

# Overview surveys from 2021 to 2023 by Chinese research vessel "Song Hang" in the NPFC convention area



Qiuyun Ma; Libin Liu; Libin Dai  
College of Marine Sciences,  
Shanghai Ocean University,  
China



# Comprehensive surveys

Several tasks:

- Investigating population structure and spatial distribution of pelagic species.
- Evaluating the relative abundance of NPFC species based on the trawl and acoustic data.
- Collecting fishery-independent data, including length-frequency, length-weight data, and biological sampling of the main species in this ecosystem.
- Collecting environment data and biology diversity for ecosystem modeling.

**Fisheries  
resources**

**Egg-Larval-  
juvenile**

**Plankton**

**Environment**

# Background

- Five-year scientific survey program
  - From 2021 to 2025
  - NPFC convention area
  - Research vessel "Song Hang"
  - Conducted by Shanghai Ocean University
- Objectives in NPFC:
    - To provide essential information to supplement the current scientific database;
    - To improve our understanding of the marine ecosystem.

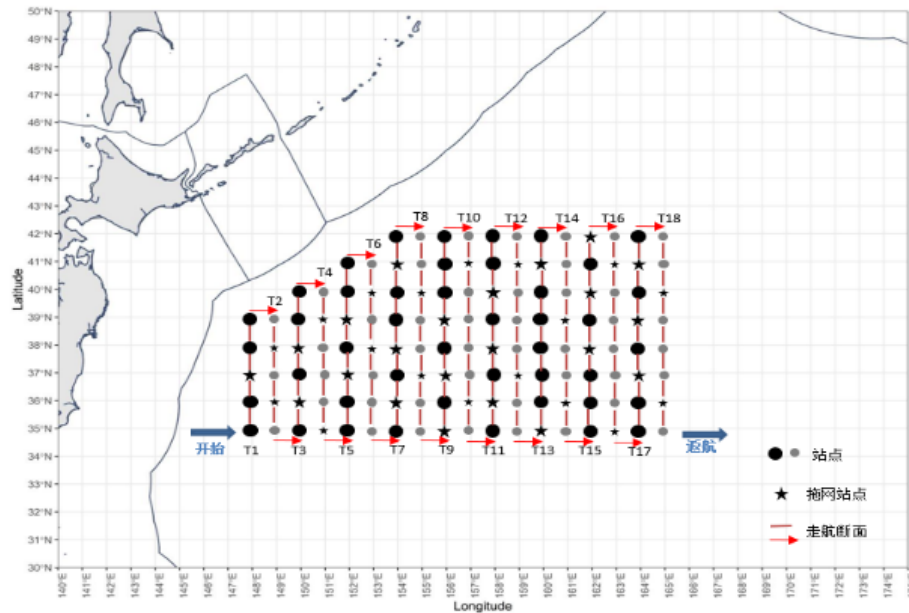
# Research vessel “Song Hang”



- 3166 tons
- Length 85m, width 14.96m
- Max 15kn, 10,000 nautical miles
- Gear:
  - Mid-trawl
  - Squid jigging
  - Tuna longline

# Survey design

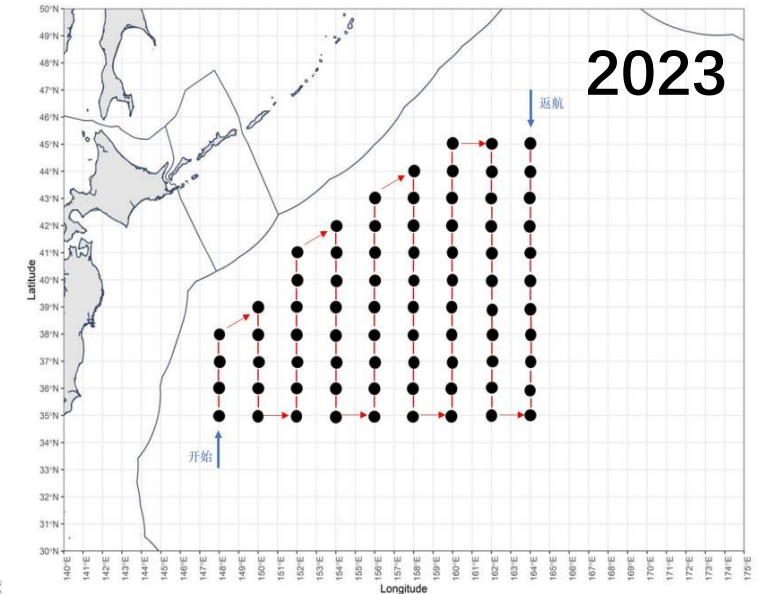
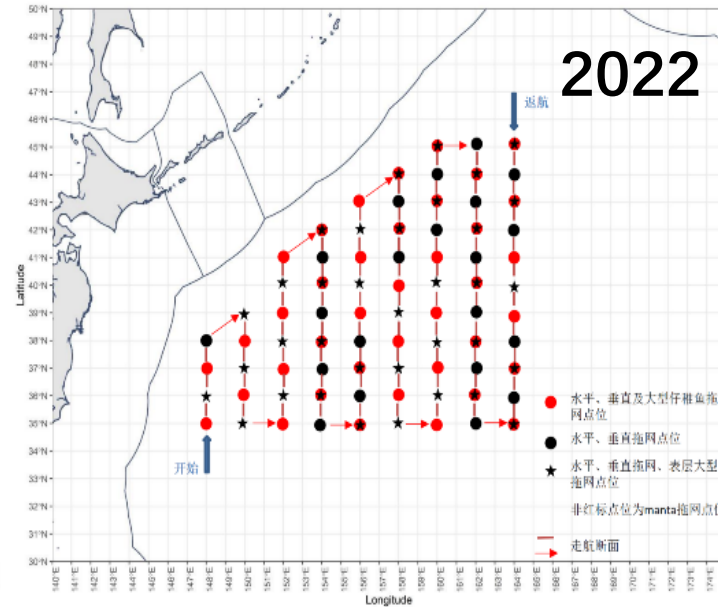
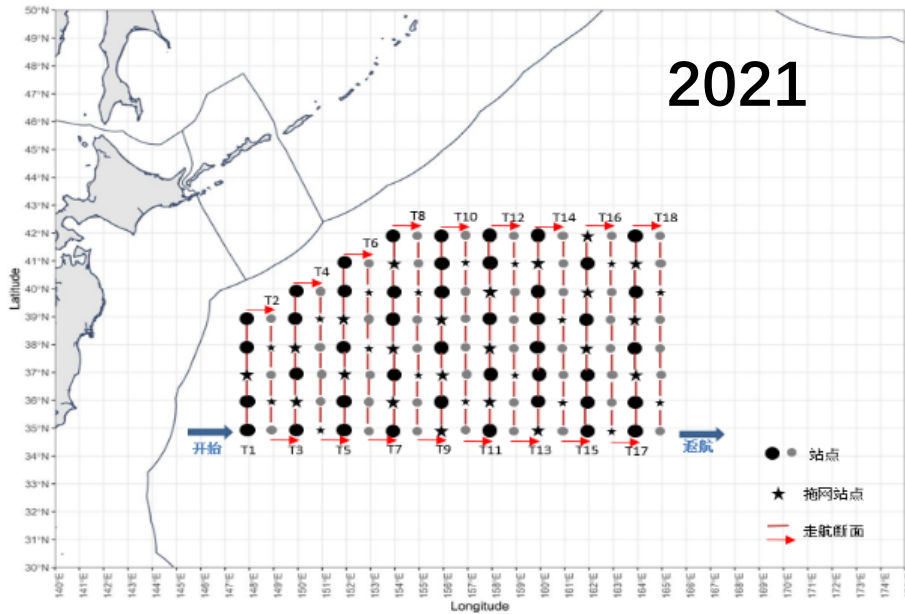
- Two months from mid-June to mid-August
- $148^{\circ} \text{ E} \sim 165^{\circ} \text{ E}$ ,  $35^{\circ} \text{ N} \sim 45^{\circ} \text{ N}$



- Fishery Resources Mid-trawling
- Squid Jigging
- Egg-larva-juvenile Trawling
- Zooplankton & Phytoplankton Vertical Trawling
- Environmental Factors Monitoring
- Acoustic Survey
- Environment-DNA
- etc.



# Survey stations



Number of Stations	2021	2022	2023
Mid-Trawling	42	36	39
Squid Jigging	None	15	25
Total	144	76	70

# Survey design

- Mid-trawling: 2~3 hours, with 4~5kn
- Squid jigging: 5 hours.
- Environment factors:
  - Temperature, salinity, transparency, dissolved oxygen, pH, nitrogen, etc.
- Water samples
  - layers of 25m, 50m, 75m, 100m, 200m, and 300m
  - 2 bottles \*250ml bottle per layer
  - Multiple purposes, e.g. environment-DNA analysis



# Number of Species

Year	Fishes			Cephalopoda		
	Family	Genus	Species	Family	Genus	Species
2021	11	16	24	6	9	11
2022	13	13	22	8	13	14
2023	24	36	51	6	12	14

Total 65 species in the mid-trawling and squid jigging





# Dominant species



- Chub mackerel
- Blue mackerel
- Japanese sardine
- Japanese anchovy  
*Engraulis japonicus*

Mid-trawling  
survey

- Neon flying squid  
*Ommastrephes bartrami*
- Boreopacific gonate squid  
*Gonatopsis borealis*

Squid jigging  
survey



Common economic fishes



日本鯖 *Scomber japonicus*

拟沙丁鱼 *Sardinops melanostictus*

Rare fishes



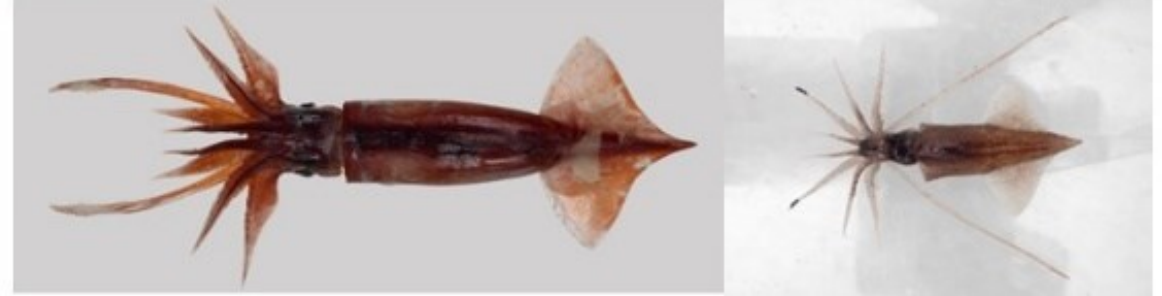
太平洋鼠鲨 *Lamna ditropis*

羽须唇飞鱼 *Cheilopogon pinnatibarbus*



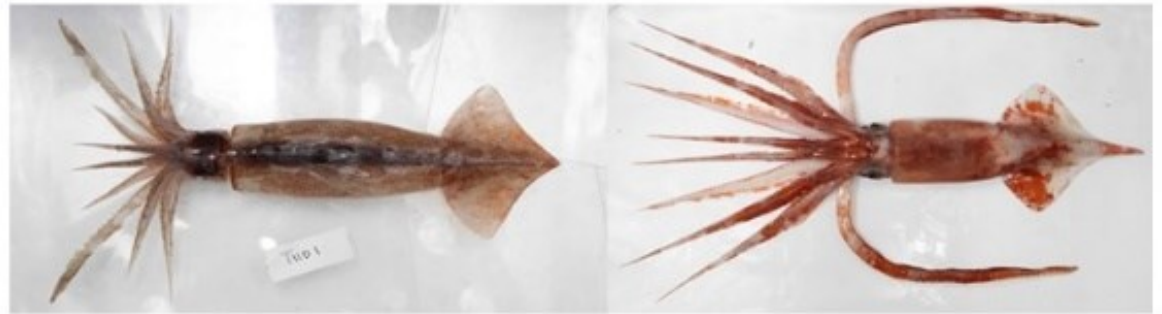
尾棘背灯鱼 *Notoscopelus caudispinosus* 日本背灯鱼 *Notoscopelus japonicus*

头足类:



发光柔鱼 *Eucleoteuthis luminosa*

萤乌贼 *Watasenia scintillans*



太平洋褶柔鱼 *Todarodes pacificus*

桑葚乌贼 *Moroteuthis robusta*

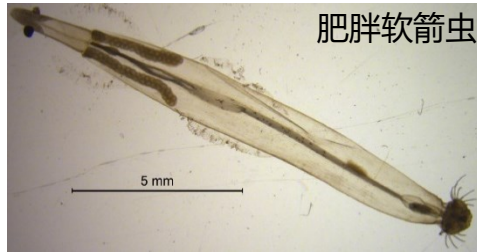


隆突爪乌贼 *Onychoteuthis compacta*

小头乌贼 *Cranchia scabra*



# Some species



肥胖软箭虫



凹腹新角藻



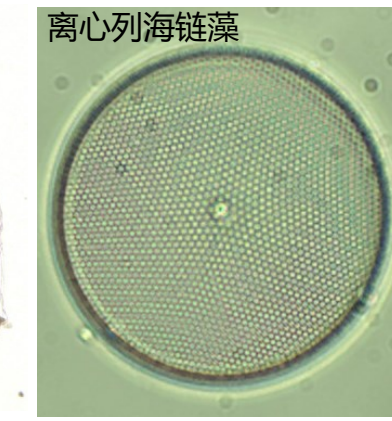
剑乳点水蚤



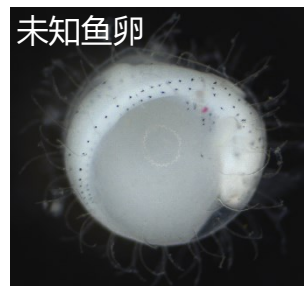
弓角基齿哲水蚤



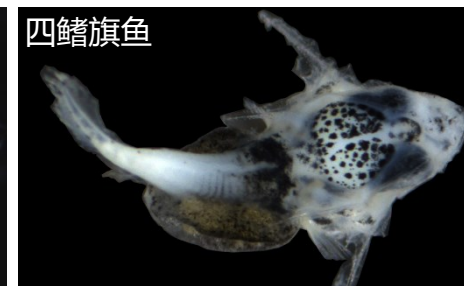
半口壮丽水母



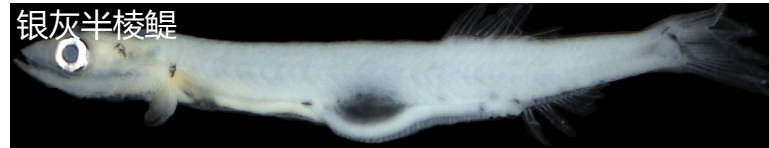
离心列海链藻



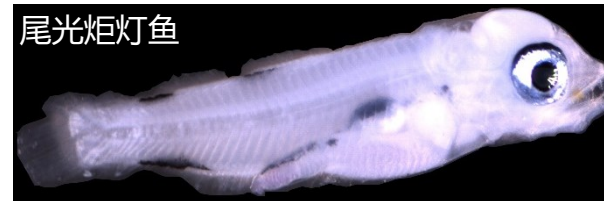
未知鱼卵



四鳍旗鱼



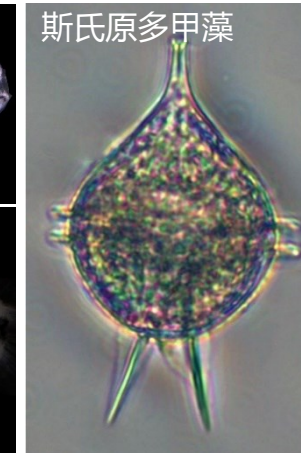
银灰半棱鯉



尾光炬灯鱼

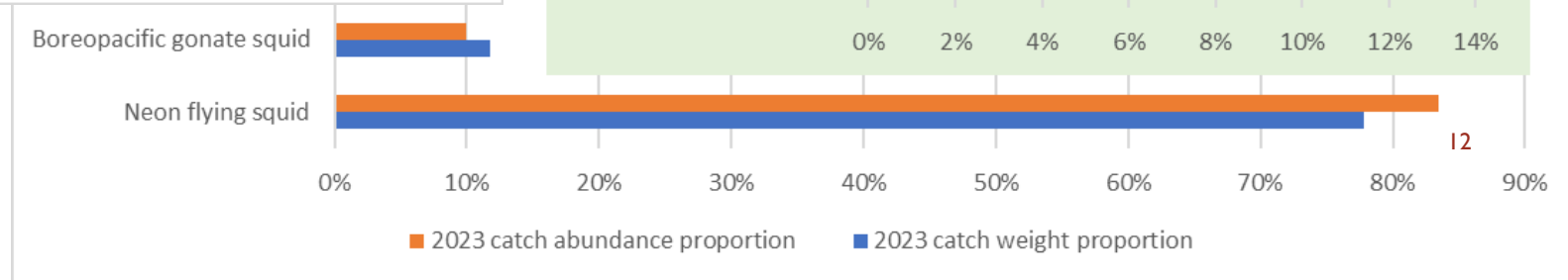
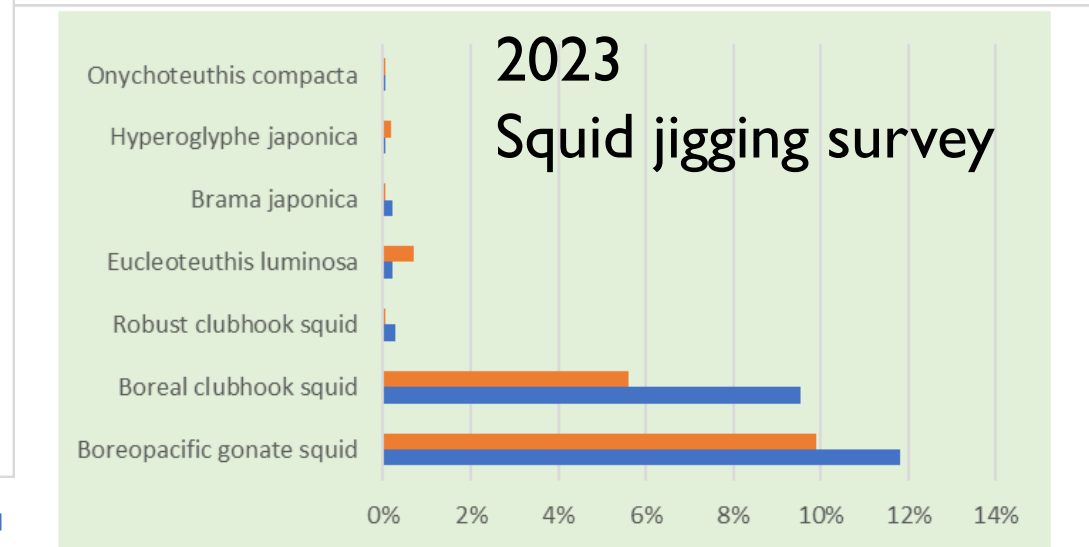
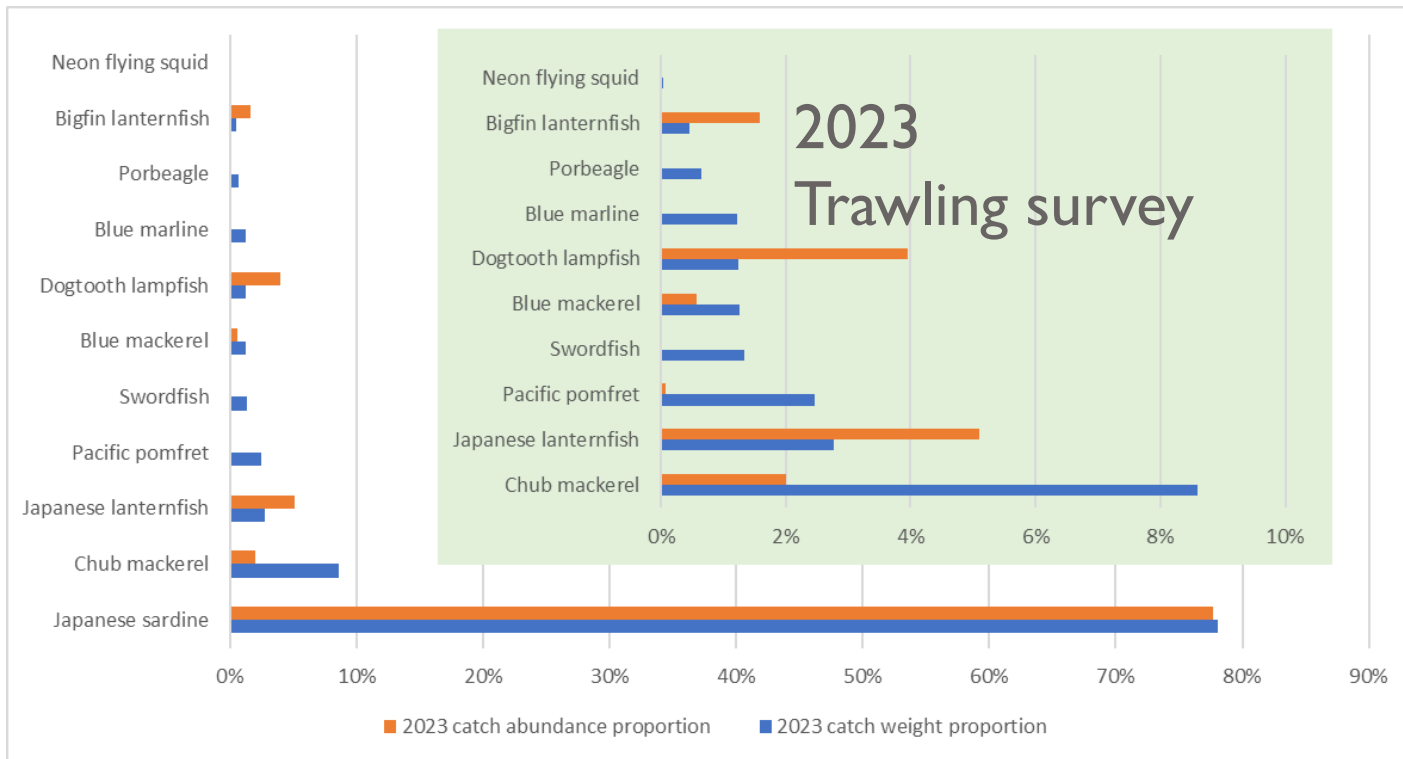


粗鳞灯笼鱼



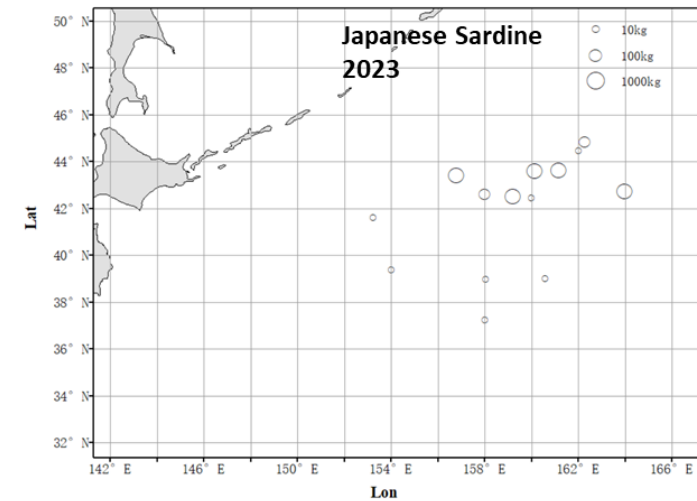
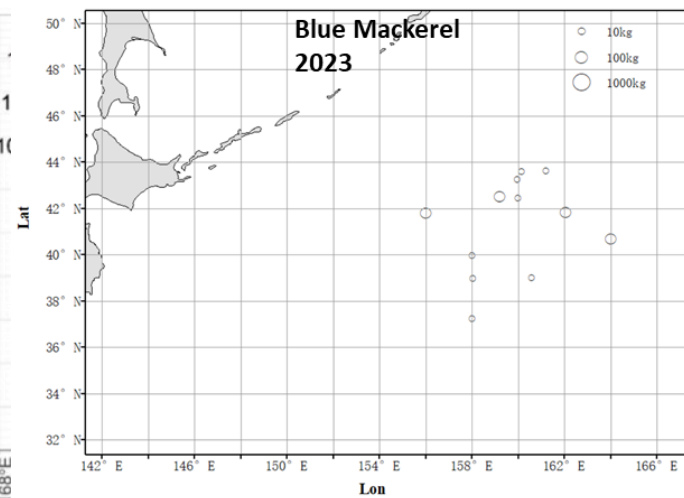
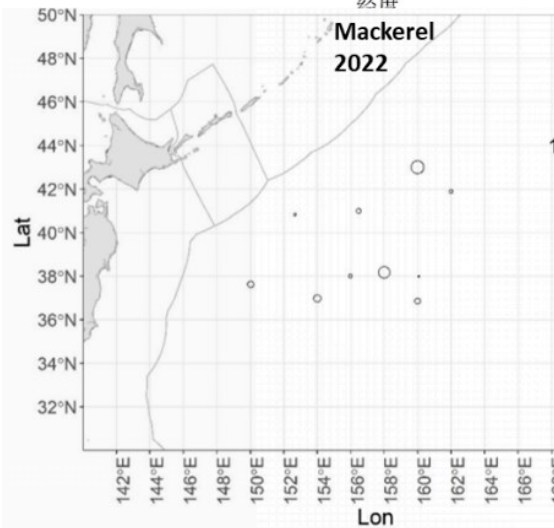
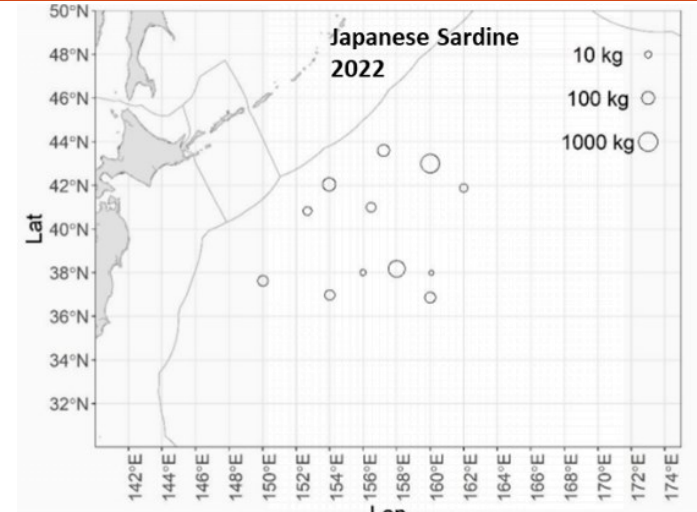
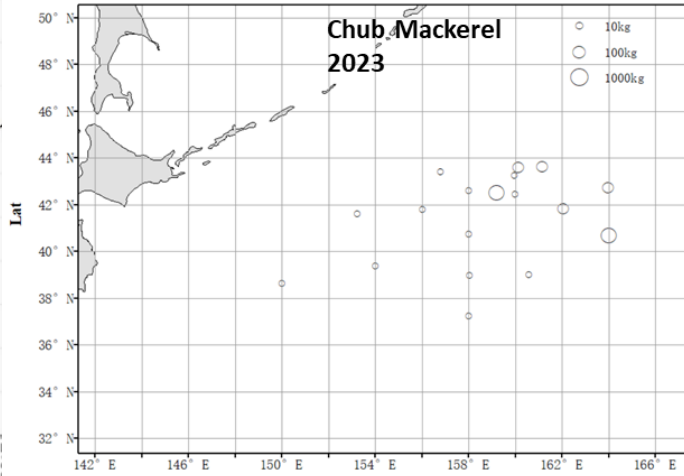
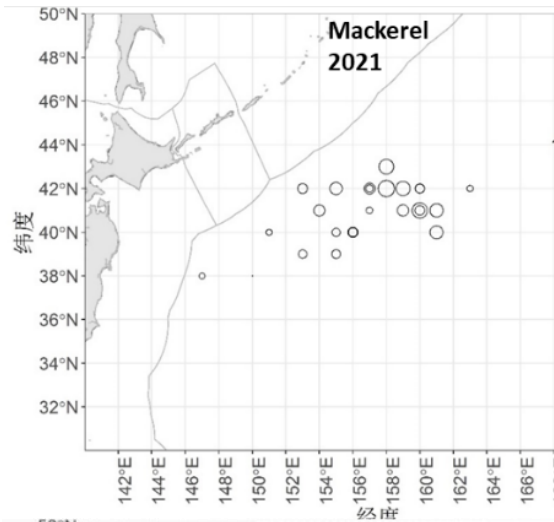
斯氏原多甲藻

# Catch Weight and Abundance Proportions

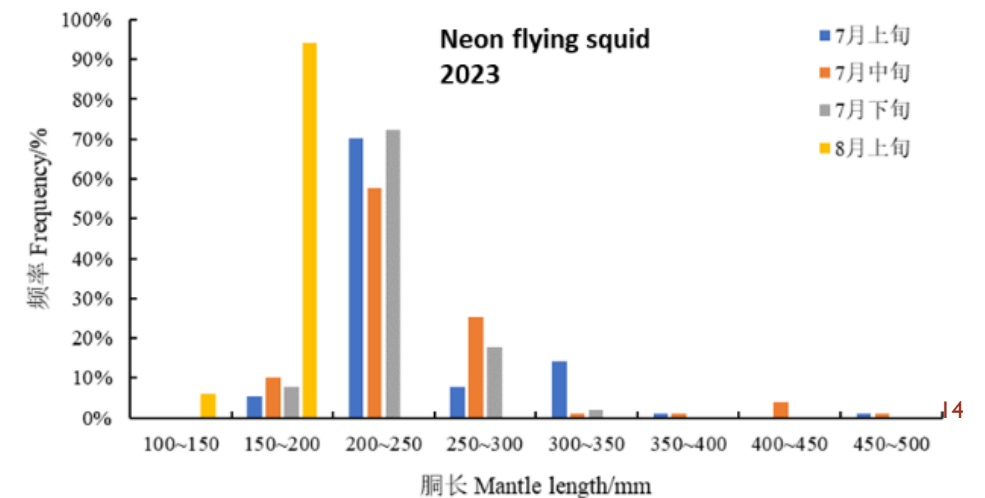
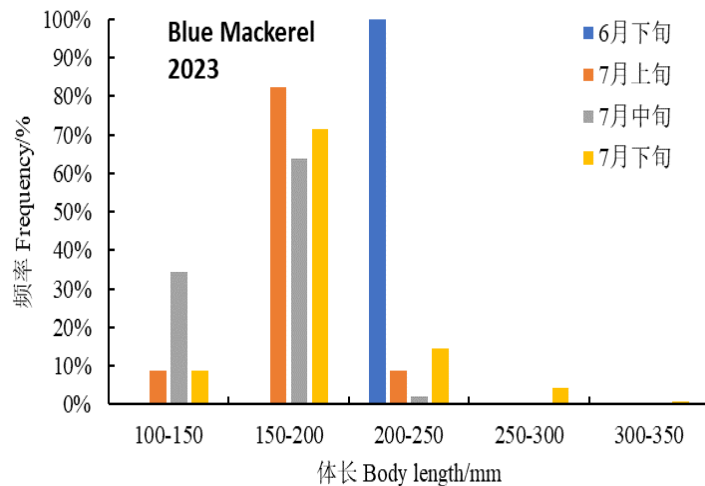
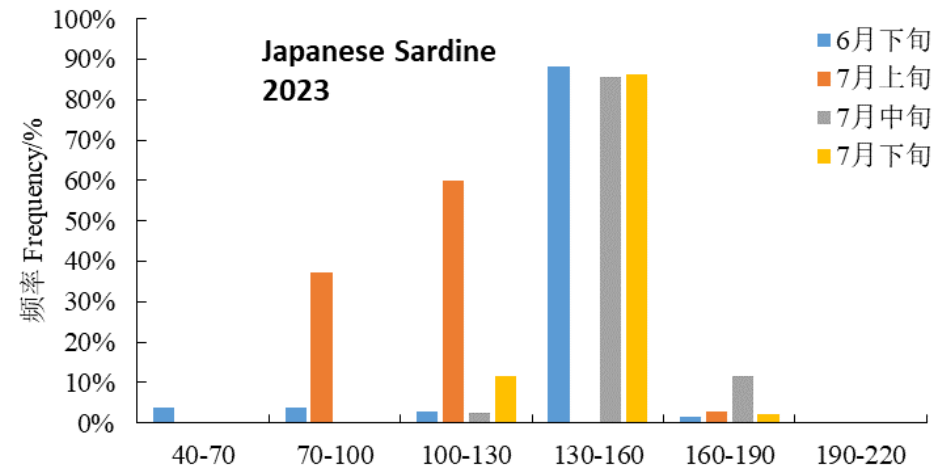
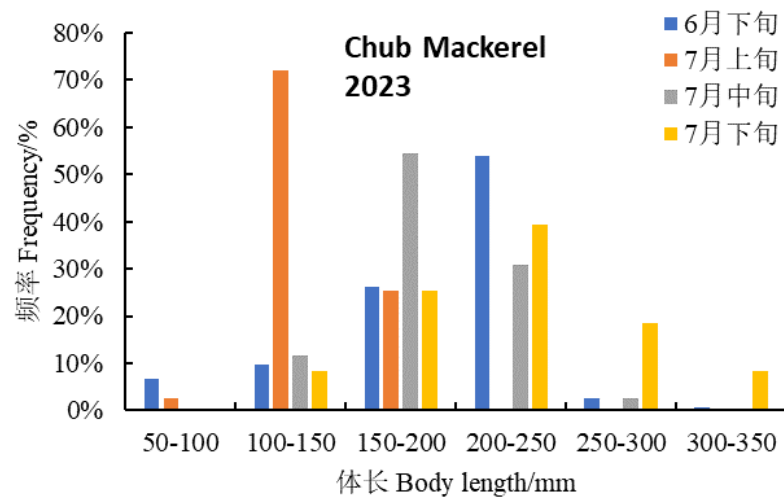




# Catch spatial distribution



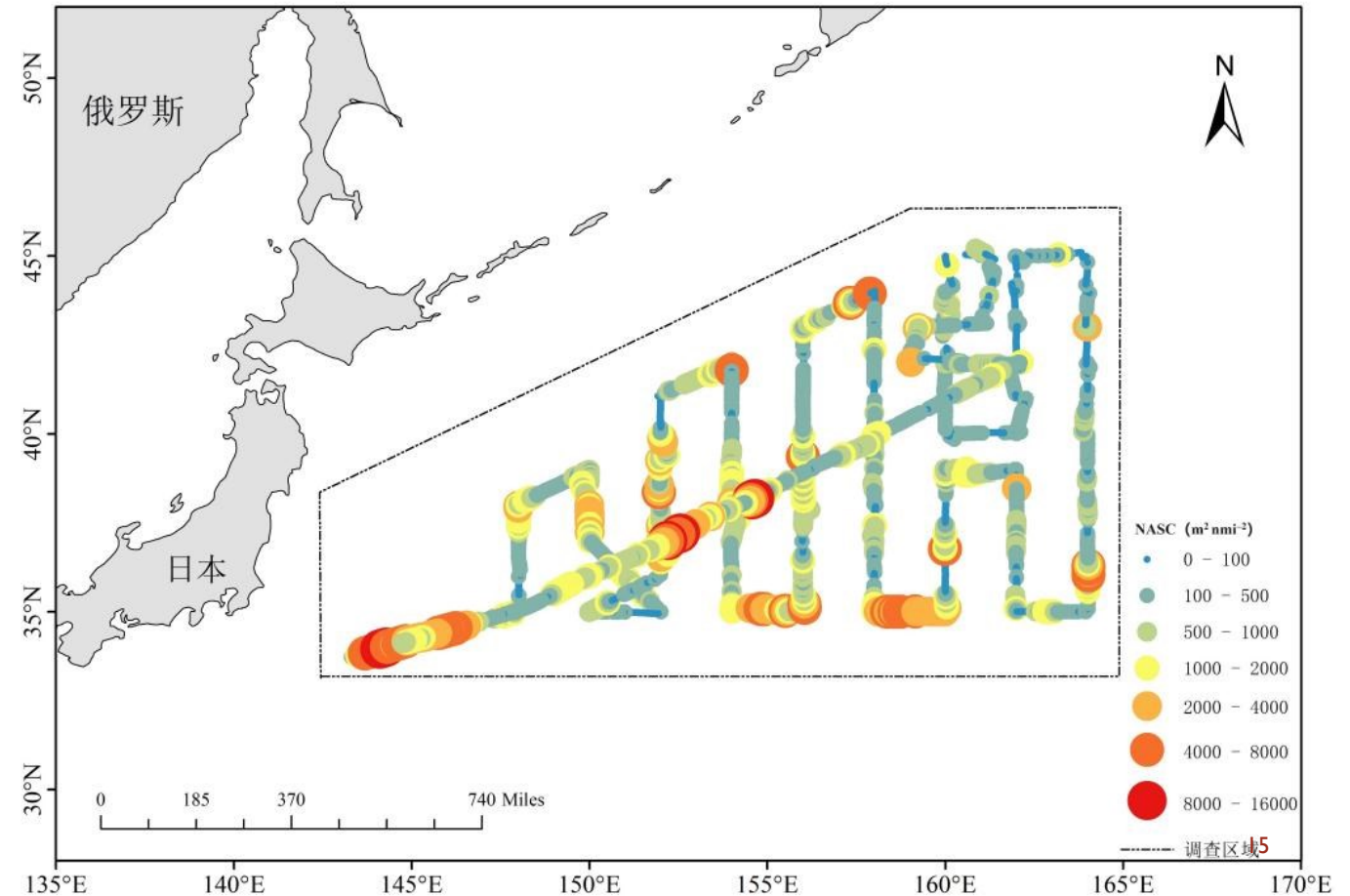
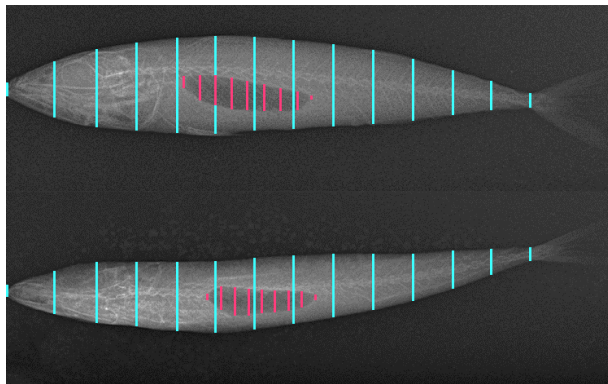
# Length distribution of specimens



# The spatial distribution of Nautical Area Scattering coefficient from the 2023 acoustic survey

## ■ Density

- Japanese sardine 211.3 t/nmi<sup>2</sup>
- Chub mackerel 22.98 t/nmi<sup>2</sup>
- Blue mackerel 3.52 t/nmi<sup>2</sup>



# Summary

- Findings:
  - More than 65 species were measured, with the associated environmental factors with multiple approaches.
  - Chub mackerel, Blue mackerel, Japanese sardine and Neon flying squid, with high priority in NPFC.
  - Pacific saury and Japanese flying squid were seldom collected.
- The collected fundamental data and biological samples could support the study for the life history traits, population dynamics, spatial-temporal distribution, feeding ecology, interspecies relation, community ecology, the abiotic environment, etc.



# Summary

- This information could improve our understanding for the marine ecosystem in the northwest Pacific Ocean.
- Currently, our project is still in the process to collect the data and materials.
- Comments and suggestions are specially needed and welcomed to improve the survey in 2024.

# Welcome to the workshop in Shanghai

- Survey design optimization for 2024
- Middle March, 2024
  - Preliminary 15~16 March
- Shanghai, China
- 1~2 from each member
- Non-member experts are also welcomed.



# Thank you!



Questions

Comments

Suggestions