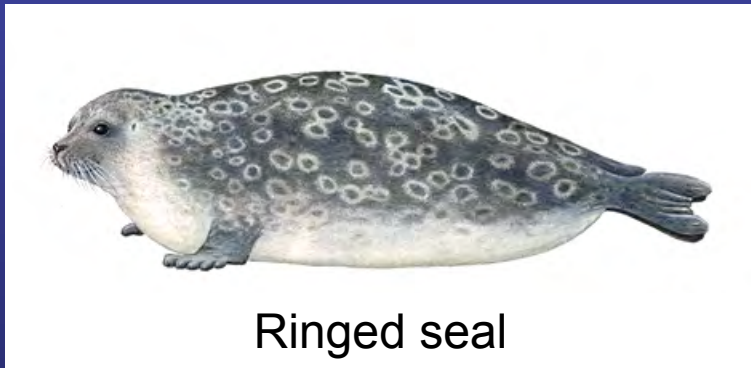


# National Marine Mammal Laboratory

## Polar Ecosystems Program

### Arctic ice seals



Ringed seal



Spotted seal



Bearded seal



Ribbon seal

# Ice seal habitat selection and seasonal movements



Are ice seals associated with sea ice during the non-pupping/molting seasons?

What are their preferred foraging zones -- shelf, slope, basin?

How might climate change and diminishing sea ice affect ice seals?





## Shipboard surveys

- 300m of sea ice
- moving
- between the hours of 08:00 and 20:00
- 52 hours and 10 minutes of survey effort
- 925.8 nautical miles of survey line.



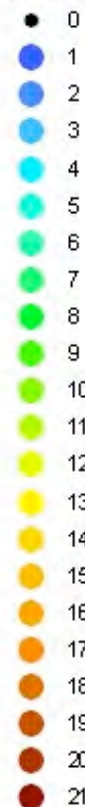
No. seals observed during surveys

Species	No.
Bearded seals	20
Ribbon seals	158
Ringed seals	0
Spotted seals	380
Steller sea lions	4
Unknown pinnipeds	197
<b>Total</b>	<b>759</b>

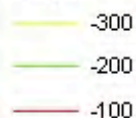
April 13 - May 12, 2006

NOAA: Ice seal / FOCI Bering Sea Research Cruise  
R/V Thomas G. Thompson

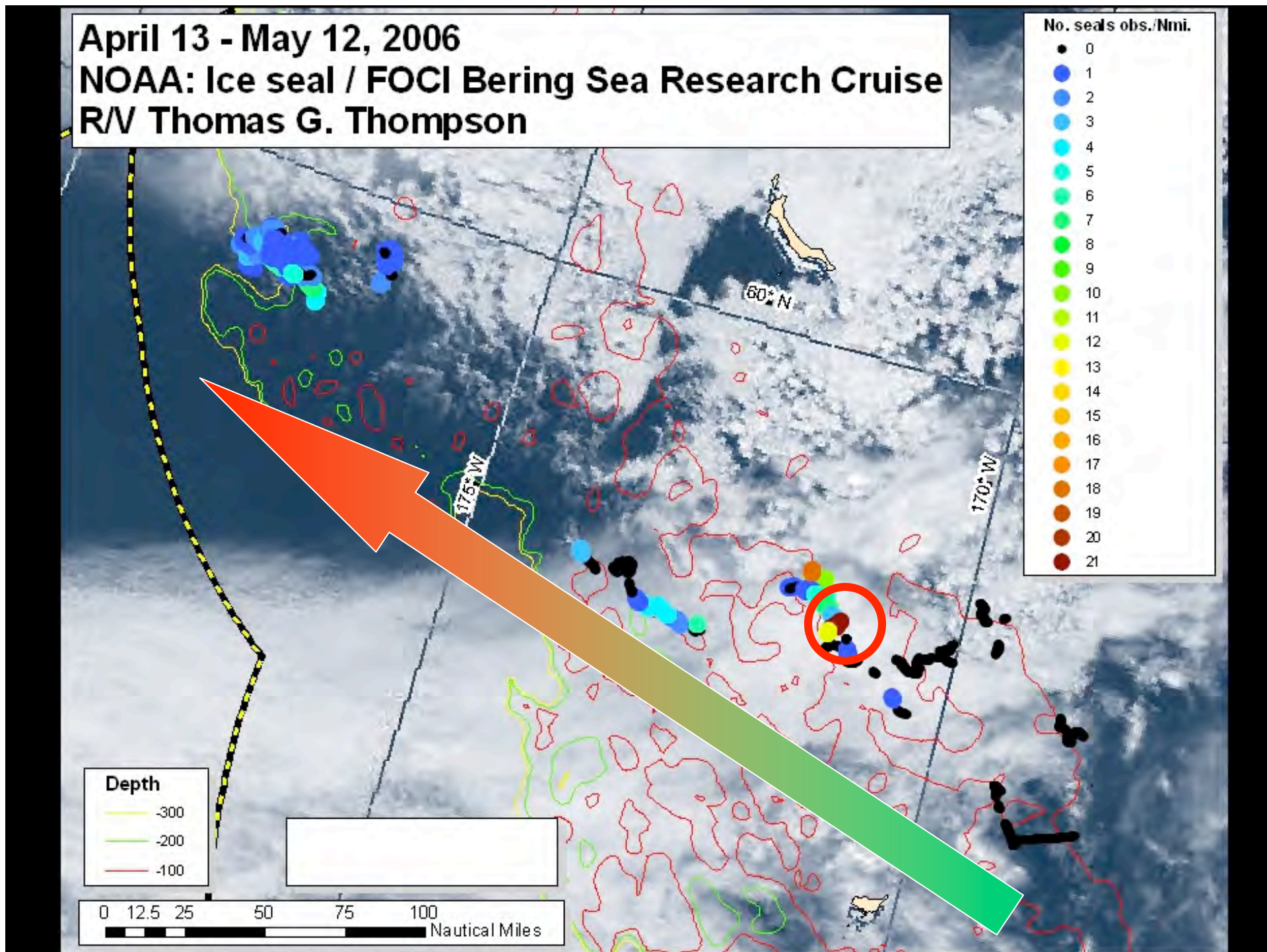
No. seals obs./Nmi.



Depth



0 12.5 25 50 75 100 Nautical Miles











## SPOT tags

- Attached to seal's flipper (permanent)
- Only transmits when seal is completely hauled out (locations only on ice/land)
- Provides location and haulout data



## SPLASH tags

- Glued to seal's fur (temporary)
- Transmits when seal's back is out of the water (provides locations at-sea)
- Provides location, haulout and dive data

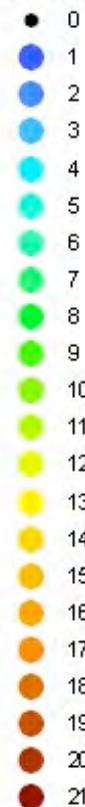




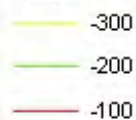
April 13 - May 12, 2006

# NOAA: Ice seal / FOCI Bering Sea Research Cruise R/V Thomas G. Thompson

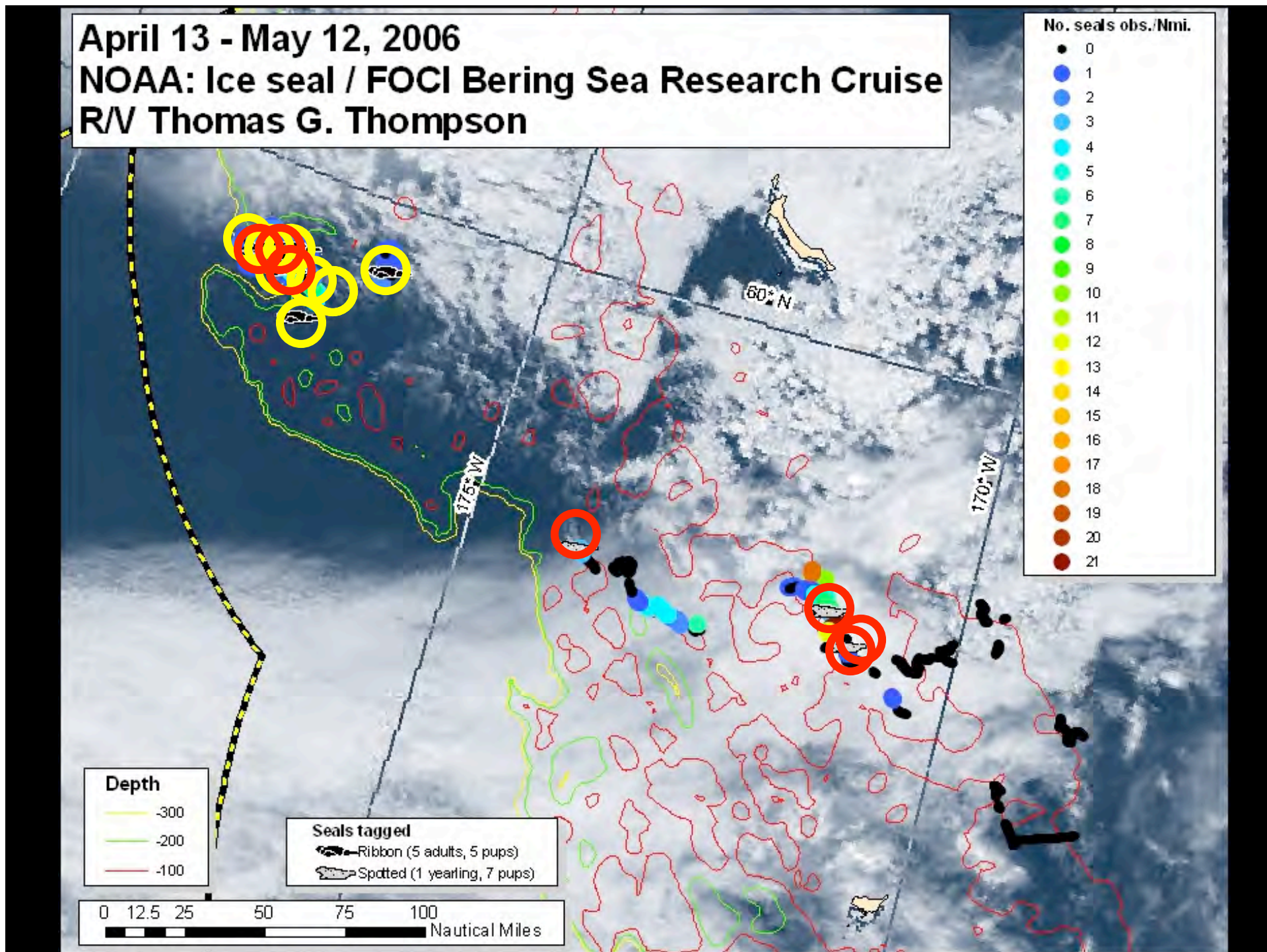
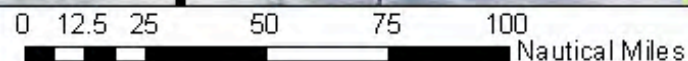
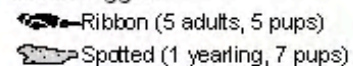
No. seals obs./Nmi.



Depth



Seals tagged





Satellite-tagged 10 ribbon seals:

5 adult females

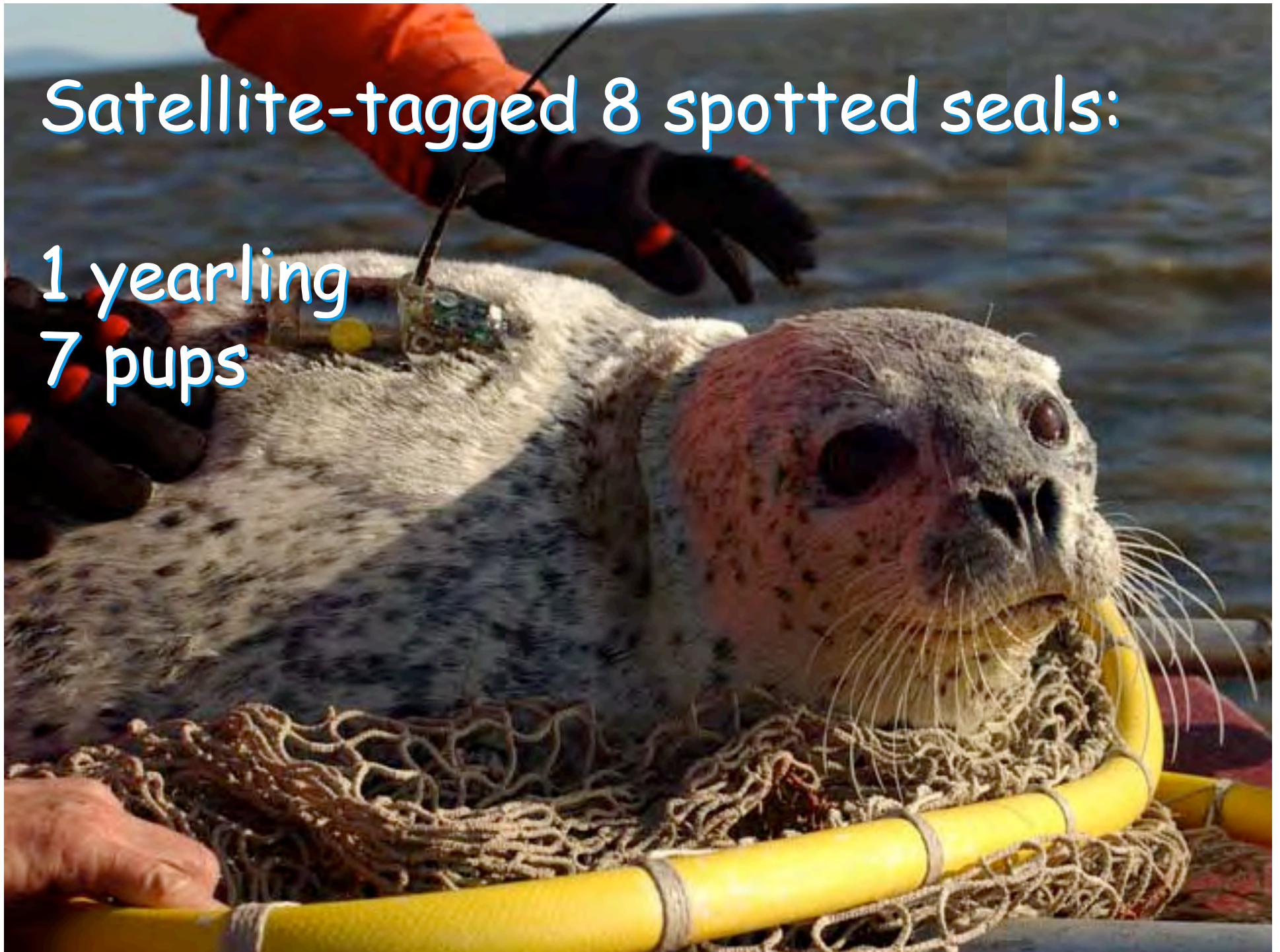
5 pups





# Satellite-tagged 8 spotted seals:

1 yearling  
7 pups

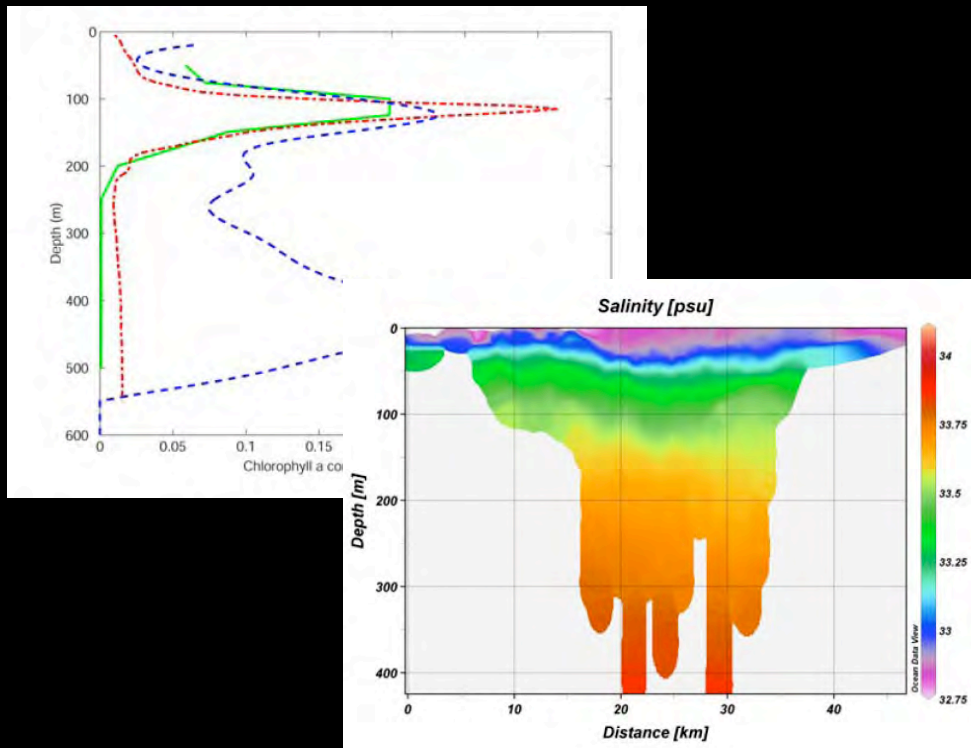


## Future work

- Analyze dive data from SPLASH tags
- Compare trends in abundance of seals with that of seabirds

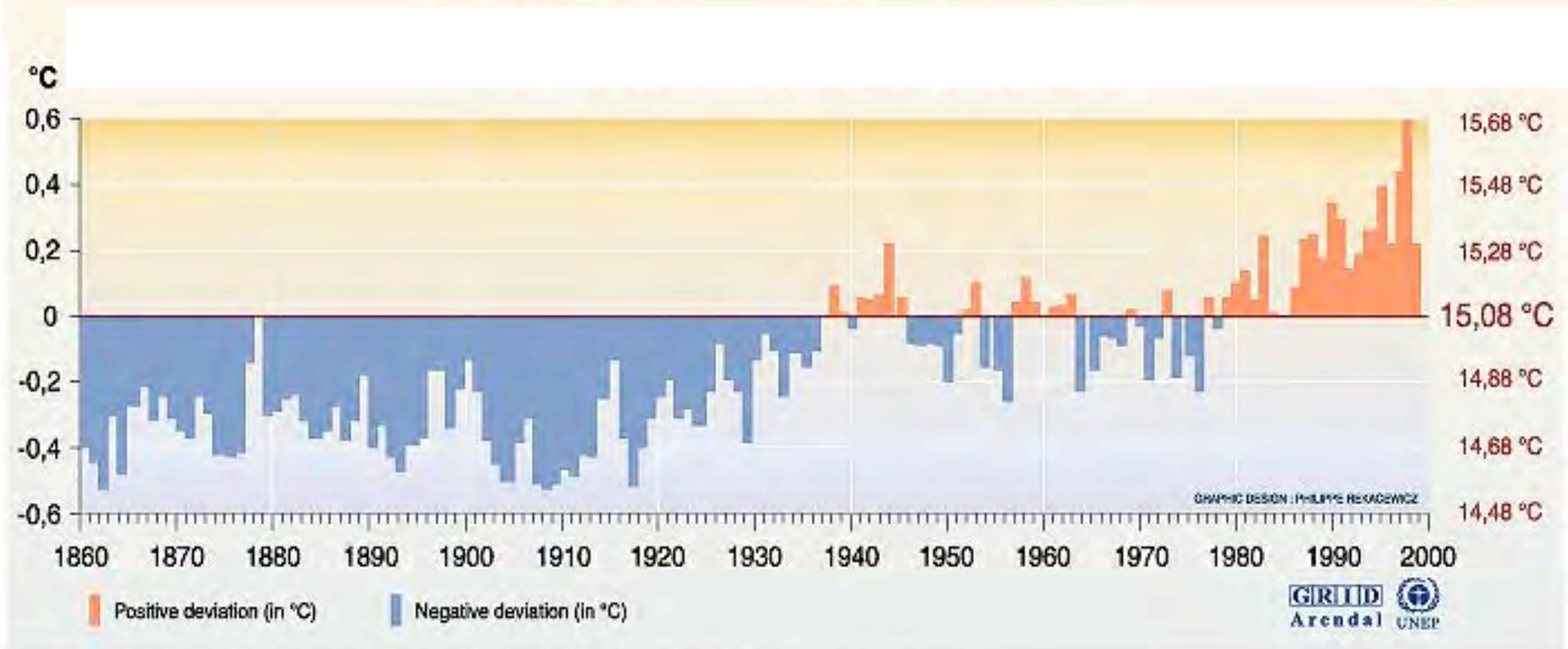
## New research

- Appropriate abundance surveys for ice seals
- Use of CTD tags to better understand habitat requirements





# Climate change, sea ice, and seals



Sources: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.

# Climate change, sea ice, and seals

. . . going . . . going . . .  
(when might it be gone?)





# Potential impacts of altered sea ice

Loss of sea ice platforms during critical life history events (pup-rearing, molting) -- perhaps increasing predation risks

Extinct by 2050?

Shifting distributions of both seal and prey populations, perhaps with seals losing access to their favored foraging zones

How do ribbon seals utilize sea ice habitats  
in the marginal ice zone during winter  
(prior to the pupping season)?



# Thank you!



Funded by NOAA's  
Alaska Fisheries Science Center  
National Marine Mammal Laboratory



Spring

RUSSIA

ALASKA

Kamchatka Peninsula

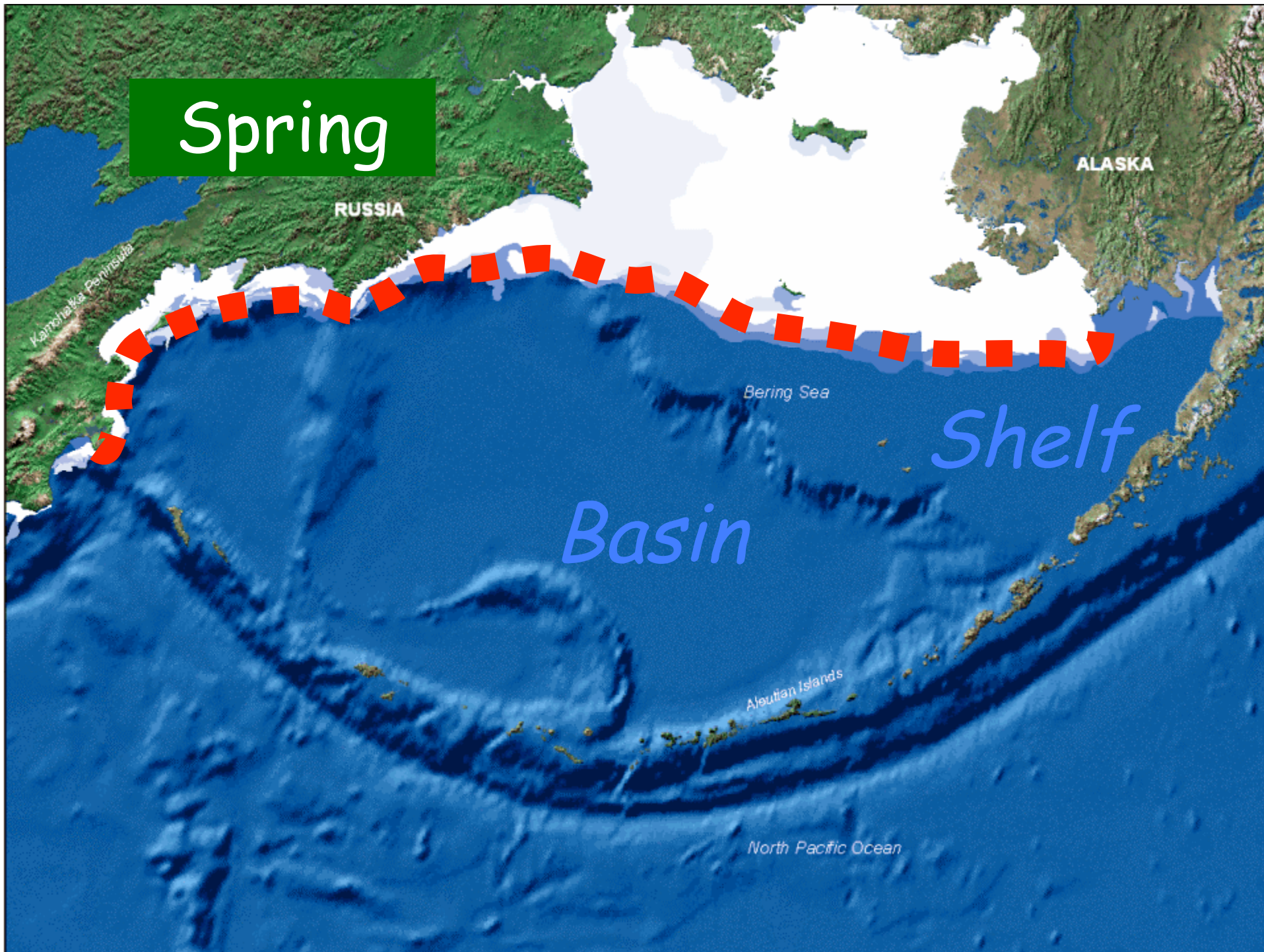
Bering Sea

*Basin*

*Shelf*

Aleutian Islands

North Pacific Ocean





Spring

RUSSIA

ALASKA

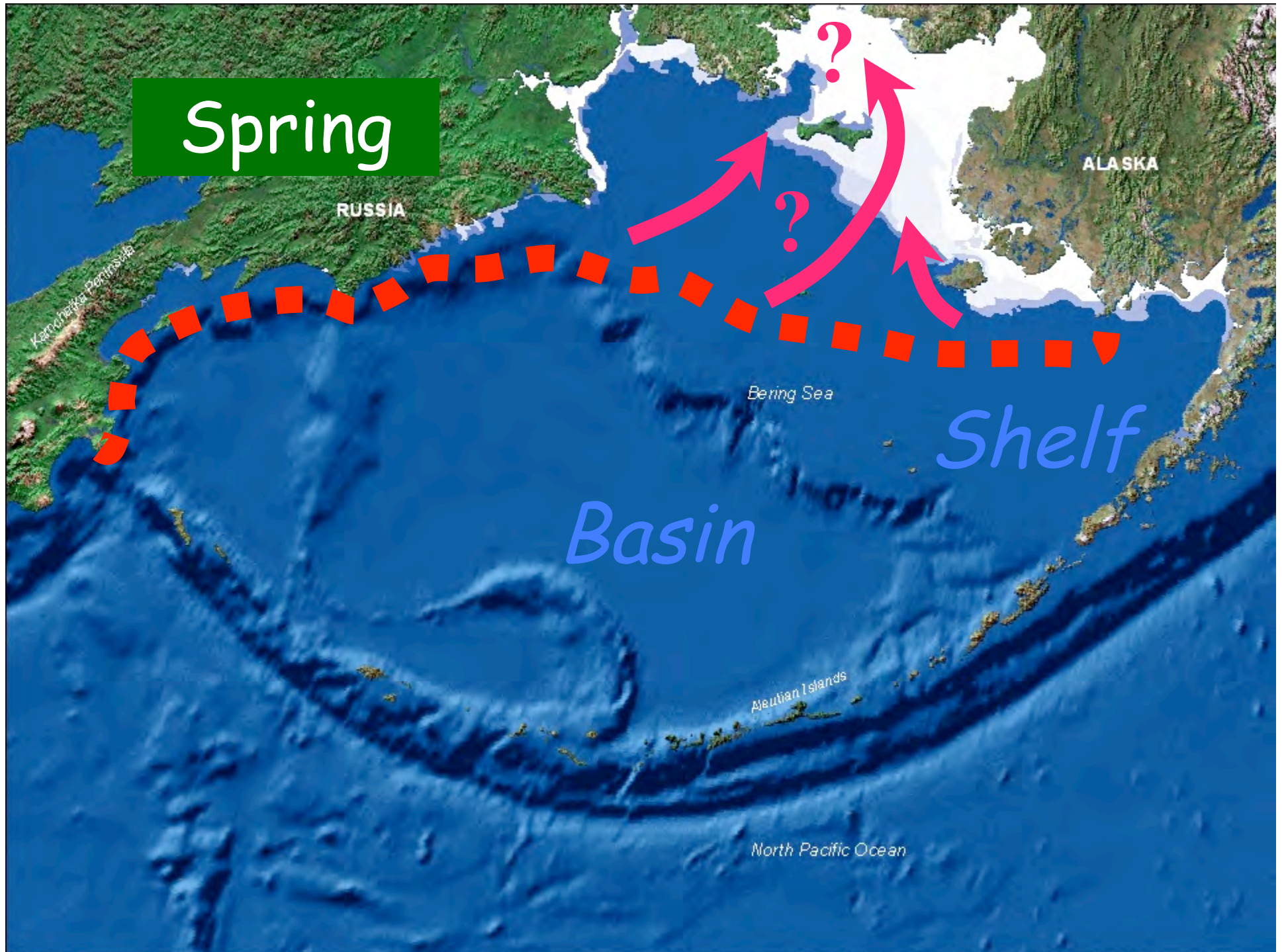
Bering Sea

*Basin*

*Shelf*

Aleutian Islands

North Pacific Ocean





Summer

RUSSIA

ALASKA

Bering Sea

Aleutian Islands

North Pacific Ocean

Shelf

Basin

?

?

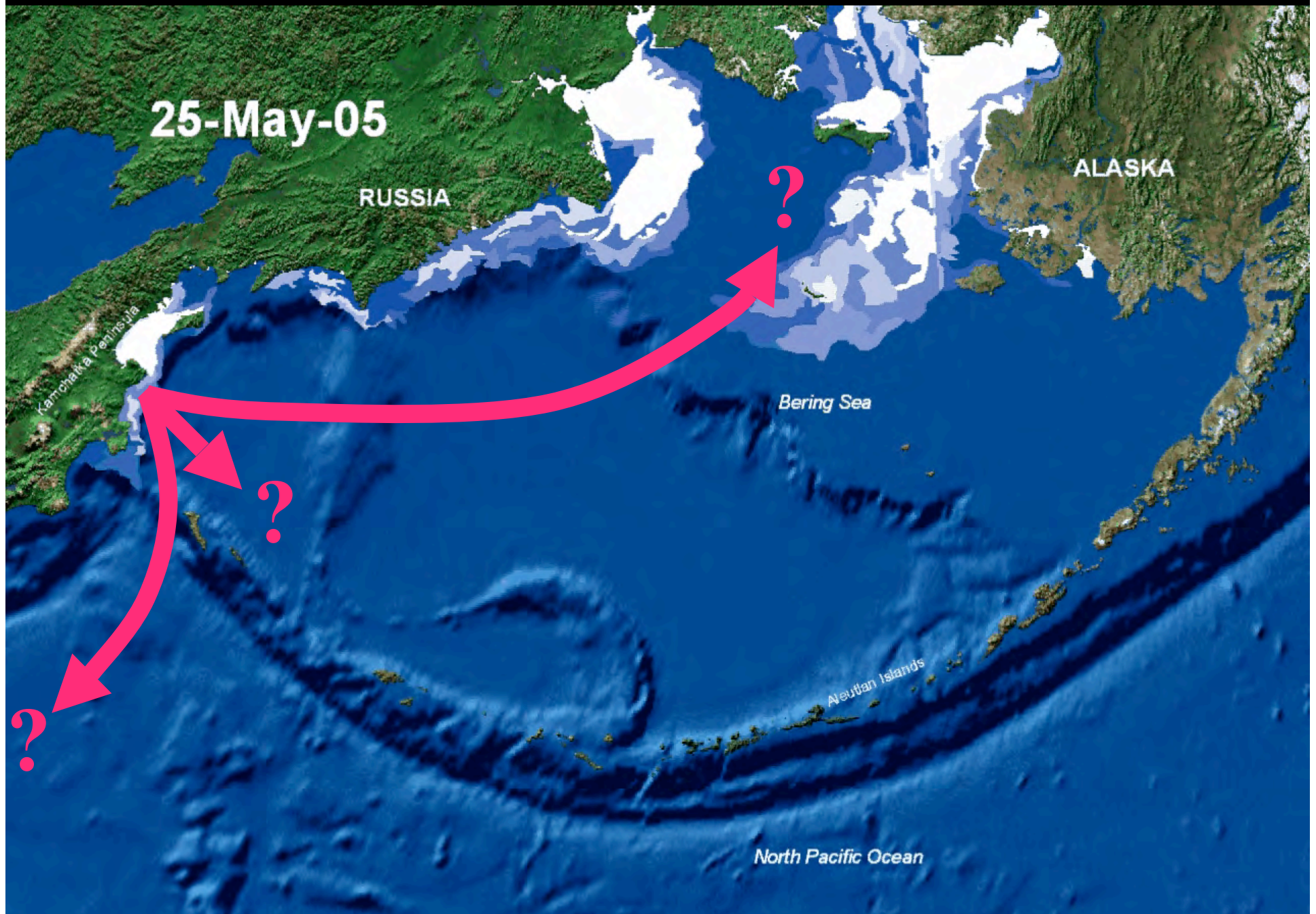
?

?

?

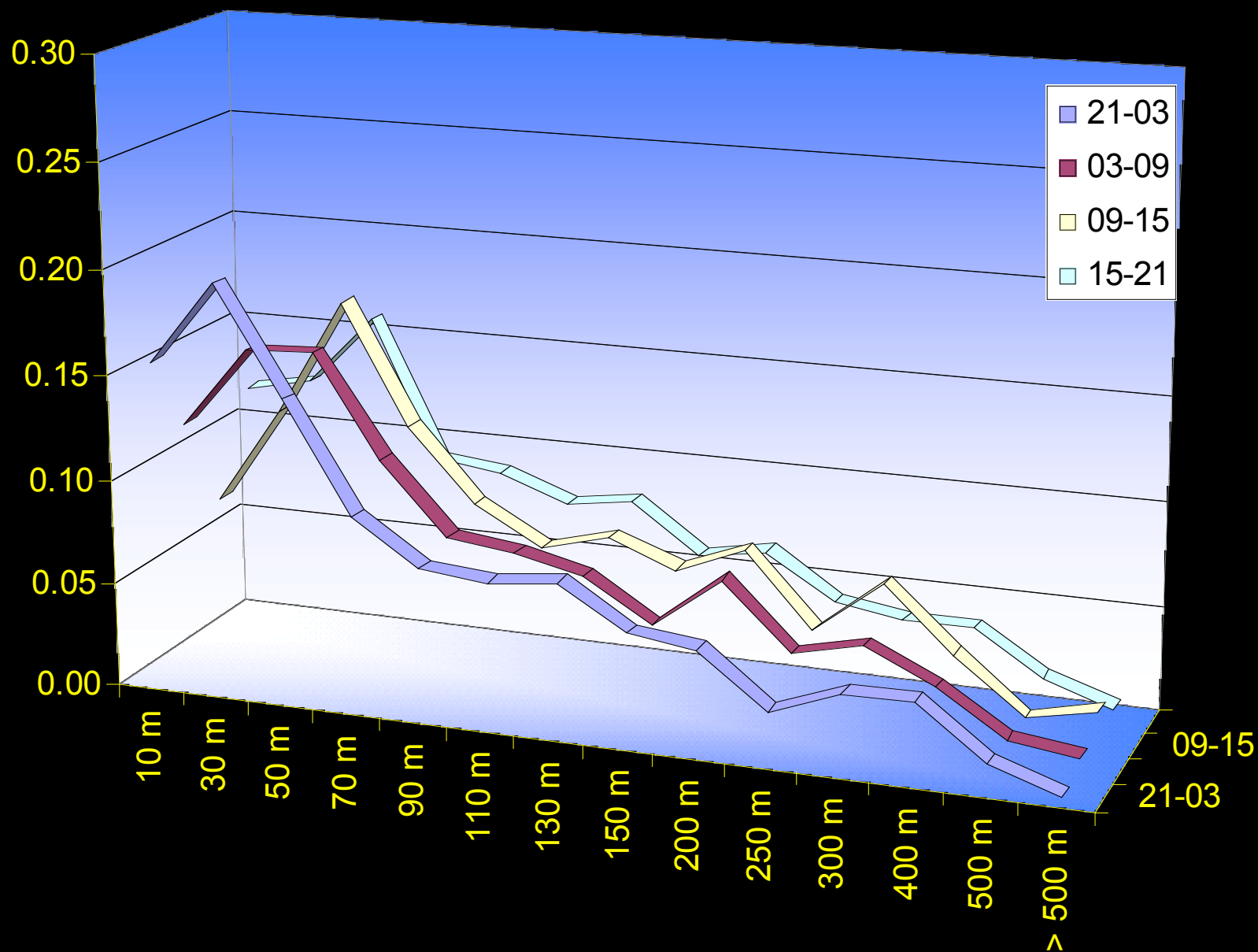


# Male ribbon seal track



# Ribbon seal dive depths

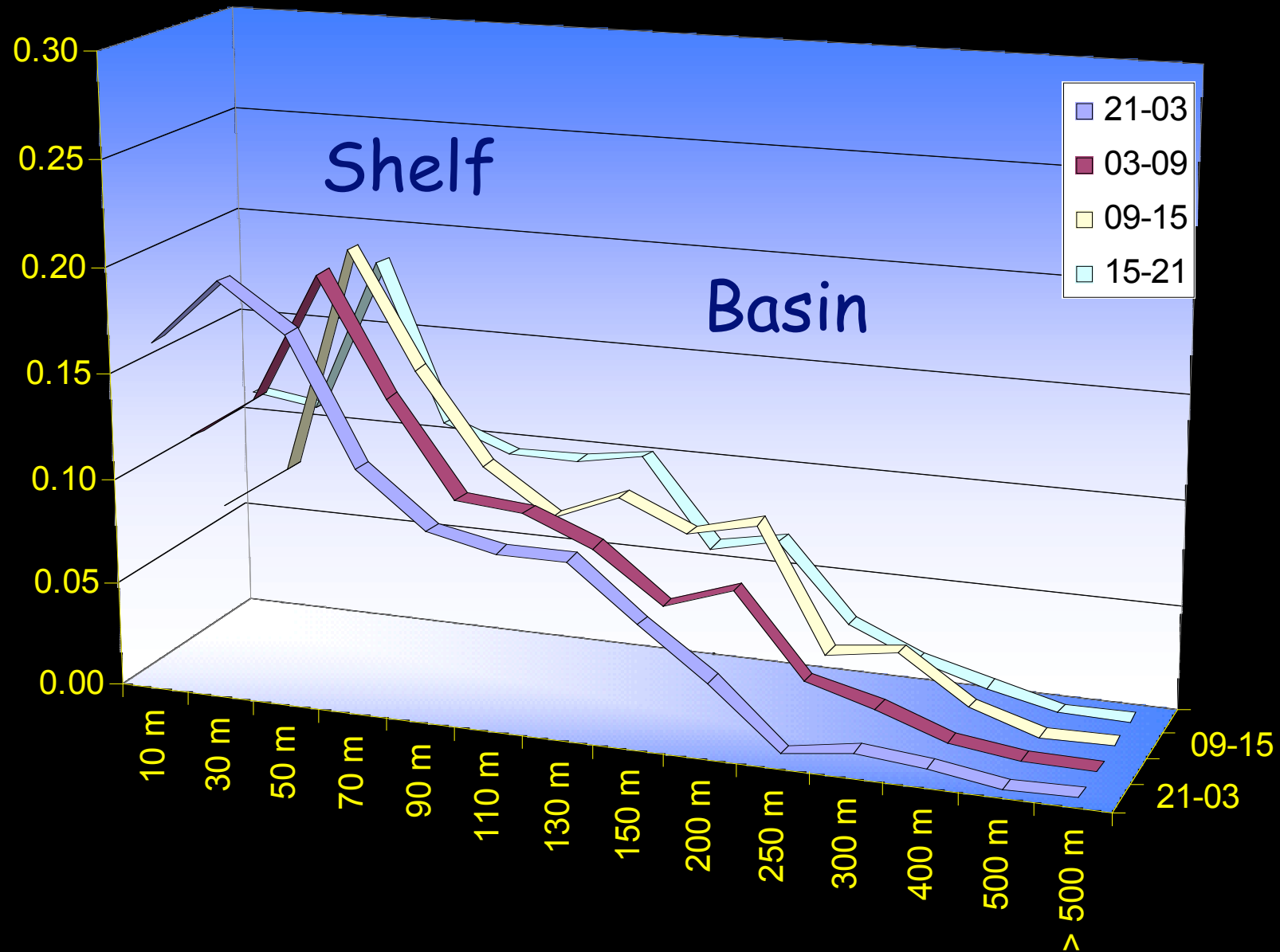
June-November: all seals





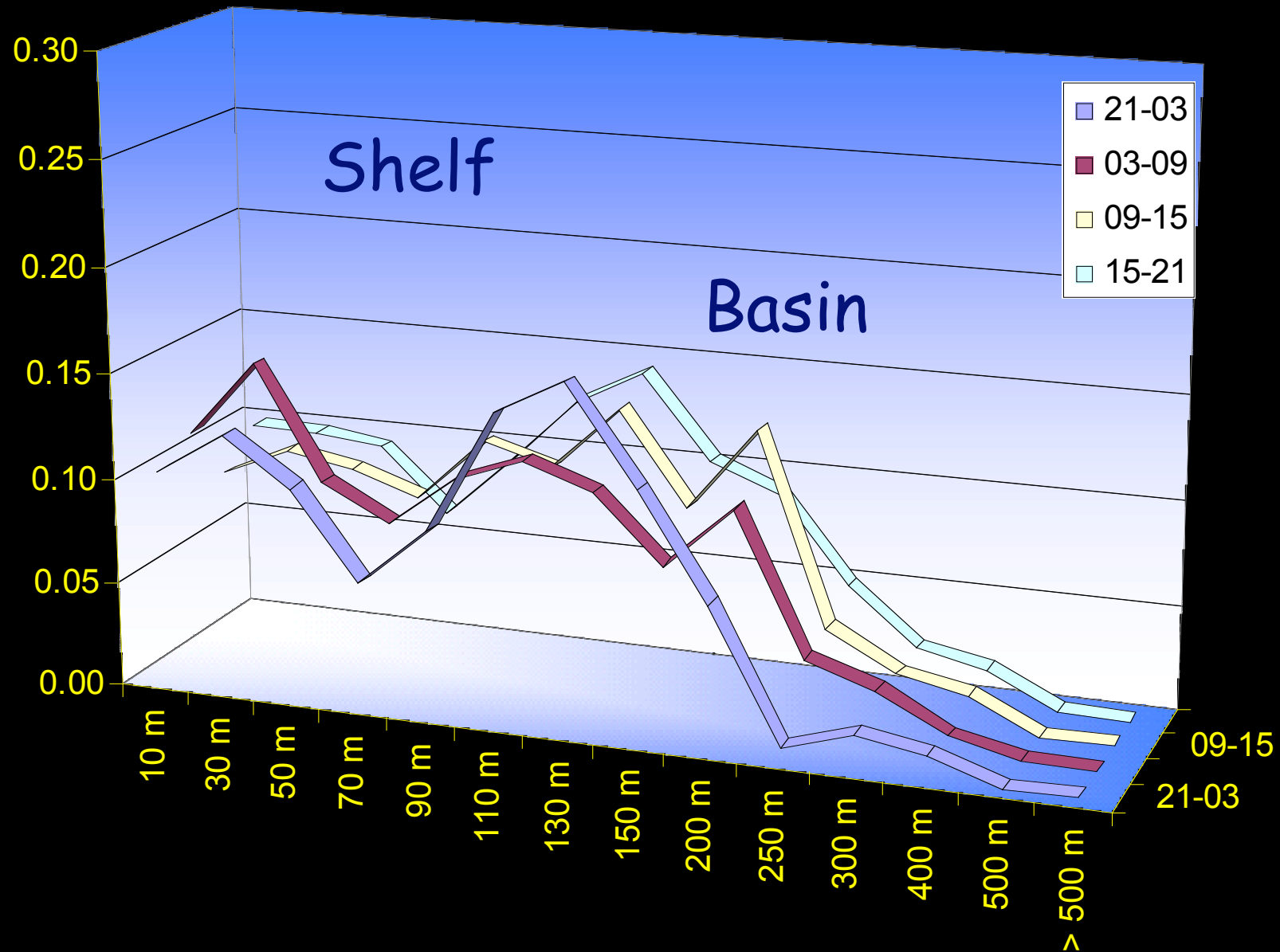
# Ribbon seal dive depths

June-November: all pups



# Ribbon seal dive depths

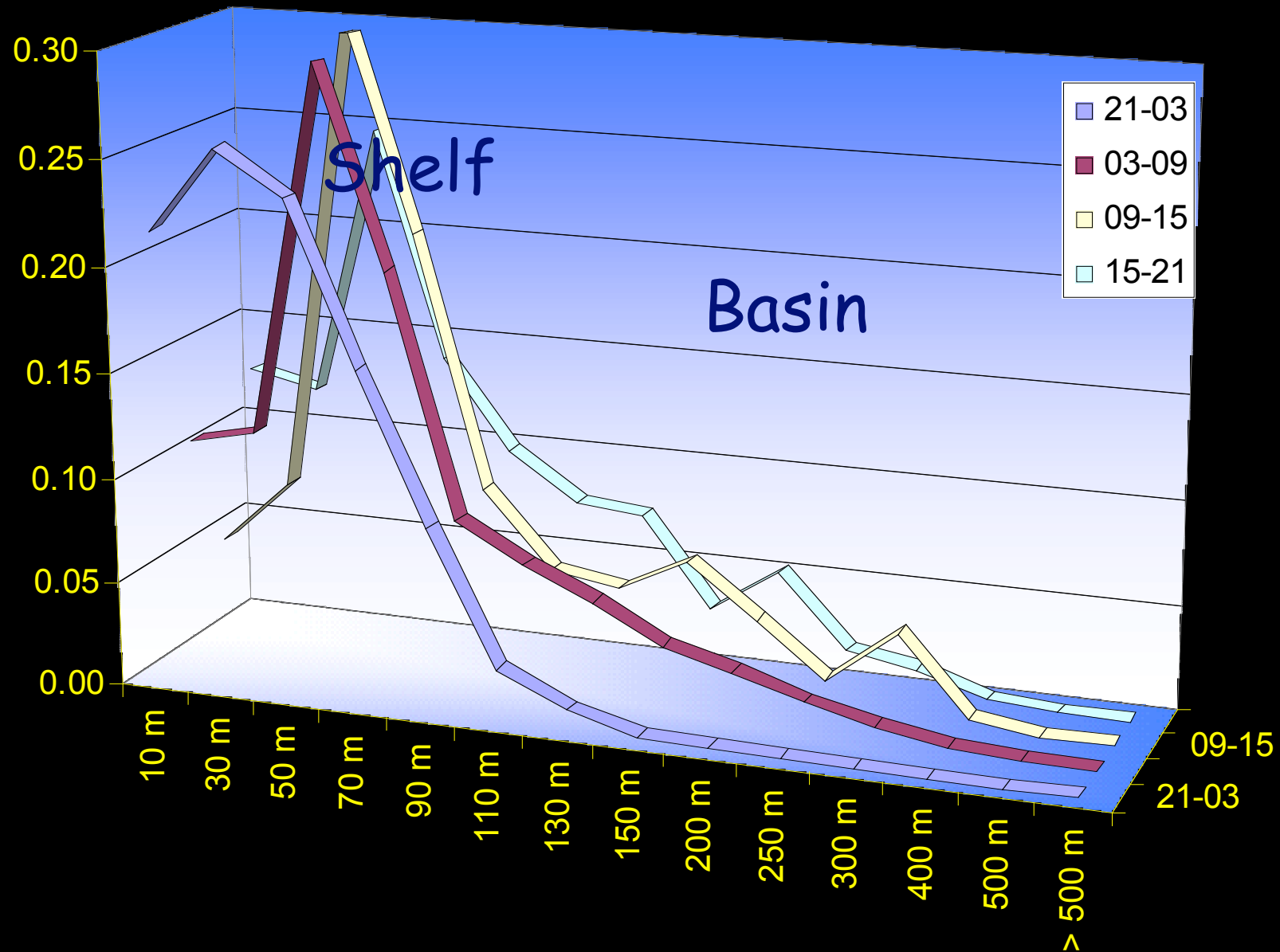
June-November: male pups





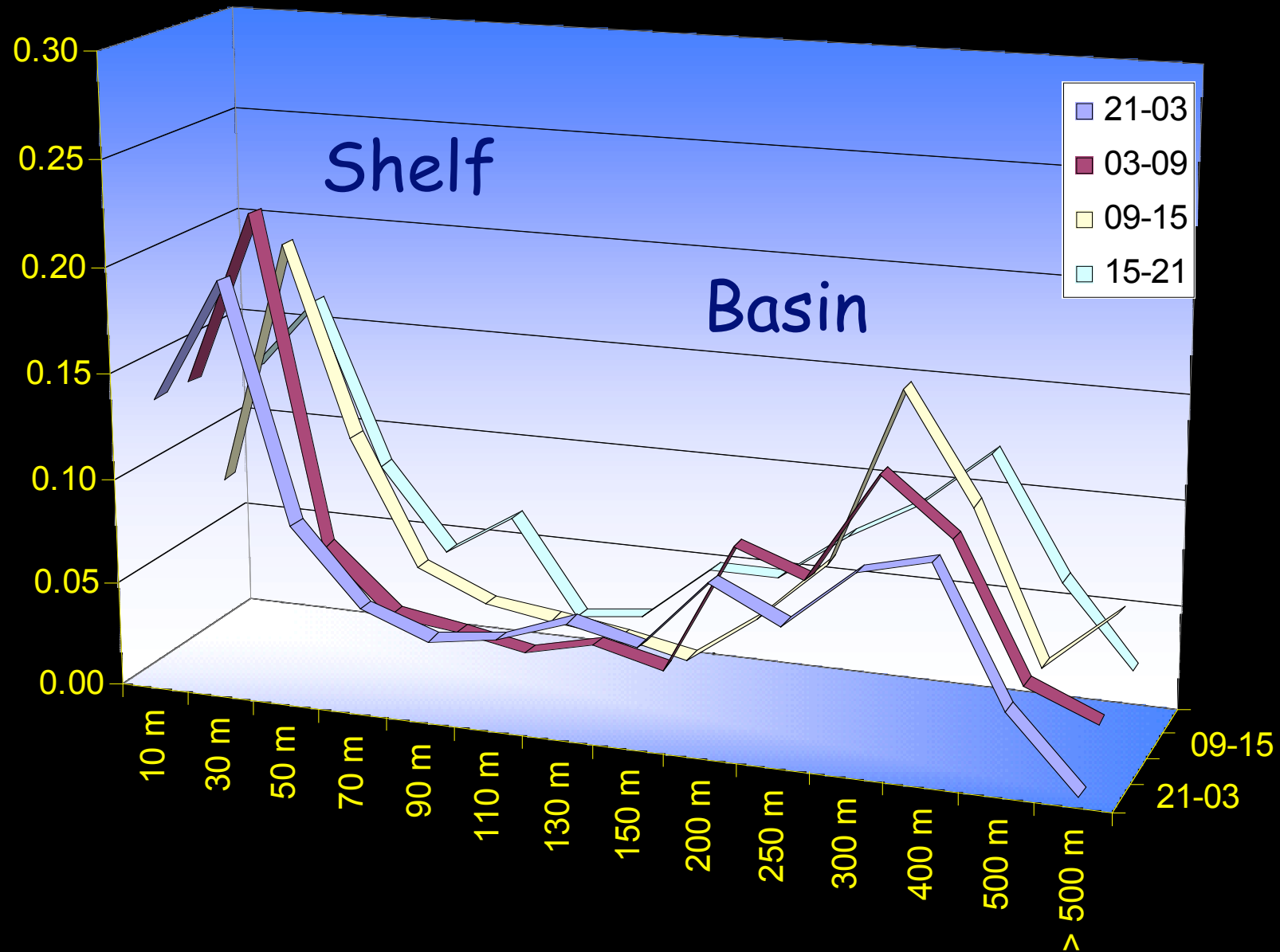
# Ribbon seal dive depths

June-November: female pups



# Ribbon seal dive depths

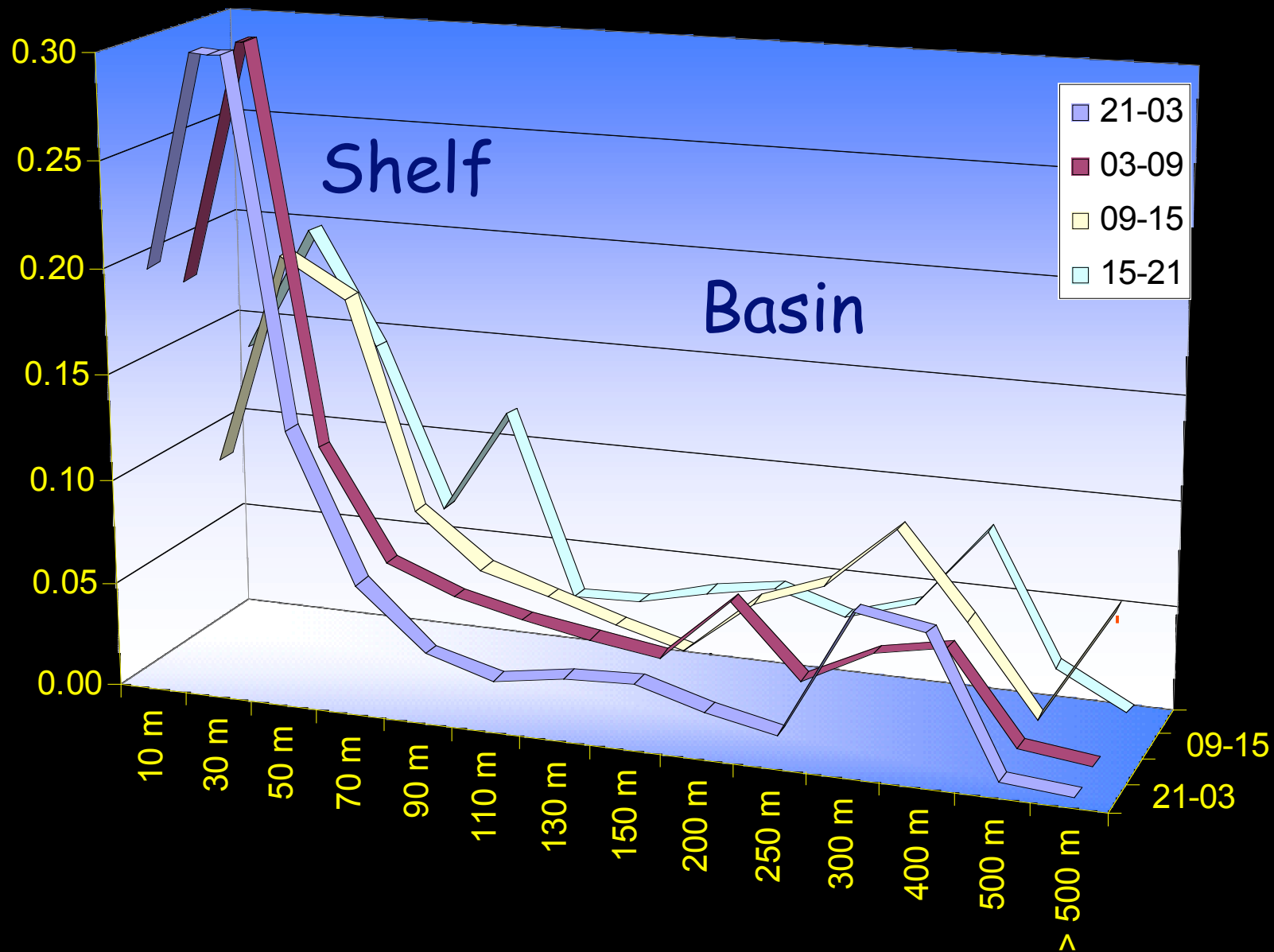
June-November: all adults





# Ribbon seal dive depths

June-November: adult females



# Ribbon seal dive depths

June-November: adult males

