

**Stomach contents of toothed whales
in relation to prey distribution in the
North Pacific**

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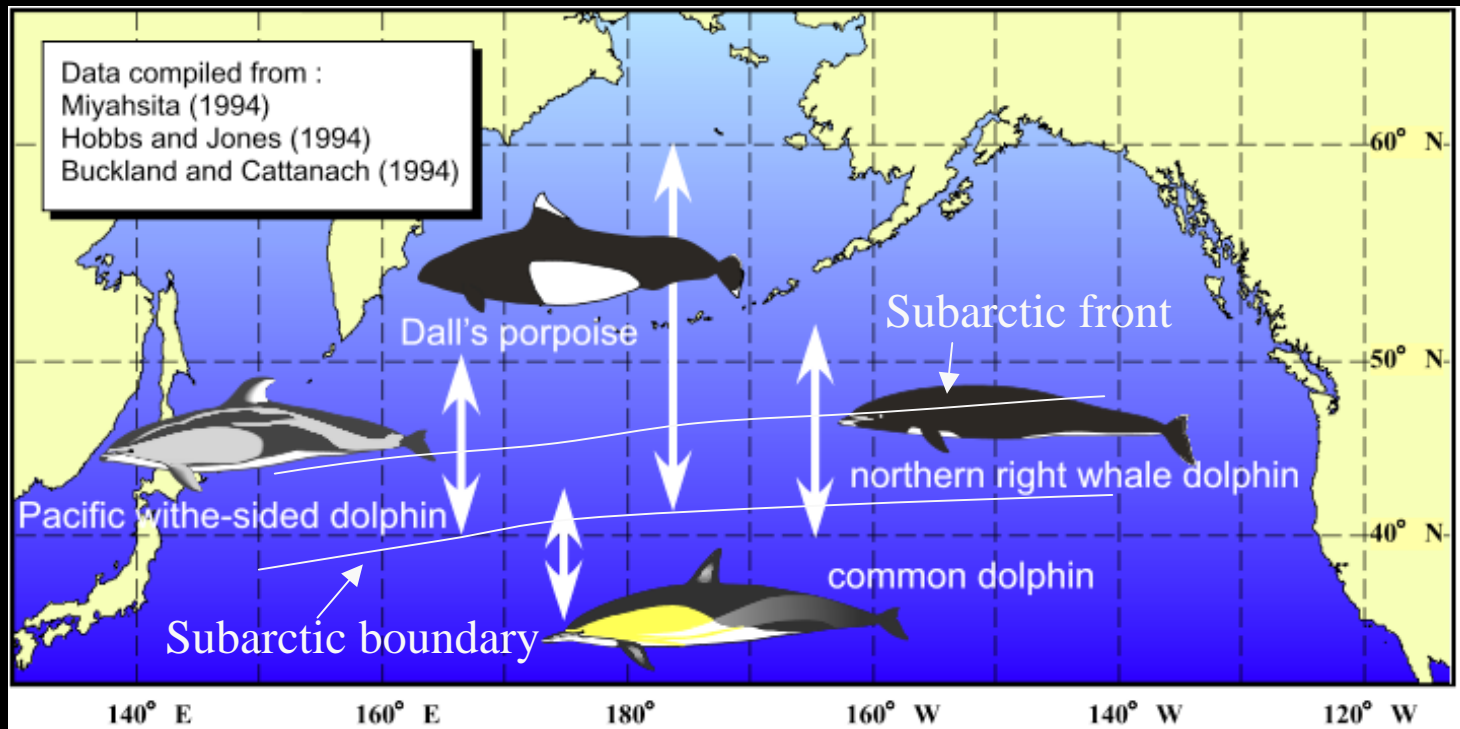
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Aim of this presentation

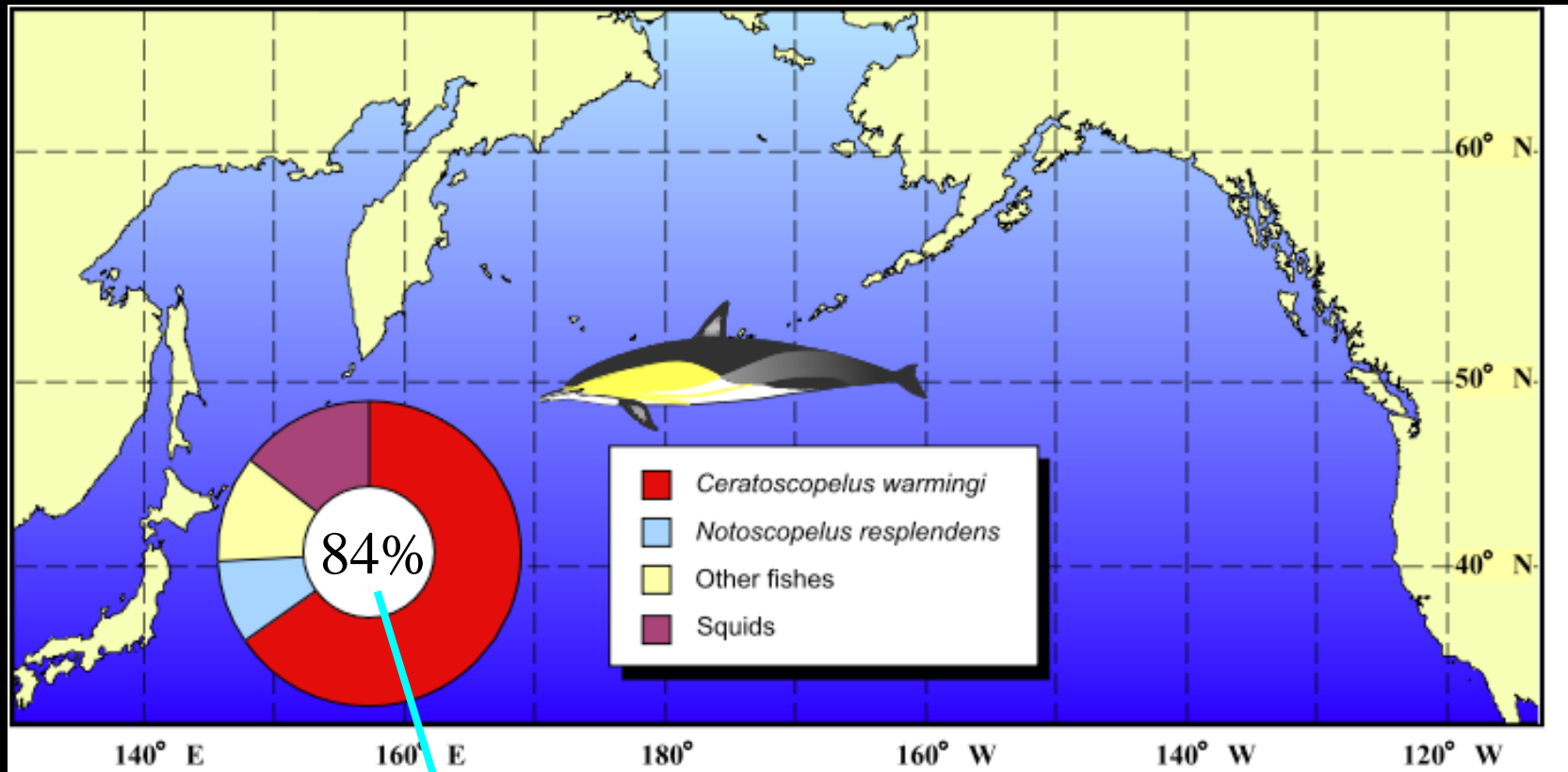
- Review distribution of dolphins in the PICES area, from the view of...
 - ✓ Feeding habits
 - ✓ Prey availability
 - ✓ Strategy of habitat selection
 - ✓ Oceanographic environment
- And discuss needed information in future 'hot spot' study.

Distribution of the northern North Pacific dolphins



- Subarctic domain => Dall's porpoise
- Transitional domain => northern right whale dolphin and Pacific white-sided dolphin
- Transition zone => short-beaked common dolphin

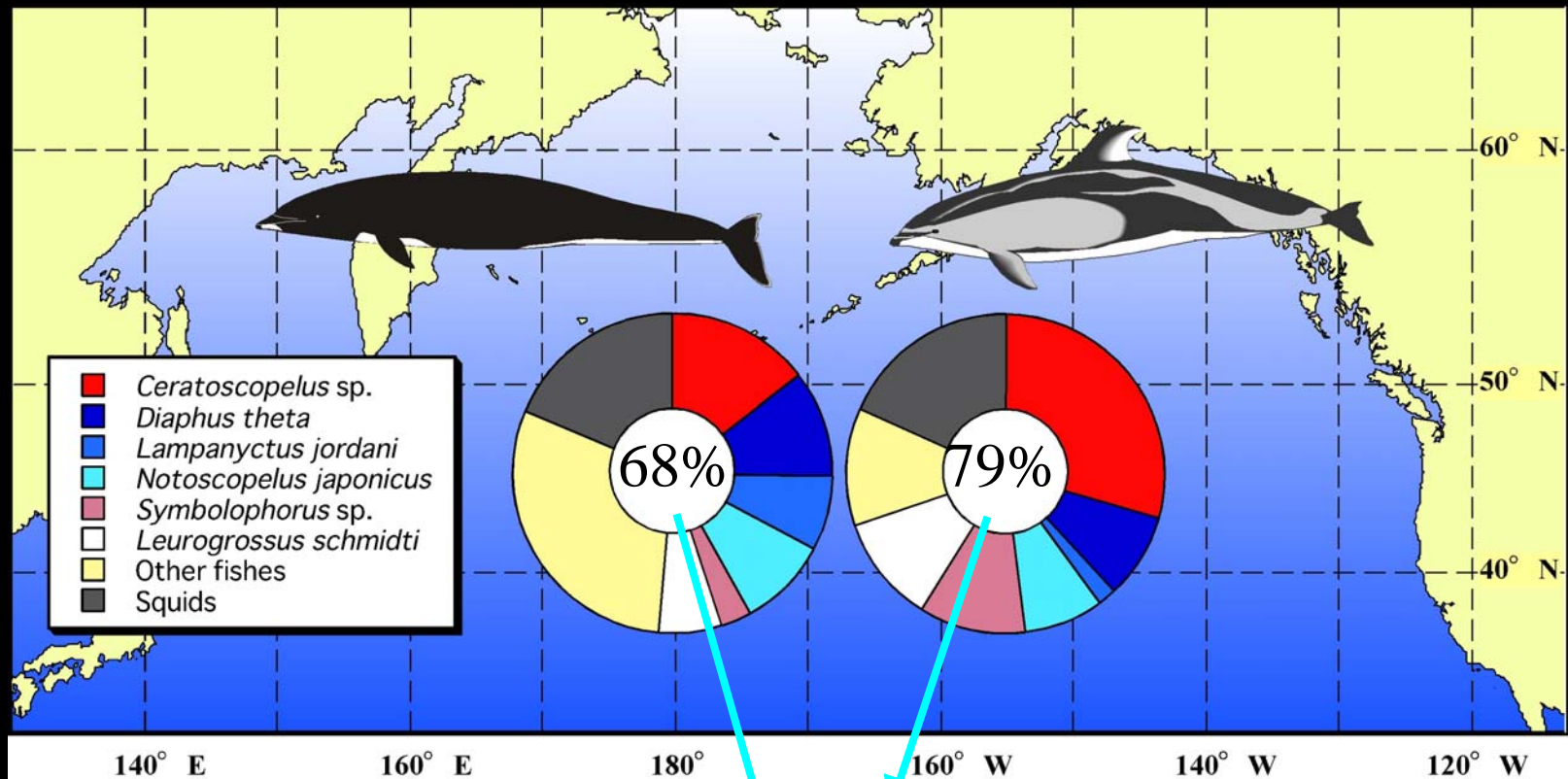
Prey of short-beaked common dolphin



Ohizumi *et al.* (1998)

Most of the prey is Myctophid fish

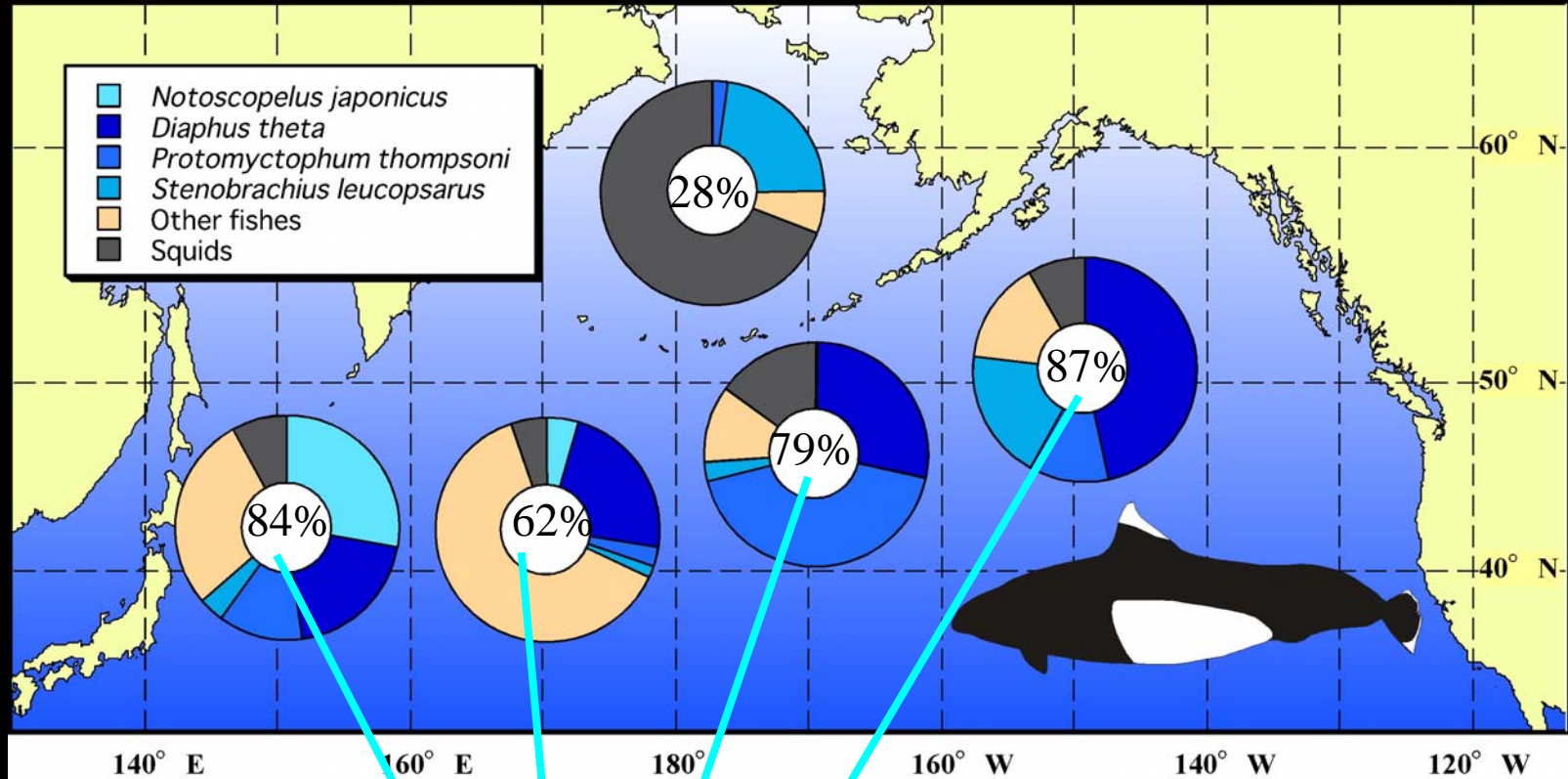
Prey of Pacific white-sided & northern right whale dolphins



Walker and Jones (1994)

Most of the prey is Myctophid fish

Prey of Dall's porpoise

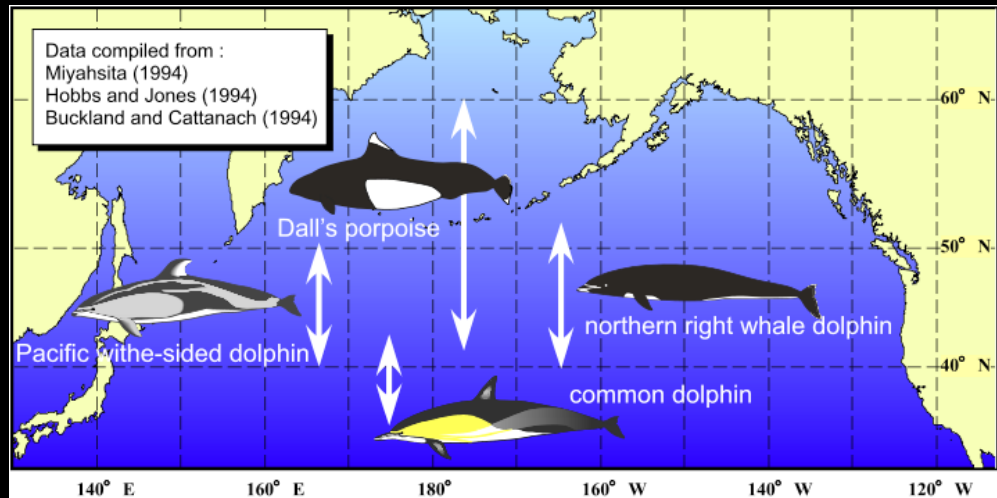


Ohizumi *et al.* (2003)

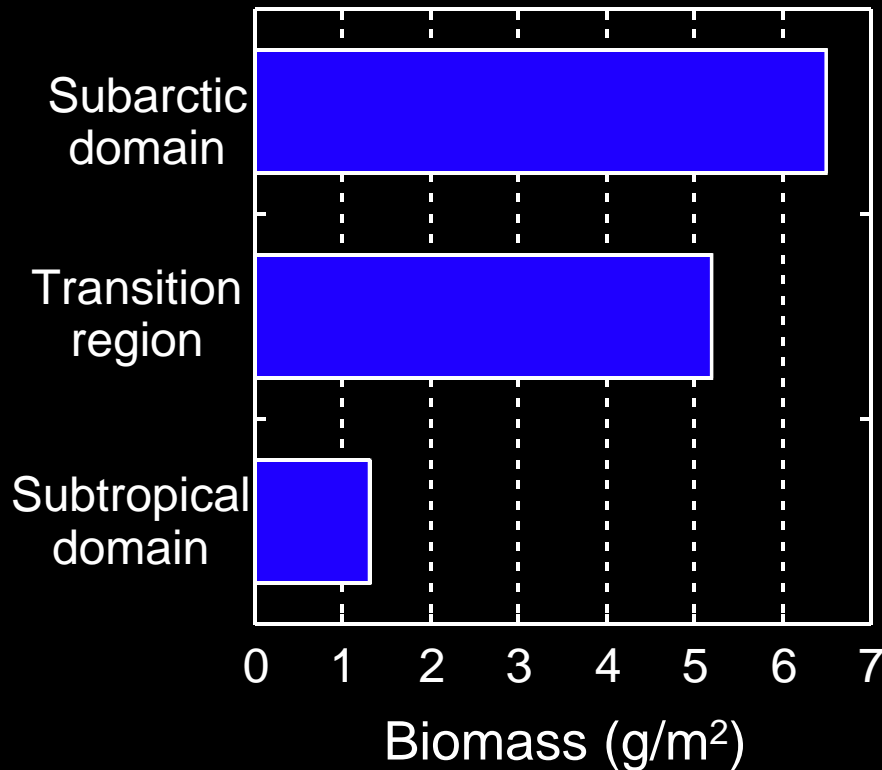
Most of the prey is Myctophid fish

Prey competition among dolphins

- Most of the prey is Myctophids.
- Dolphins are nonselective feeders.
- They are potentially competitive, but separately distributed.
- Why this pattern of segregation?



Biomass of micronekton in the western North Pacific



- The biomass is most abundant in the subarctic domain.
- But generally there are large seasonal and annual variations in the subarctic domain.

Gjøsaeter and Kawaguchi (1981)

Life history parameters of dolphins

Species	Age at mature	Calving interval	Nursing period	Life time	Strategy	School size
Dall's P.	4.4	1yr.	2mo.?	15yr.	r	S
P. white-sided D.	8~11	?	?	40	K	L
N. right whale D.	10	2+	?	30	K	L
Common D.	7~8	1~2+?	6~14	30	K	L

(Ferrero and Walker 1995, 1996, 1999, Evans 1994, Iwasaki and Kasuya 1994)

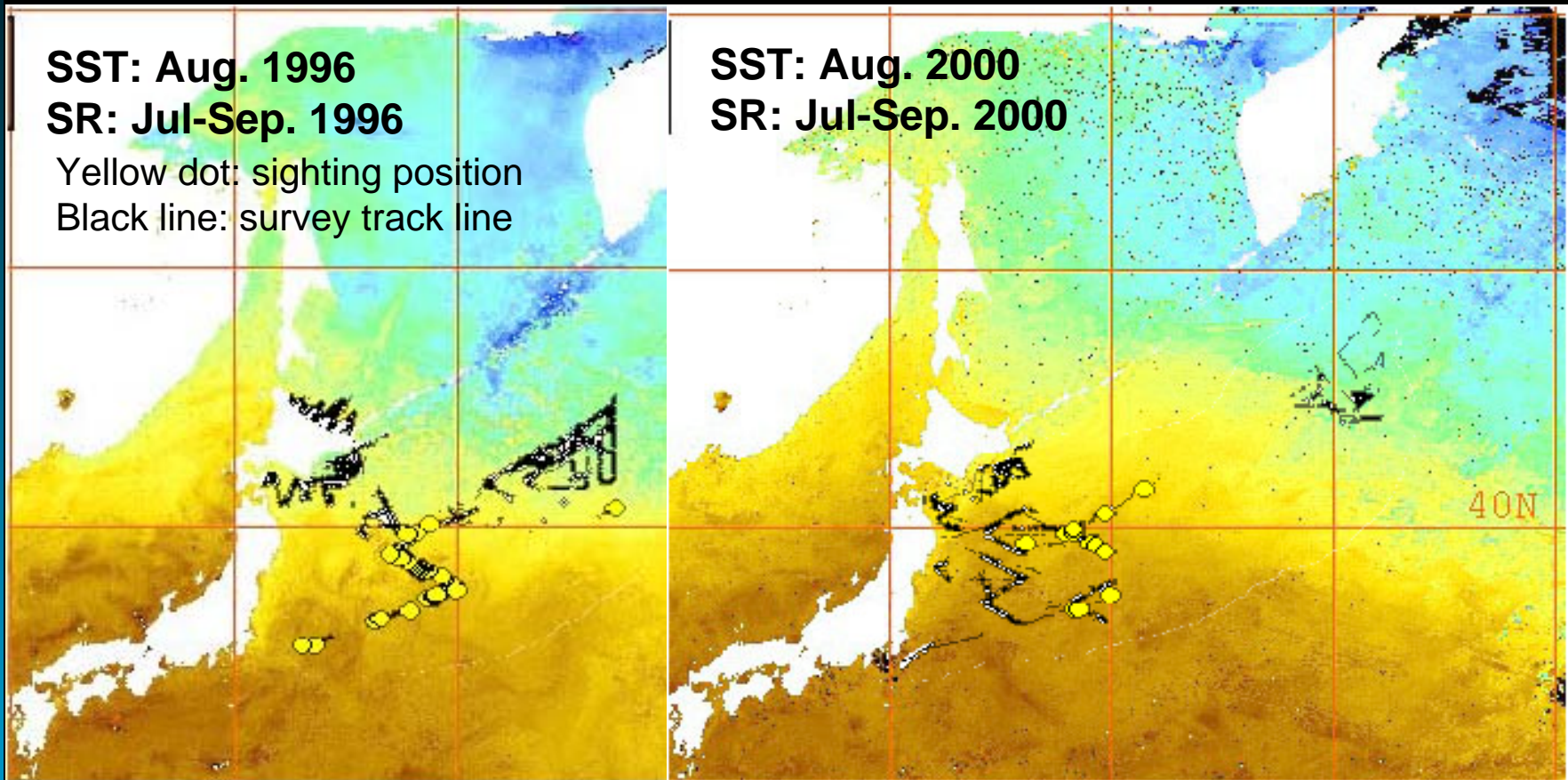
Strategy of habitat separation

- Dall's porpoise in subarctic domain;
 - ✓ r-selective
 - Seasonally and annually changeable environment, but abundant prey.
 - ✓ Small school
 - Probably suitable for 'evenly' distributed myctophids.
- Other species in transitional region;
 - ✓ K-selective
 - Suitable for a predictable environment.
 - ✓ Large school
 - May be sustained by predictable prey distribution in oceanic front?

New questions

- Are there more dolphins where is evident oceanographic structure?
 - ✓ Three species are distributed in narrow transition region.
 - ✓ In each species...?
- Are there more predictable distribution of myctophids along front?

Hot spot of short-beaked common dolphin...?

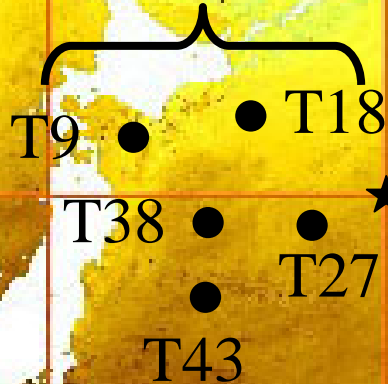


0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

Sampling locations

SST: Aug. 2000

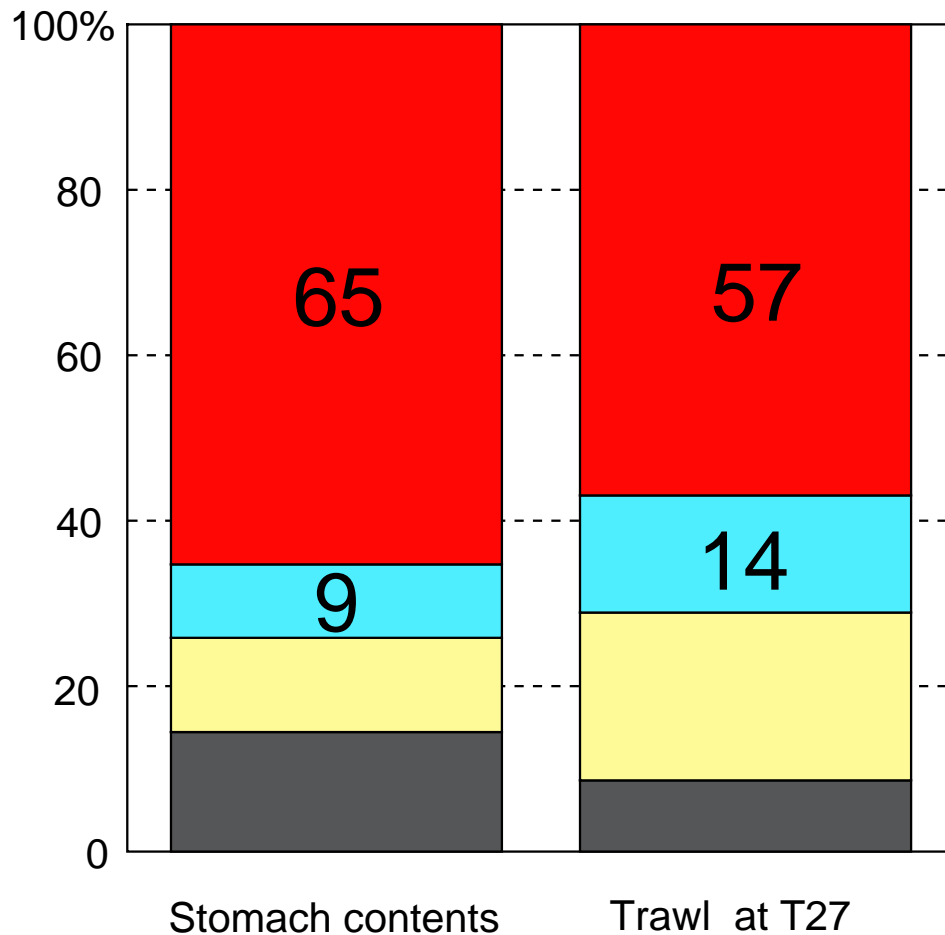
Sampling position
of midwater trawls
(Aug. 2000)



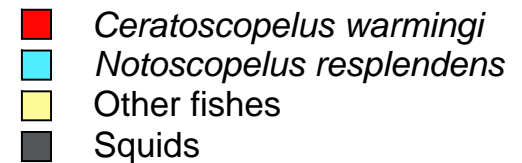
Sampling position
of 10 common
dolphins
(Sept. 1987)

150E

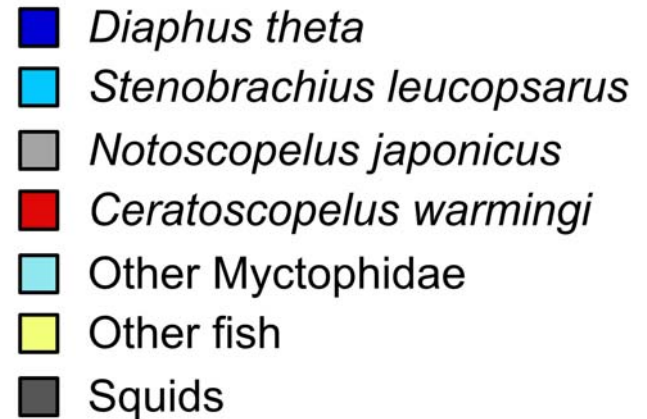
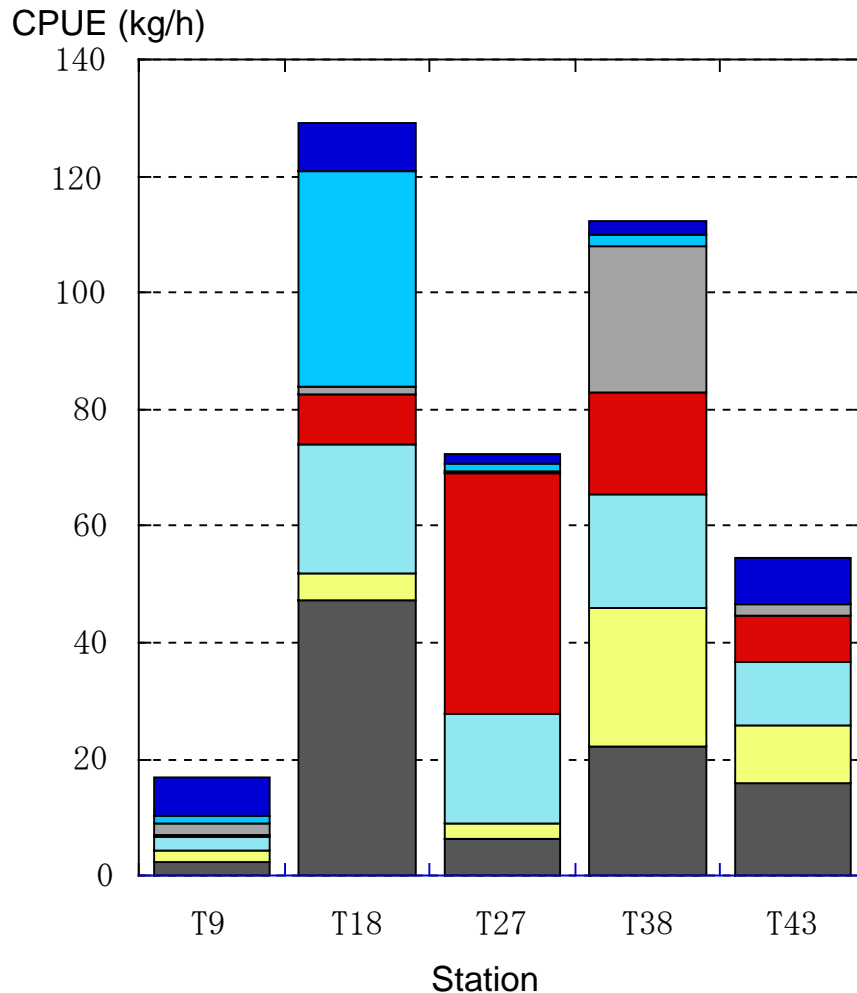
Trawl vs stomach contents



- *Ceratoscopelus warmingi* was abundant both in environment and stomach contents.



CPUE and species compositions

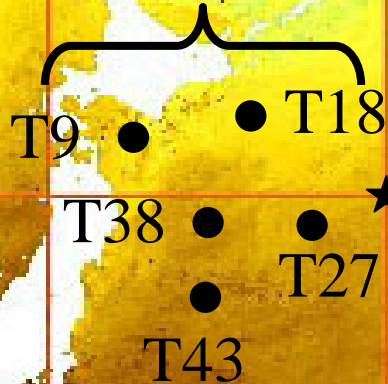


- ✓ *C. warmingi* was abundant in T27, but not in others.
- ✓ Many common dolphins with abundant *C. warmingi*...???
- ✓ More data needed.

Sampling locations

SST: Aug. 2000

Sampling position
of midwater trawls
(Aug. 2000)



Sampling position
of 10 common
dolphins
(Sept. 1987)

150E

Points of further study

- To study possible foraging in the transitional region.
 - ✓ A dense arrangement of sampling positions around oceanic front.
 - ✓ Collection of oceanographic and prey data; satellite, CTD, scientific sonar, mid-water trawl.
 - ✓ Simultaneous sighting survey.
 - ✓ Stomach contents sampling.
 - ✓ Observation of foraging depth; biologging, sonar.

Acknowledgments

- Cetacean Research Institute
 - ✓ Provided JARPN II sighting data
- National Research Institute of Far Seas Fisheries
 - ✓ Provided JARPN II trawl data
- Dr. K. Uchikawa, and Dr. M. Moku
 - ✓ Discussion on distribution of myctophids in the transitional region.
- MAFFIN-SIDaB
 - ✓ Provided NOAA MCSST data.