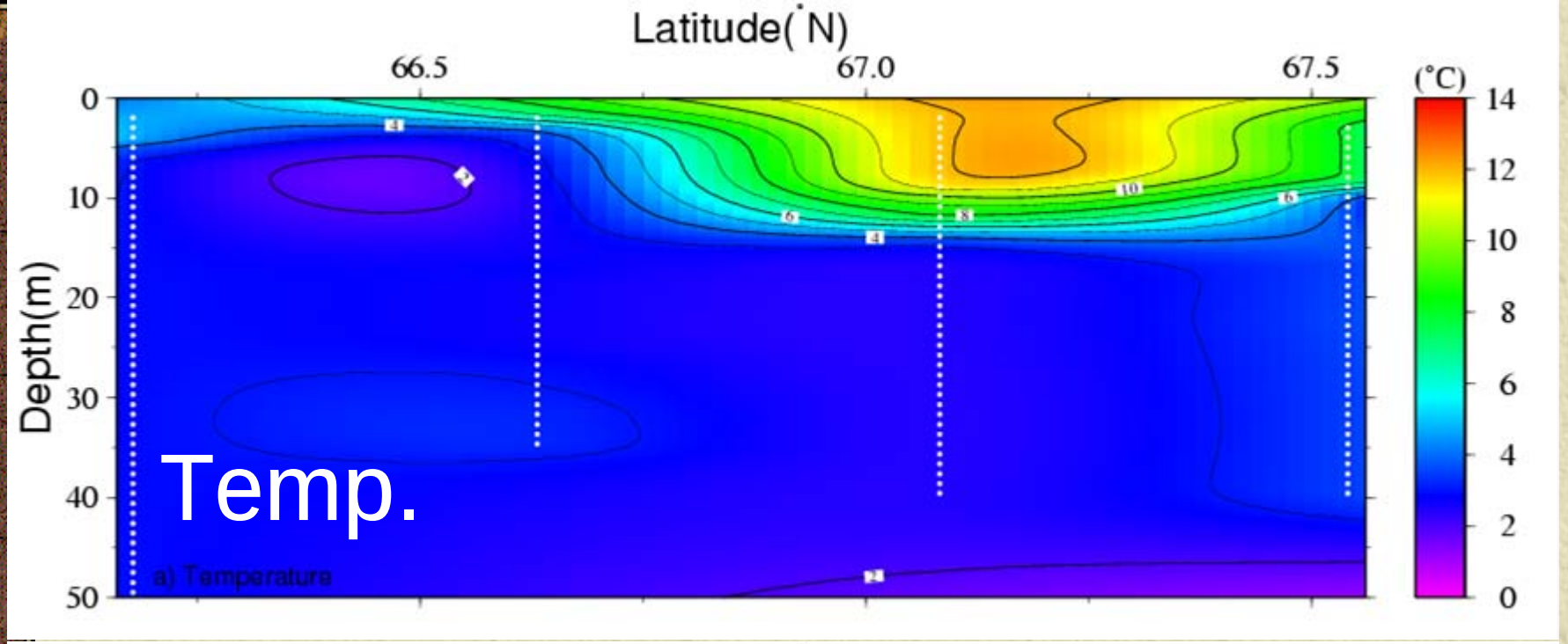
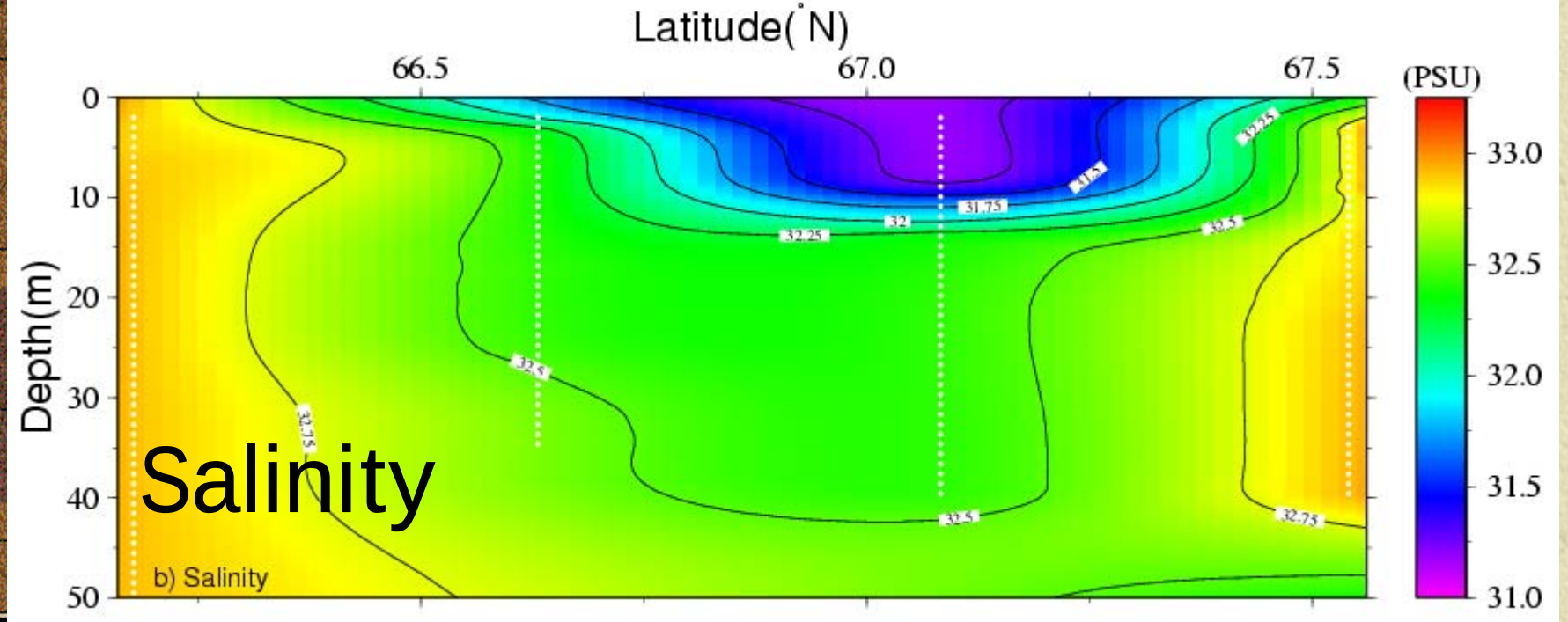
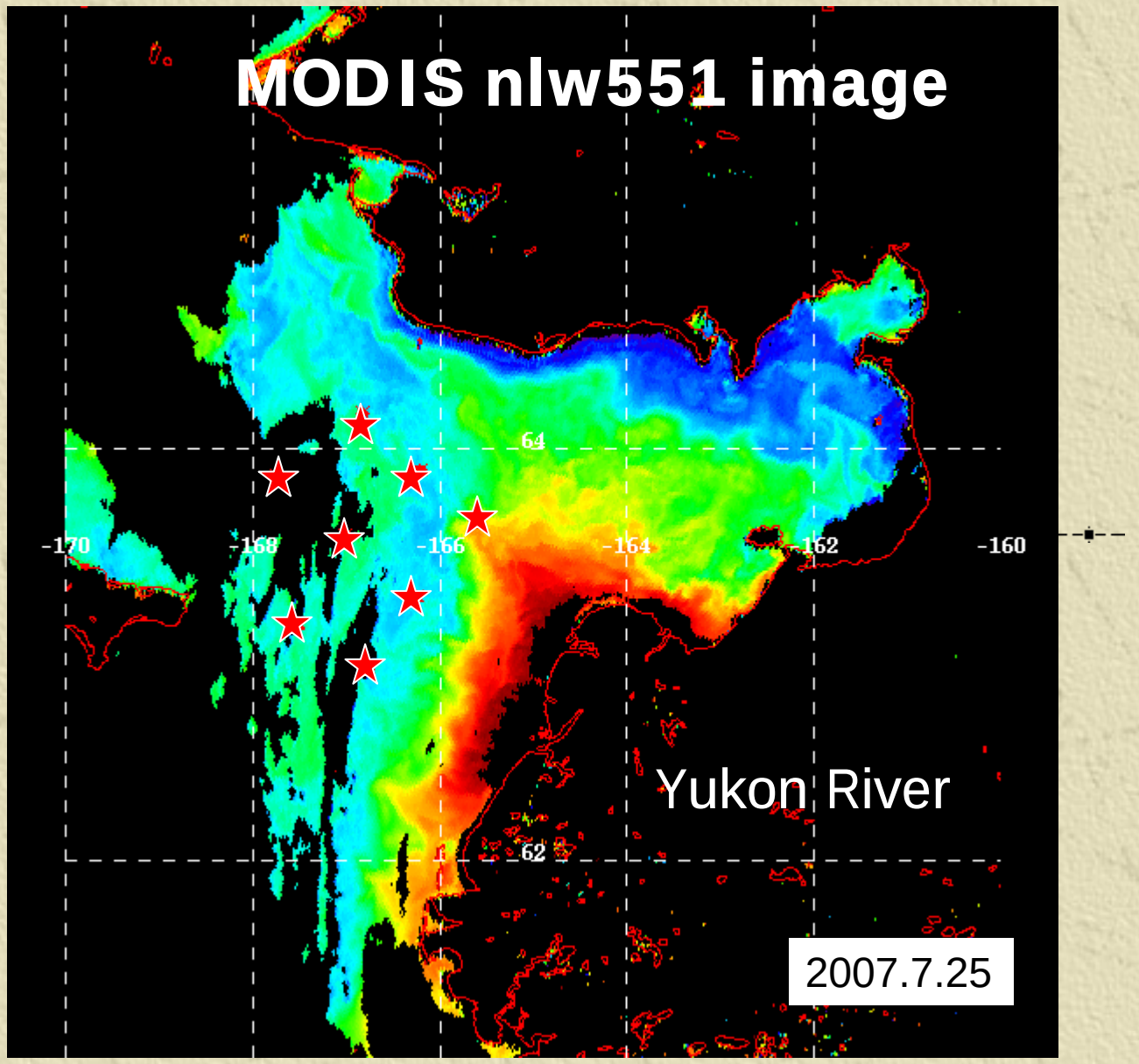

60°N
50°N
2007 . 08.05
~08.06

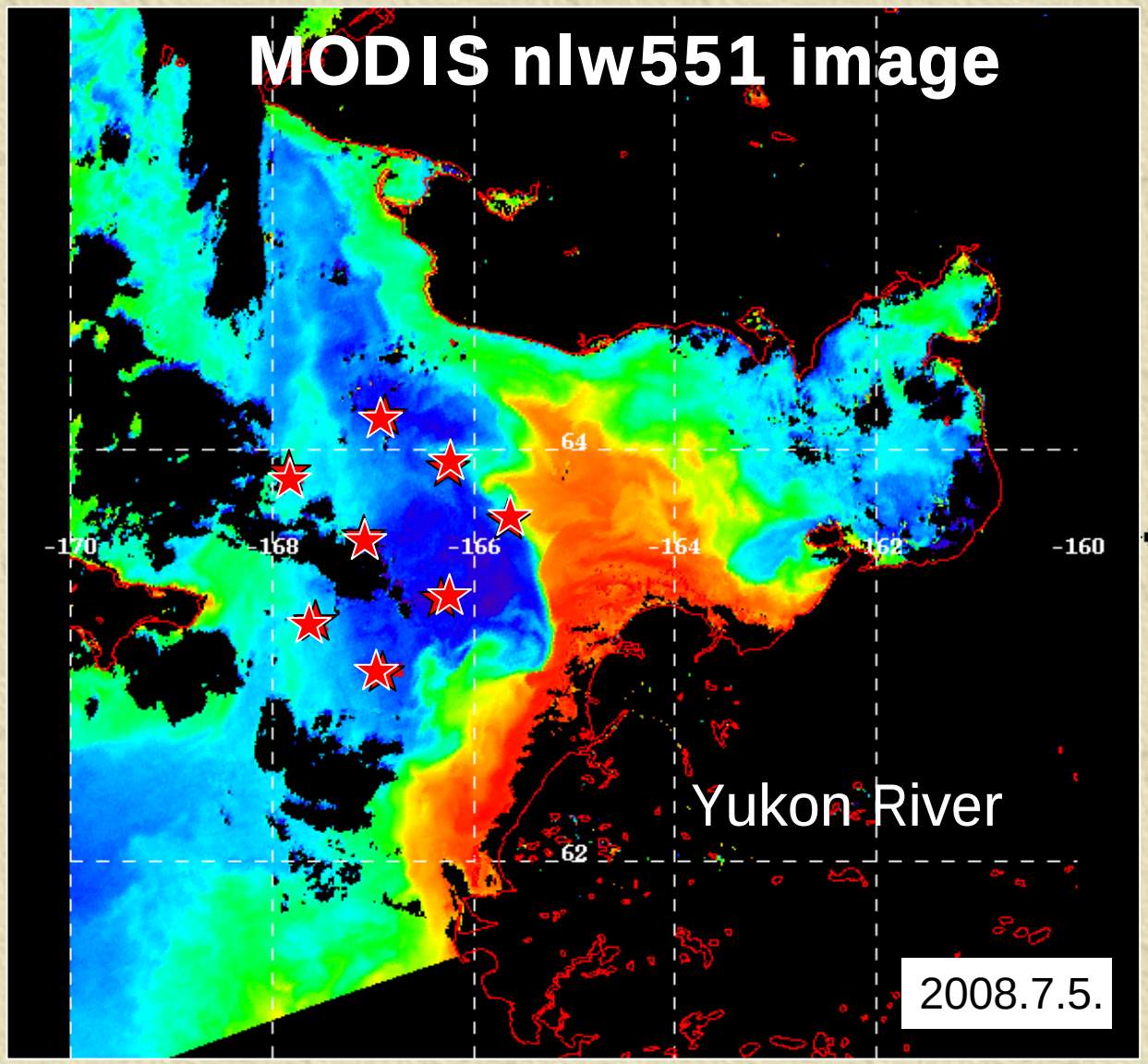

Latitude(˚N)
66.5
67.0
67.5
Depth(m)
0
10
20
30
40
50
(°C)
14
12
10
8
6
4
2
0
Temp.
a) Temperature


Latitude(˚N)
66.5
67.0
67.5
Depth(m)
0
10
20
30
40
50
(PSU)
33.0
32.5
32.0
31.5
31.0
Salinity
b) Salinity

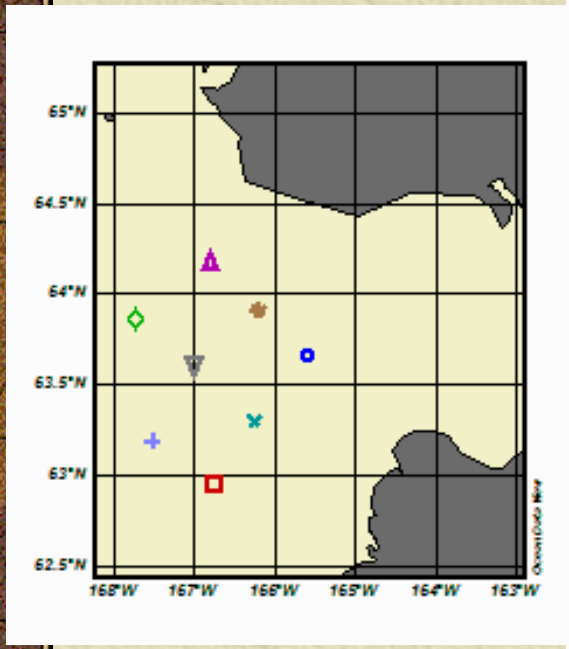
Oshoro-maru observation stations （ August 1-2, 2007 ）

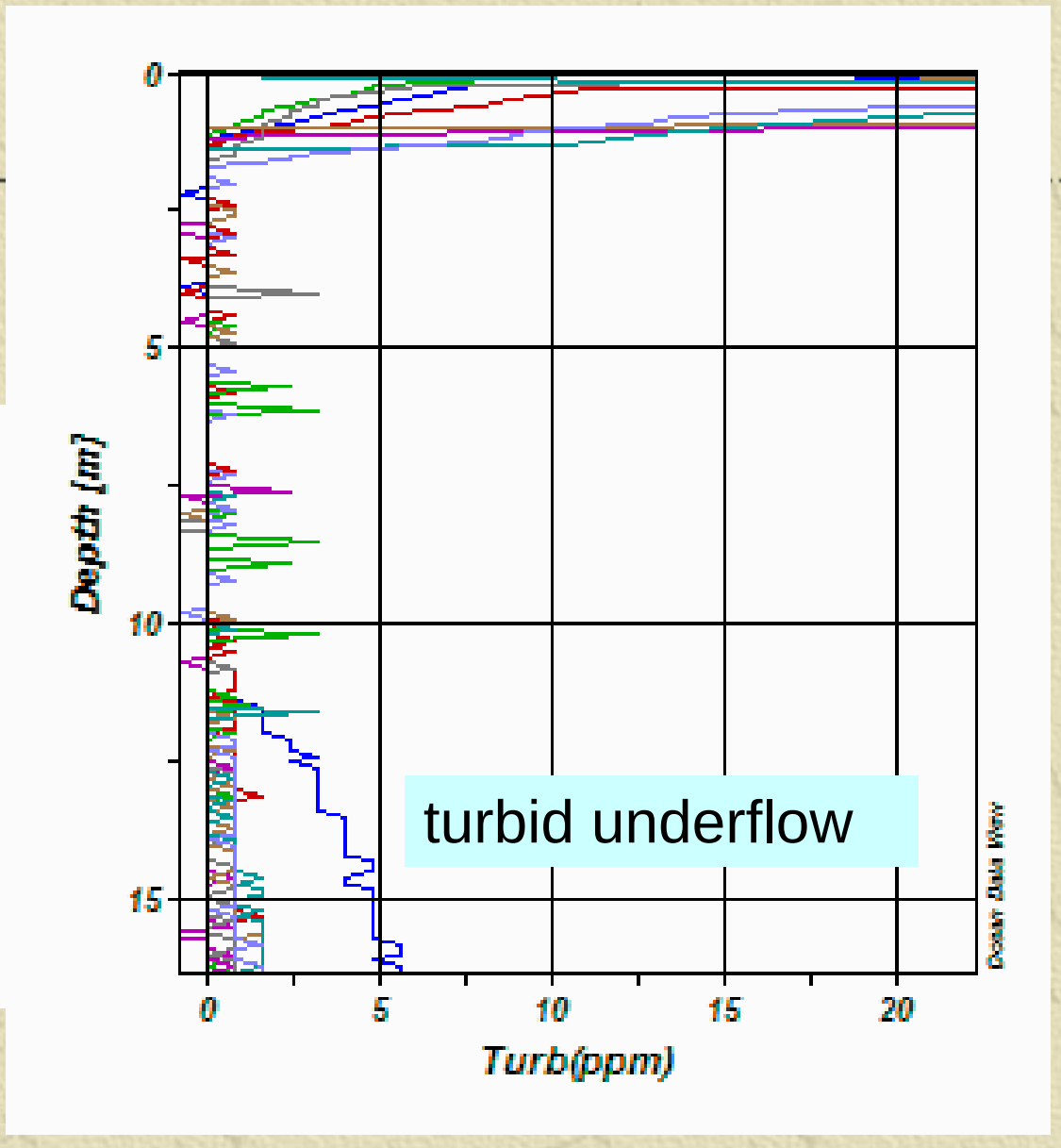


Oshoro-maru observation stations (July 2-3, 2008)

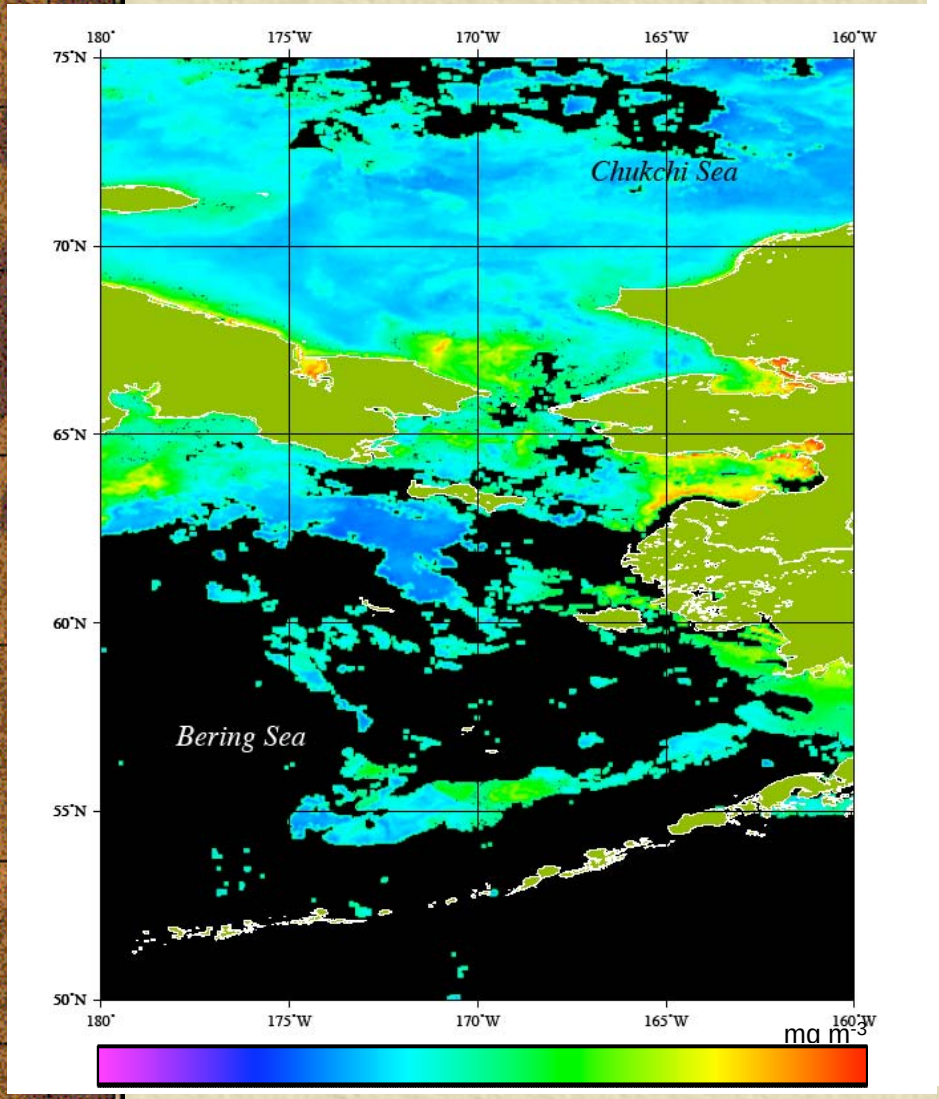


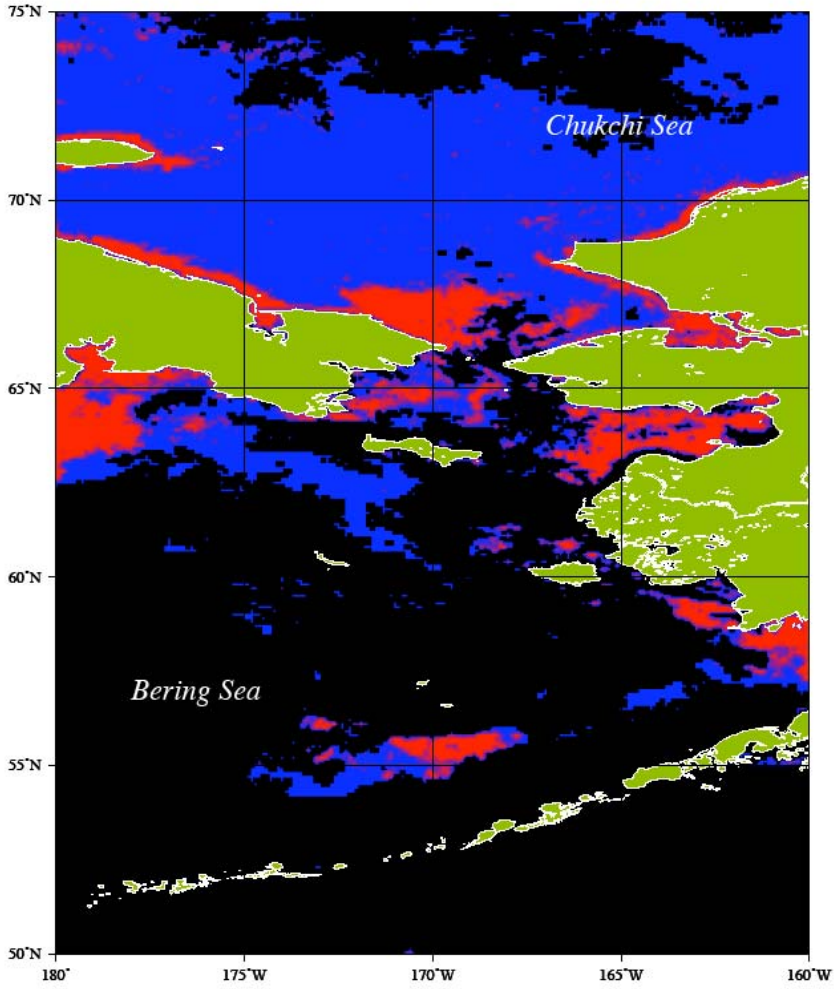
Vertical Prof. of Turbidity (August 1-2, 2007)





Satellite images





Estimation map of microplankton dominant

Micro dominat

Micro non-dominant

Summary

- We conducted IPY cruises in summer 2007 and 2008 using the Oshoro-maru
- We continue to investigate responses of marine ecosystem to rapid and abrupt environmental change in the Arctic region

Did Sea Lion know climate change?

Photo by Sei-ichi Saitoh
Baby Island, Aleutian Islands
in Summer, 1975