Spatial and Temporal Variability over the Eastern Bering Sea Shelf

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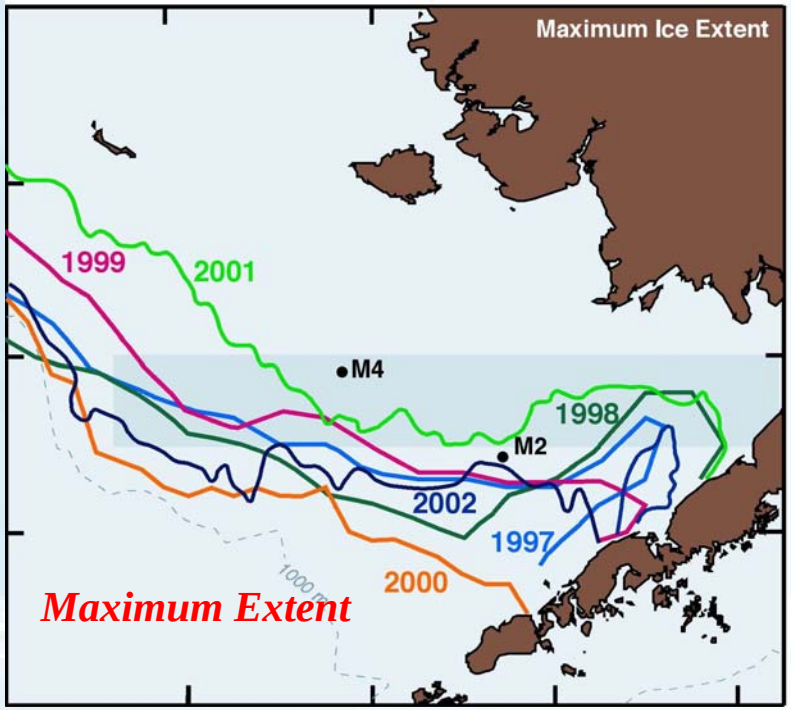
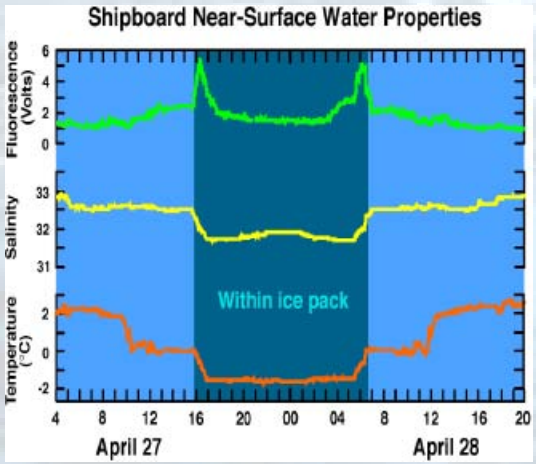
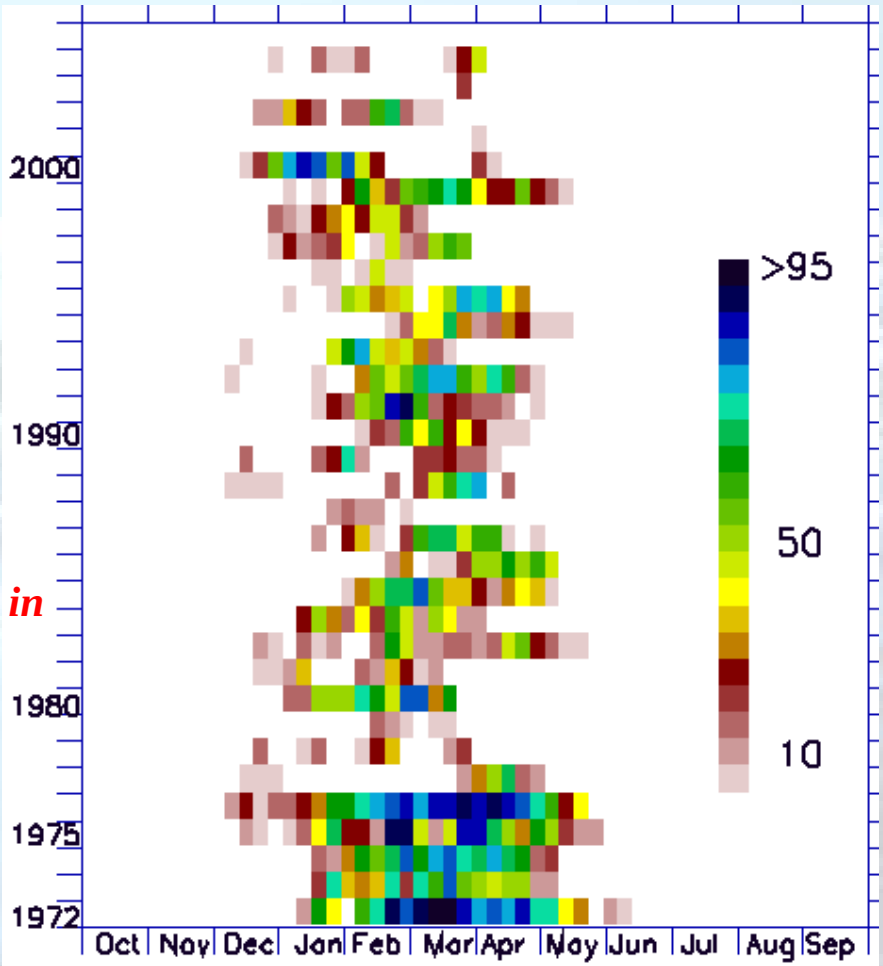
Ice Coverage on the Eastern Bering Sea Shelf

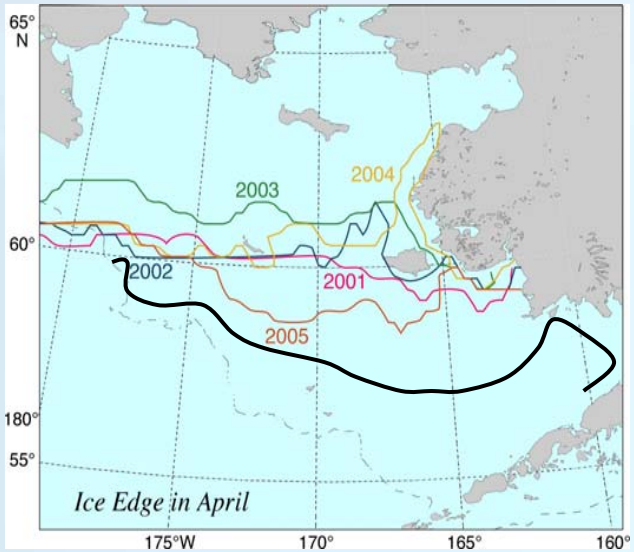


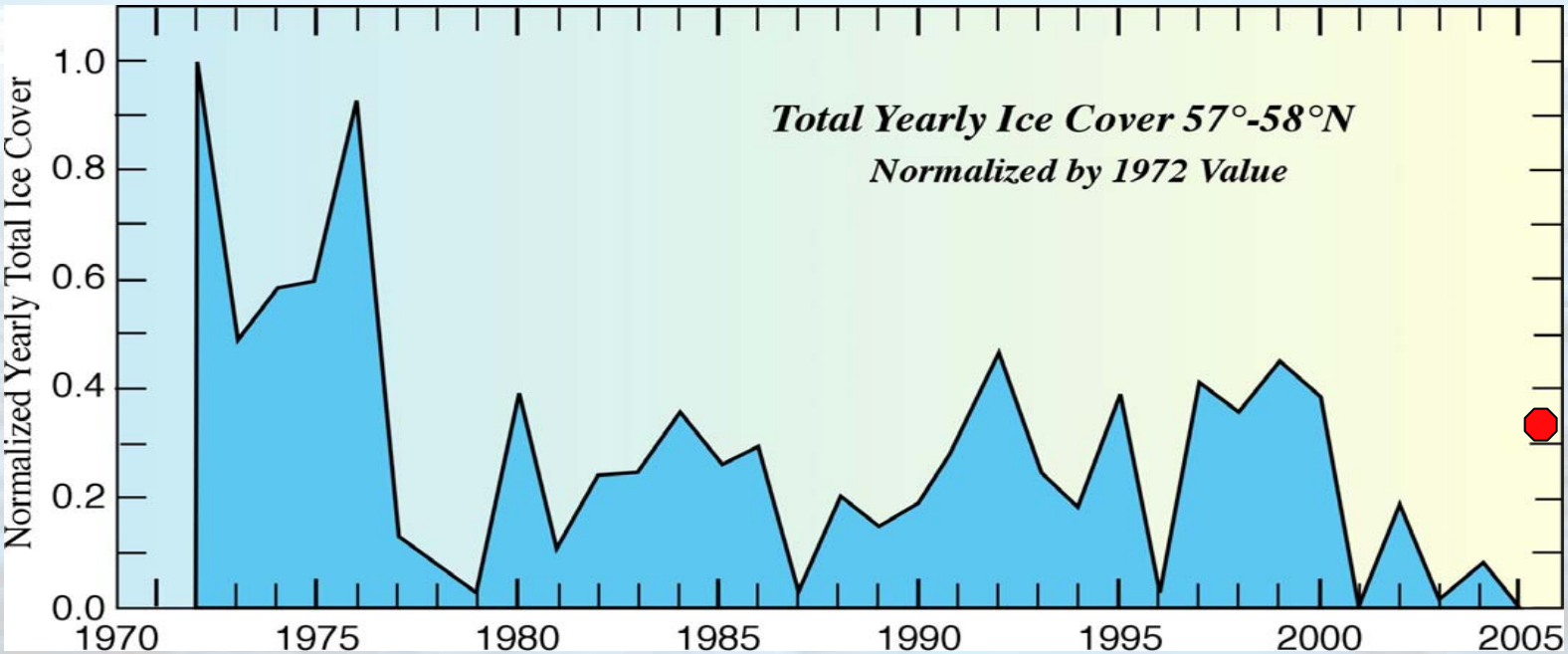


Percent Coverage in box on map.

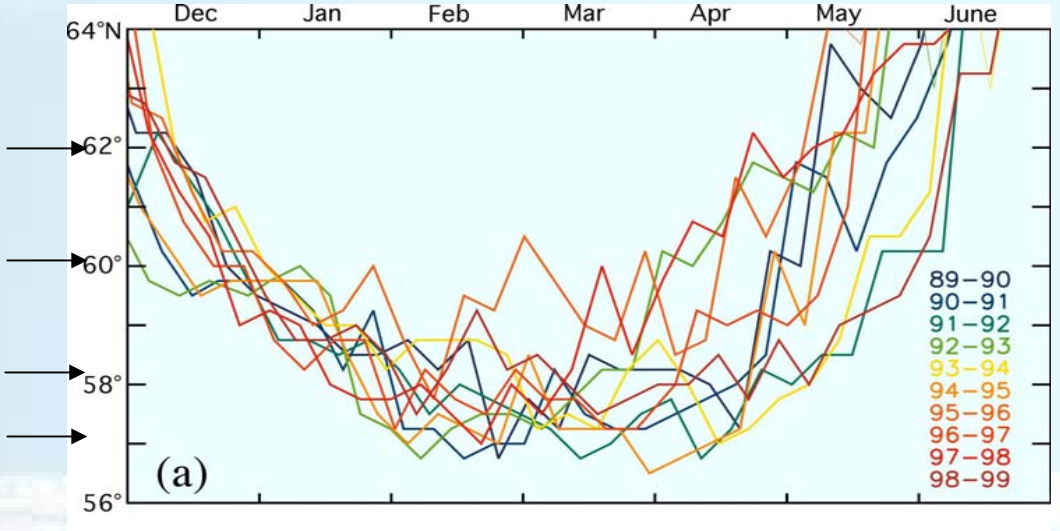


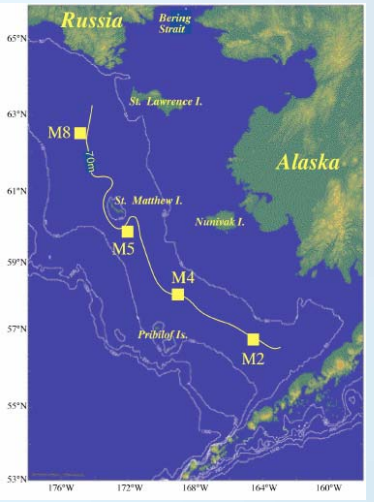
Horizontal Averaged Ice Concentration



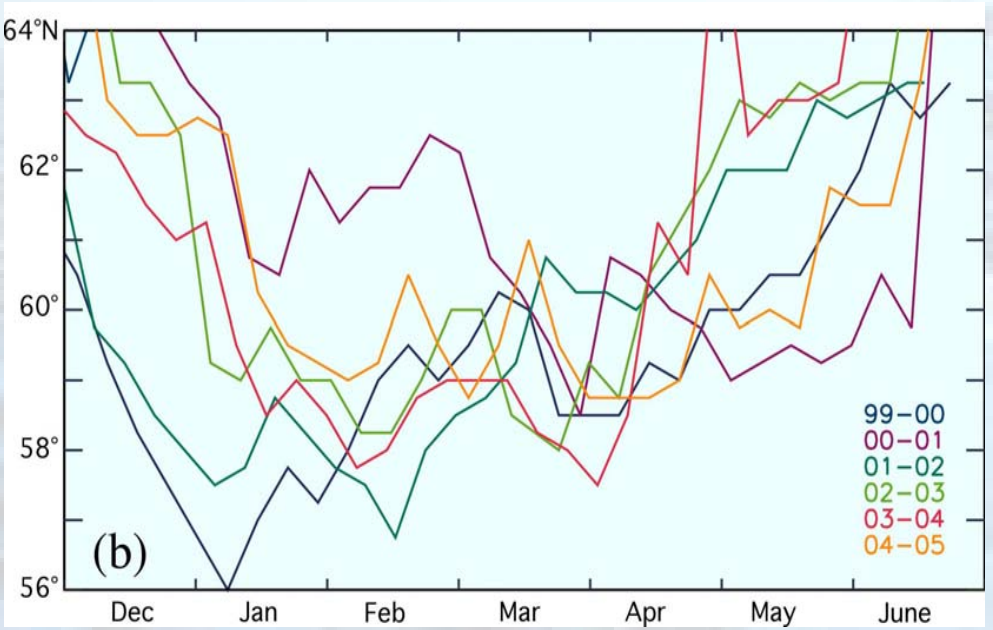


Maximum Ice Extent





1989-1999

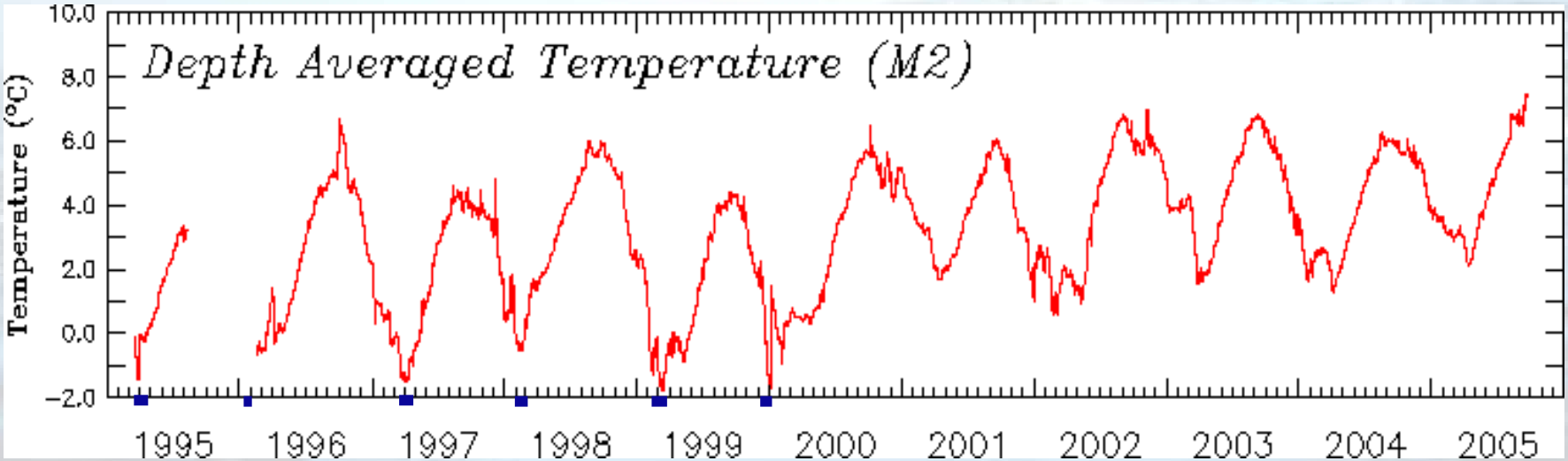


2000-2005

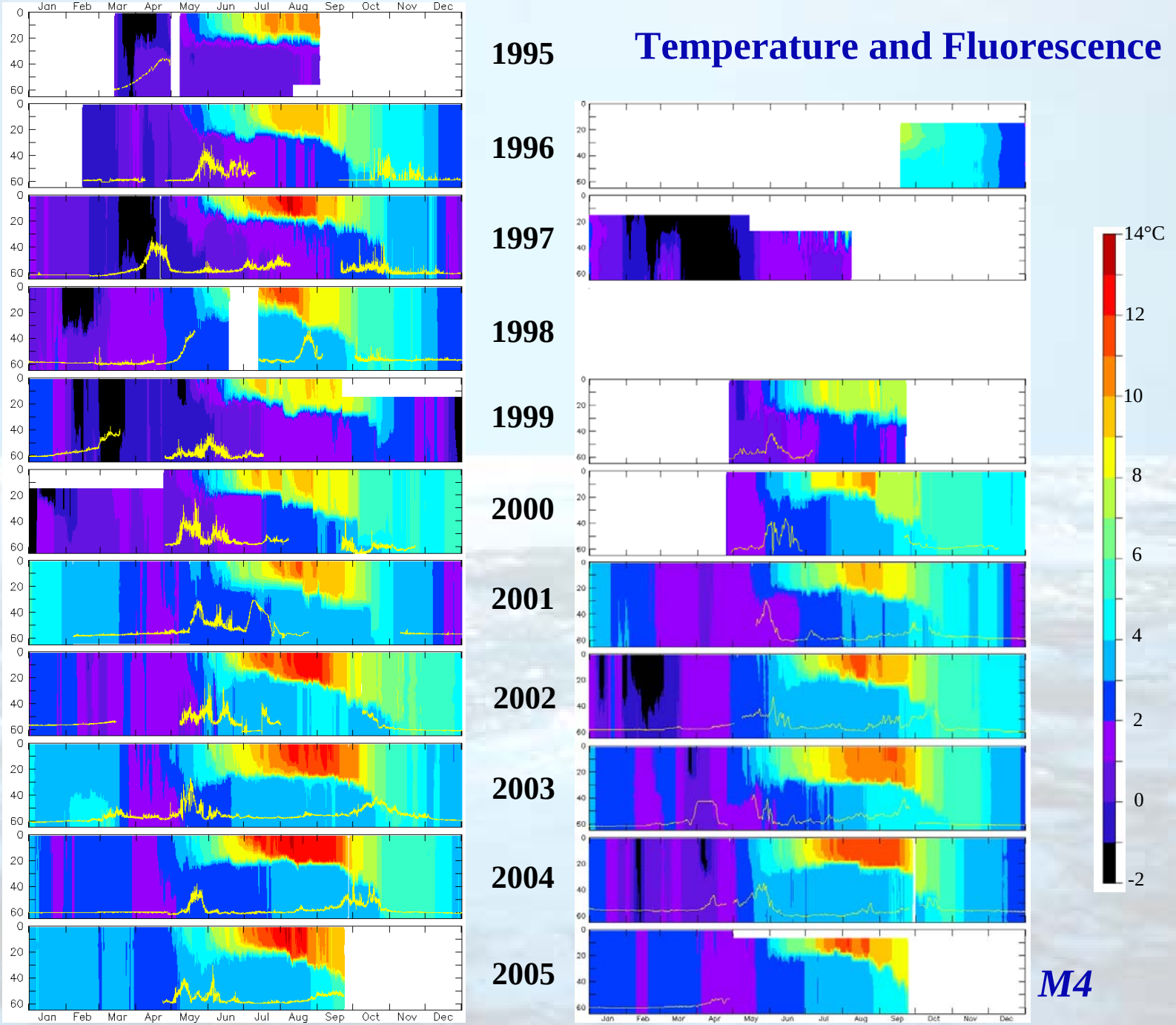
Vertically Averaged Temperature (°C) at M2

>2°C increase in winter after 2000

Blue lines indicate ice cover.

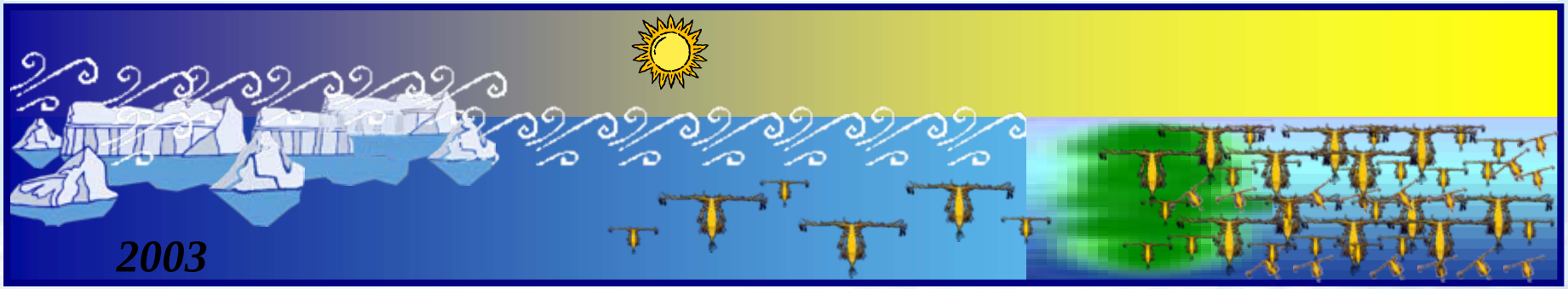


Temperature and Fluorescence

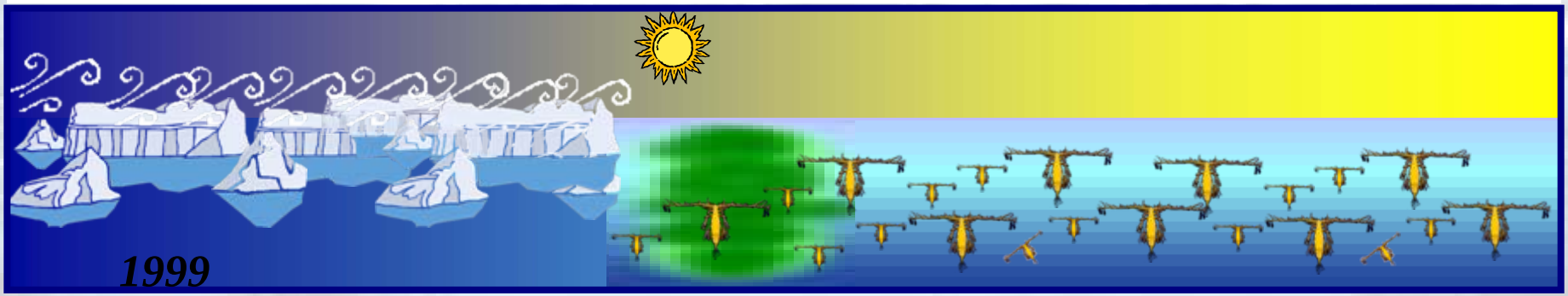


Climate affects the ecosystem through sea ice

Early Ice Retreat ⇨ Late Bloom, Warm Water – Large Copepod Biomass



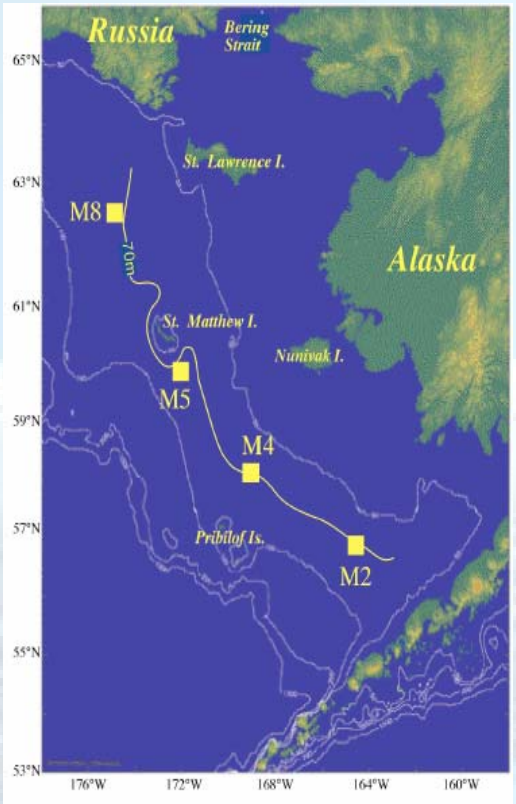
Late Ice Retreat ⇨ Early Bloom, Cold Water – Small Copepod Biomass

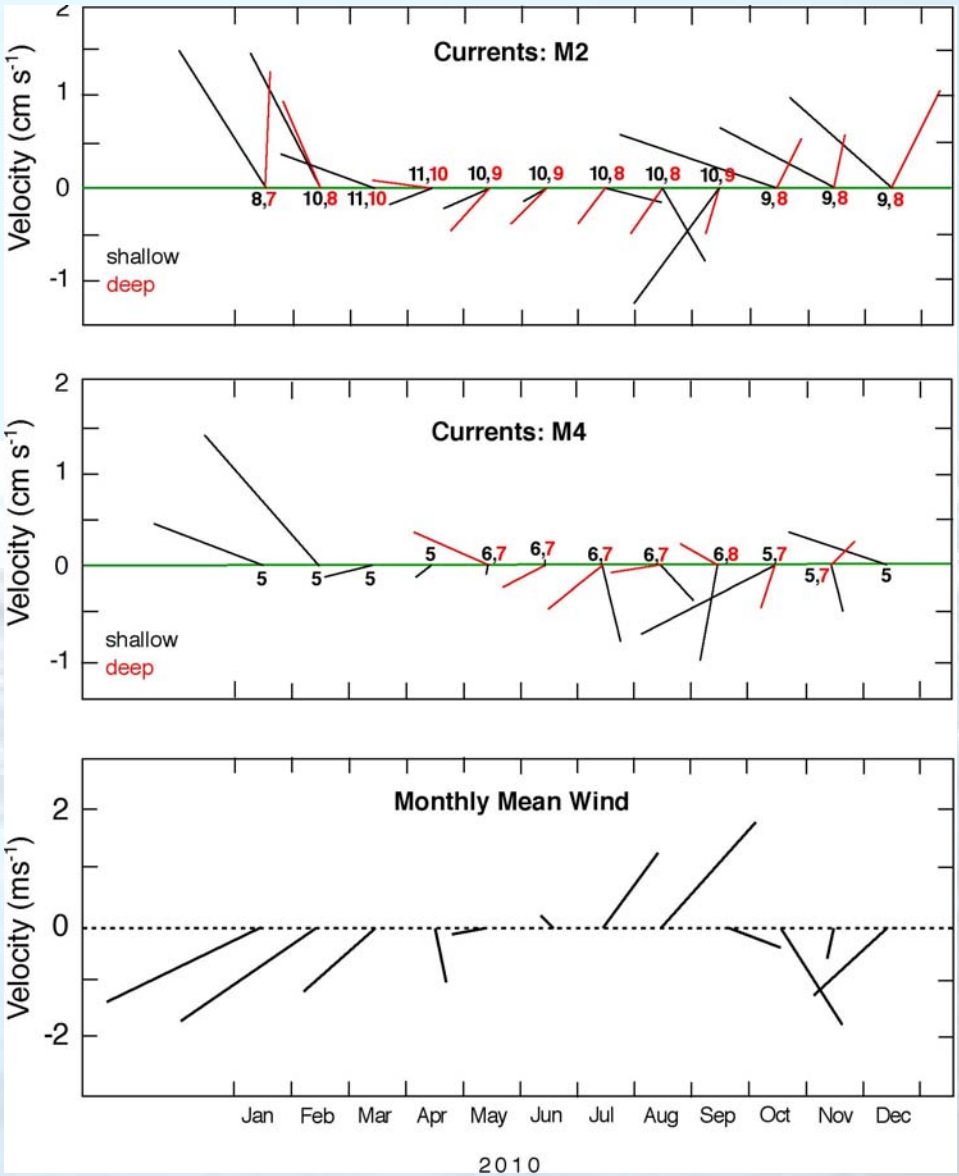


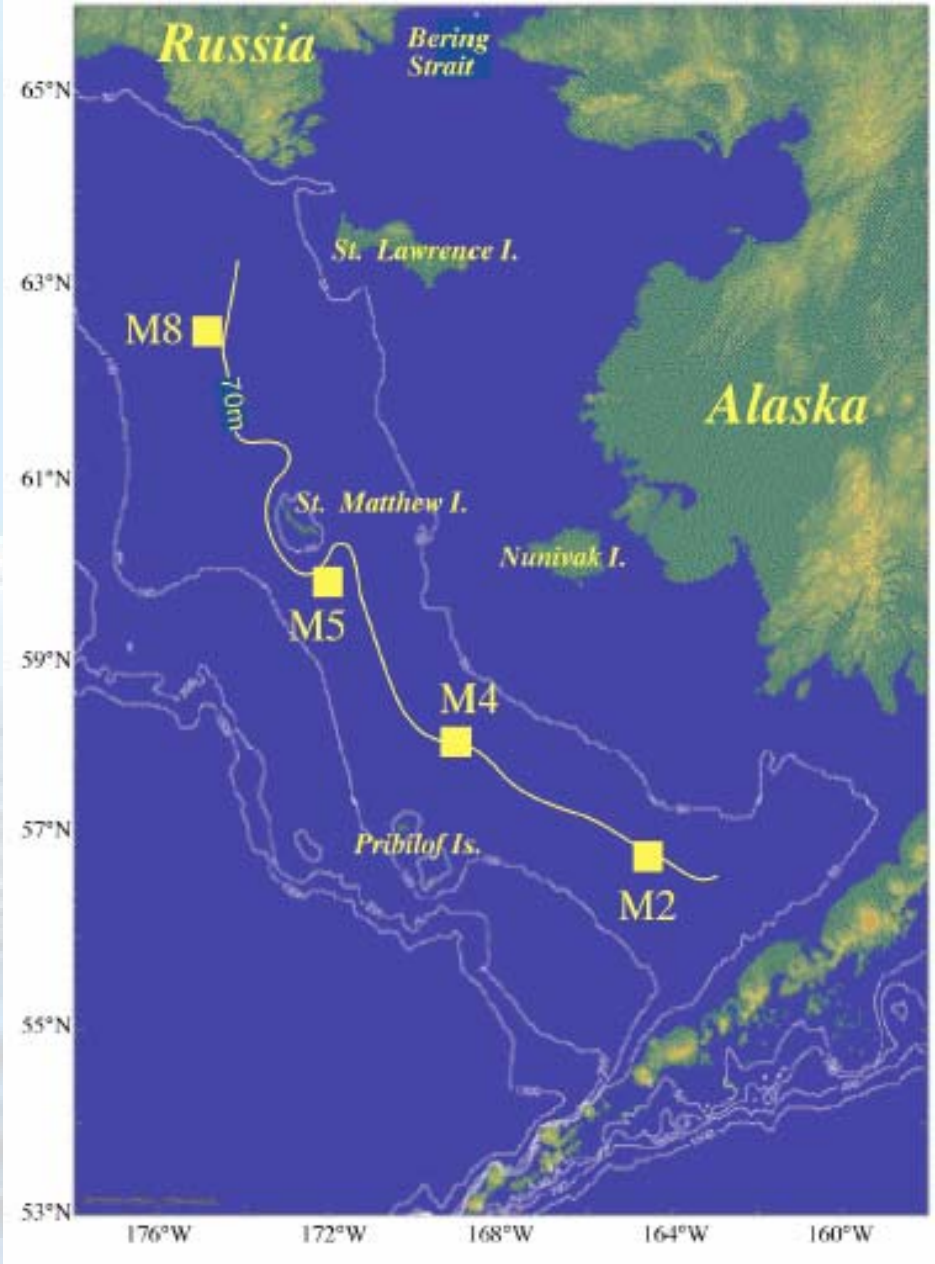
February March April May June

Hunt et al., 2002

Currents and Wind







2005

Moorings:

M2 1995-present

M4 1996, 1997, 1999-present (only summer 1996, 1997, 1999)

M5 2005-present

M8 2004-present

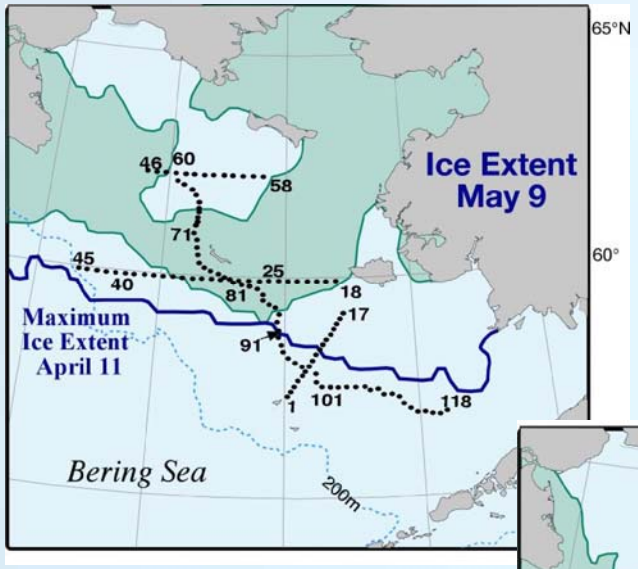
Measured: *Temperature, salinity, fluorescence, nutrients, currents*

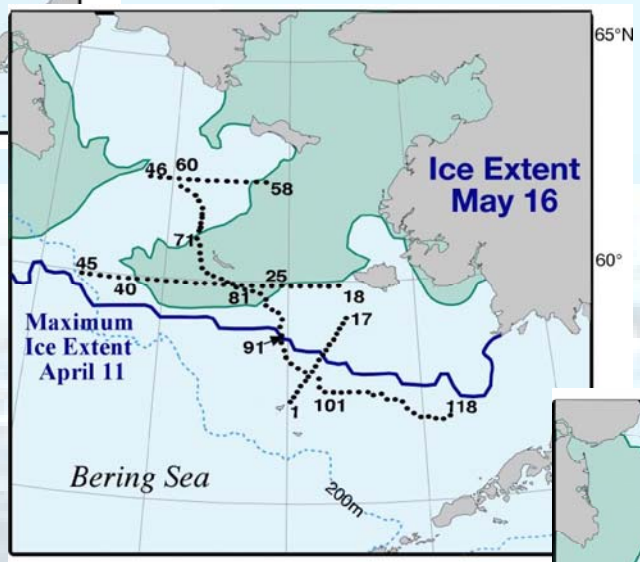
Hydrography:

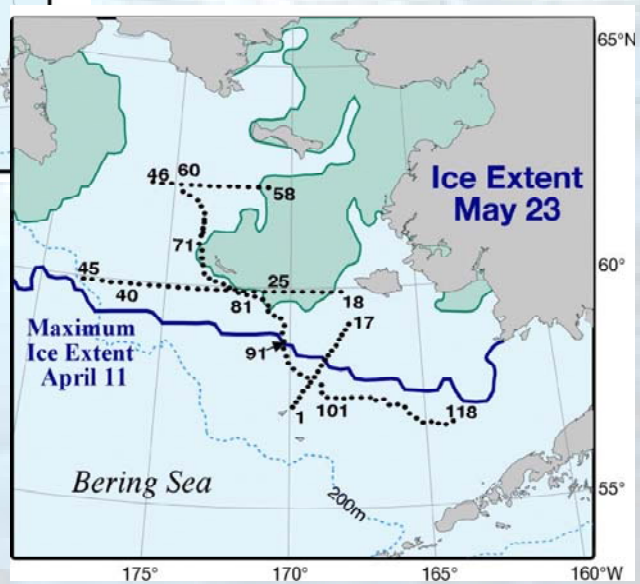
May 2005 and September 2005

Measured: *Temperature, salinity, O_2, fluorescence, nutrients, chlorophyll, zooplankton*

Ice Extent in 2005

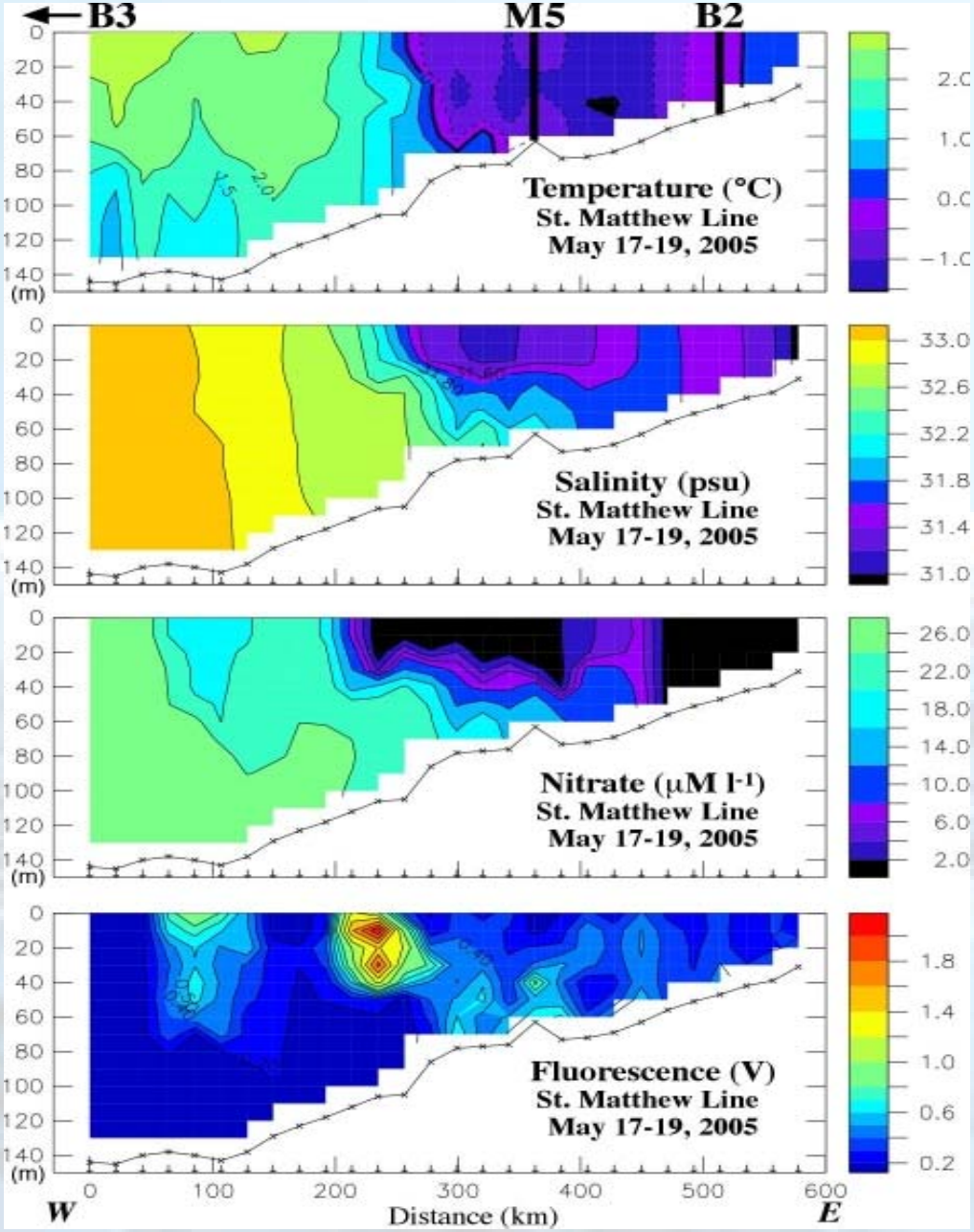


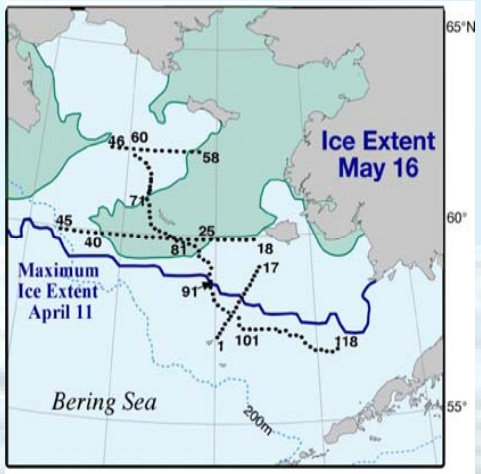




The 70-m Isobath

(May 2005)





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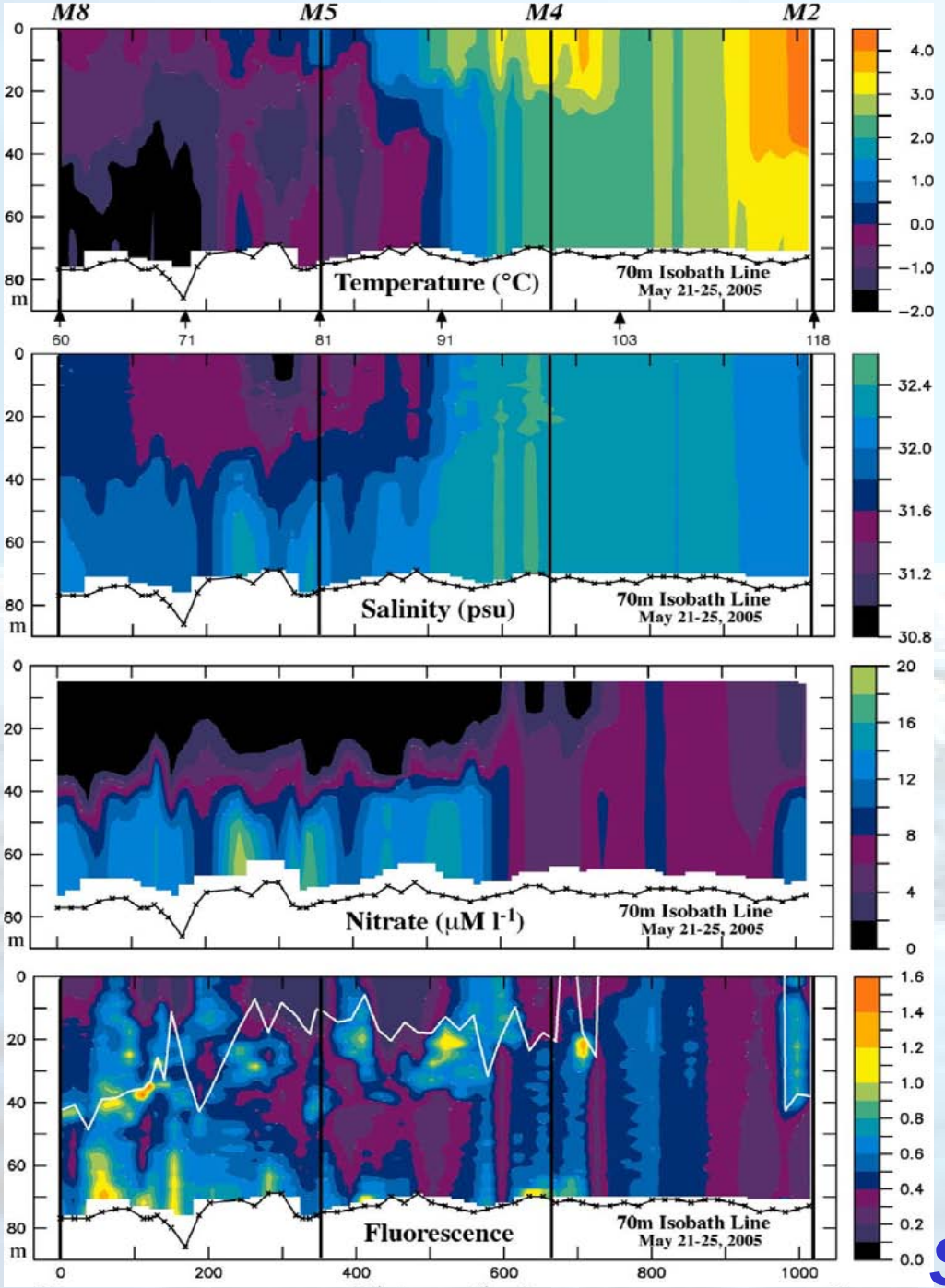
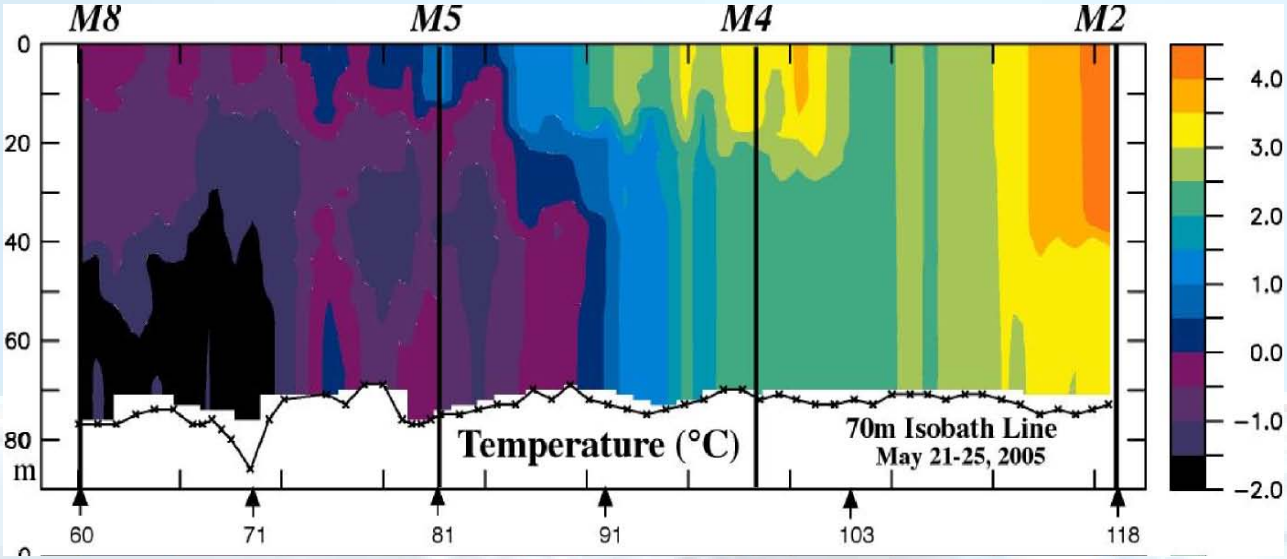
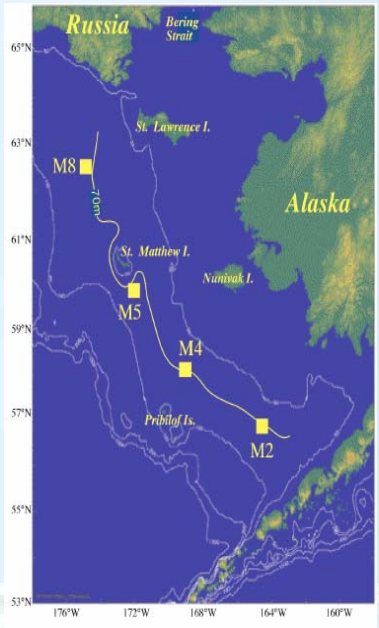
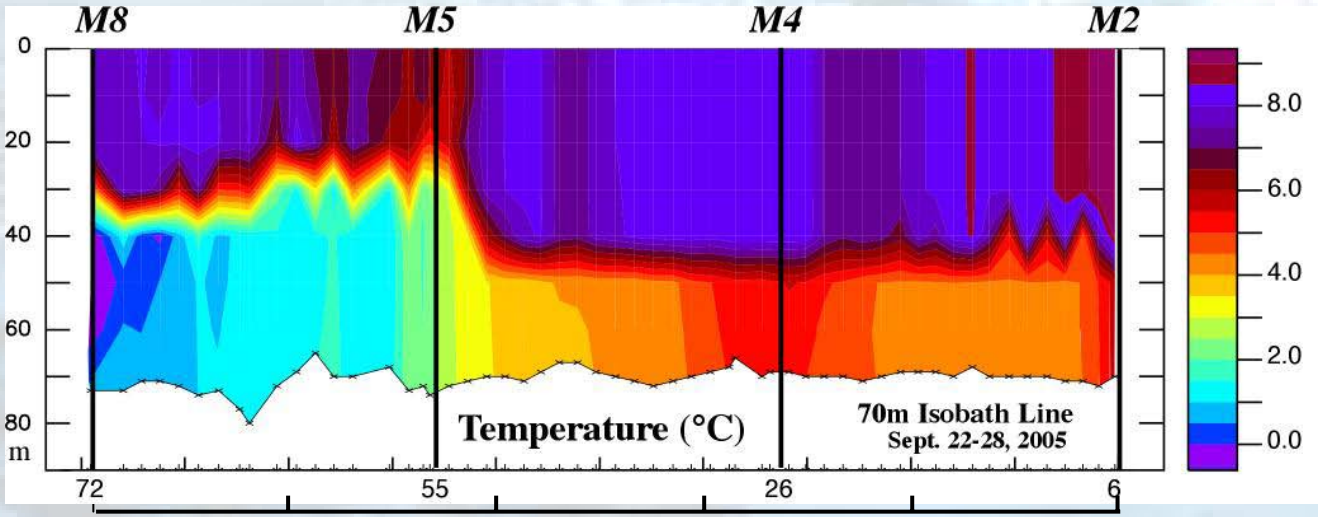


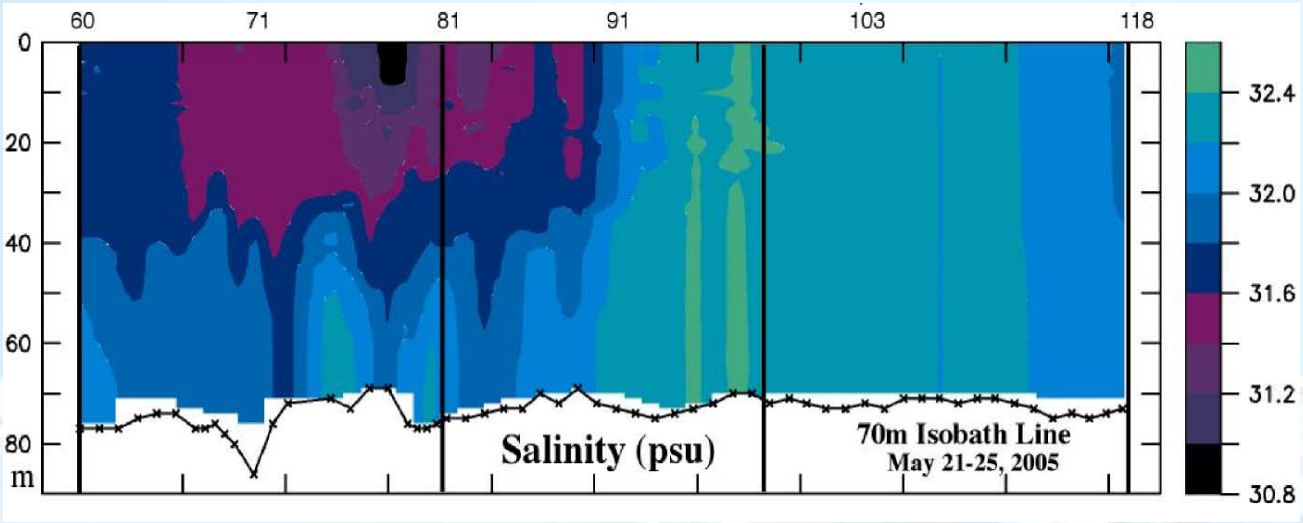
Temperature

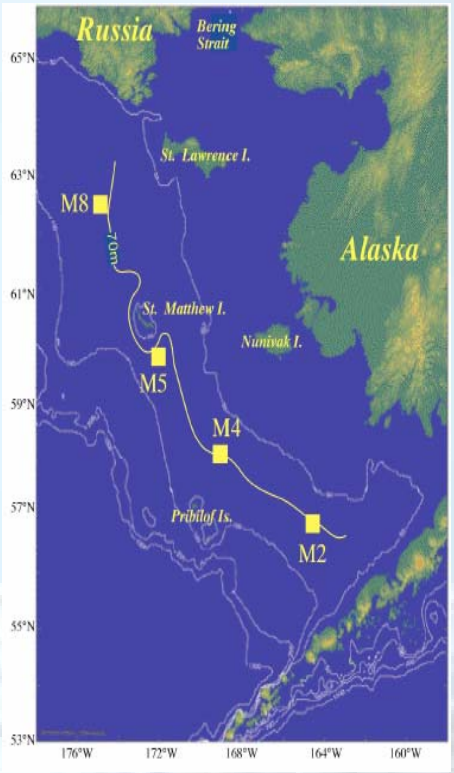


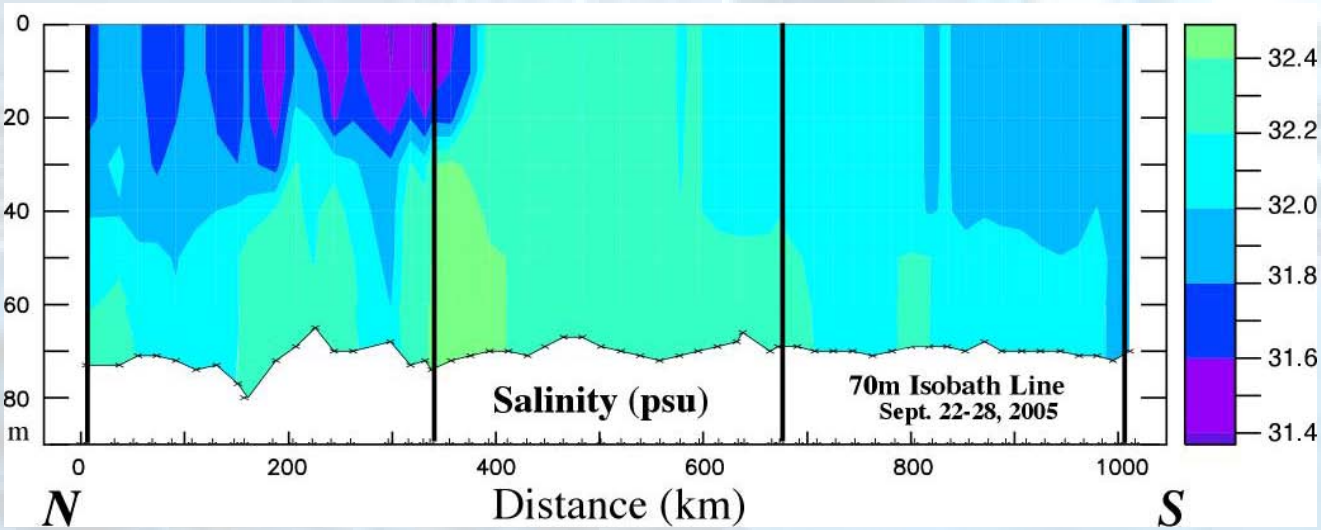




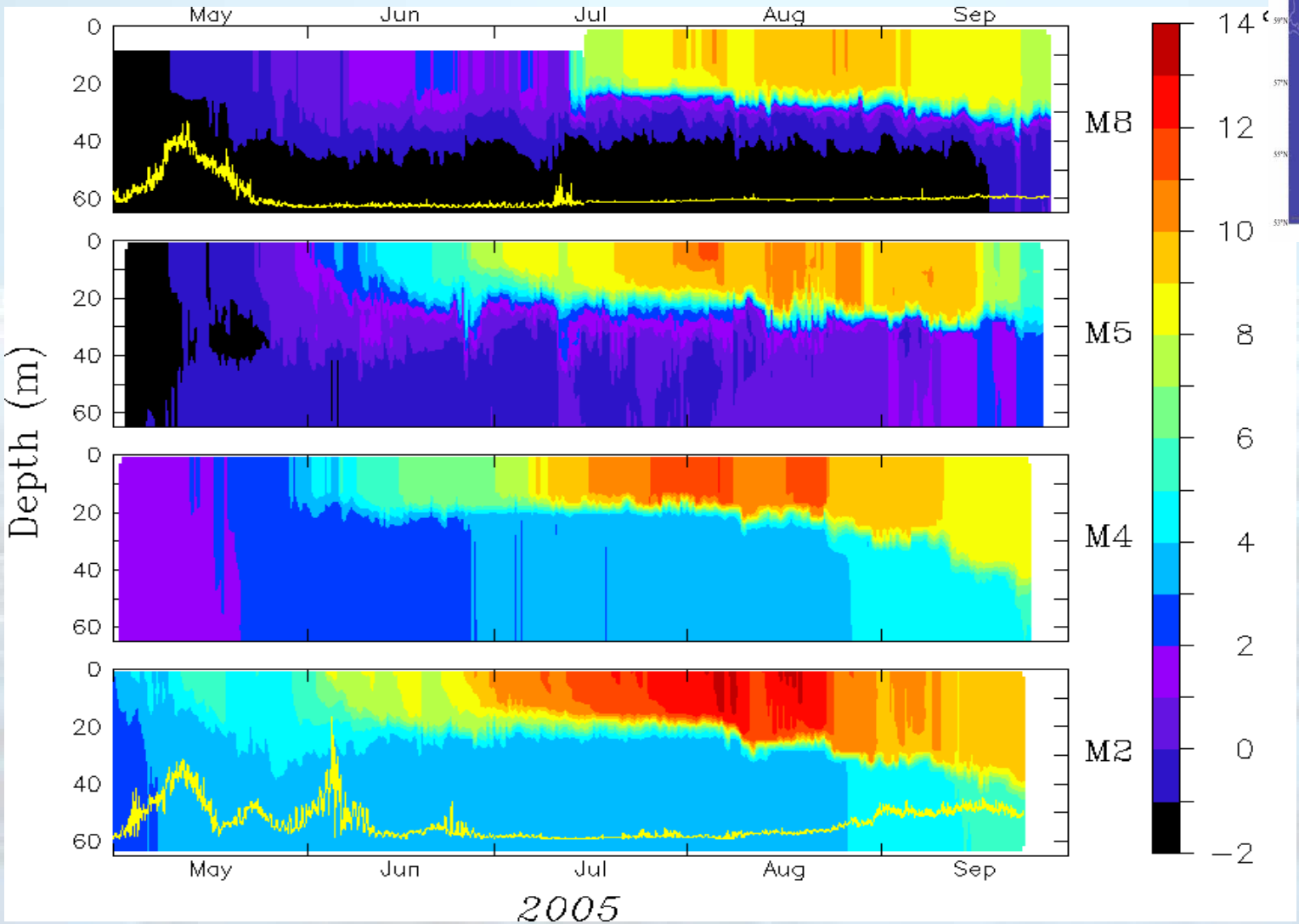
Salinity

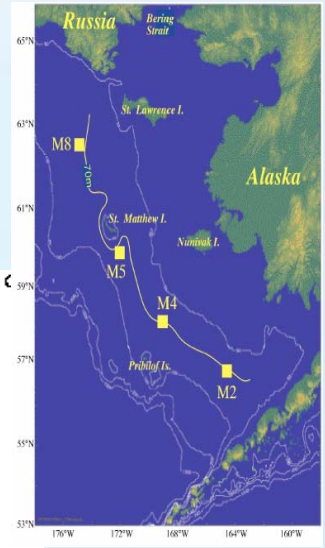

60
71
81
91
103
118
0
20
40
60
80
m
32.4
32.0
31.6
31.2
30.8
Salinity (psu)
70m Isobath Line
May 21-25, 2005


Russia
Bering Strait
65°N
63°N
St. Lawrence I.
M8
70m
Alaska
61°N
St. Matthew I.
Nunivak I.
M5
59°N
M4
57°N
Pribilof Is.
M2
55°N
53°N
176°W
172°W
168°W
164°W
160°W


0
20
40
60
80
m
32.4
32.2
32.0
31.8
31.6
31.4
Salinity (psu)
70m Isobath Line
Sept. 22-28, 2005
0
200
400
600
800
1000
N
Distance (km)
S

Temperature Measured at the Four Biophysical Mooring Sites





Summary

- **2001-2005 had reduced ice cover (80-100% reduced from 1972) and increased temperature (~3°C). What about 2006?**

- **Sharp front divides the warmer, more saline southern shelf from the colder, fresher northern shelf.**

  Spring - associated with position of ice

  Fall - modified by advection.

- **During summer: M2 and M8 weakly impacted by advection;**

  M4 and M5 impacted by advection.

- **Ice associated spring phytoplankton bloom appears to fall to bottom**