



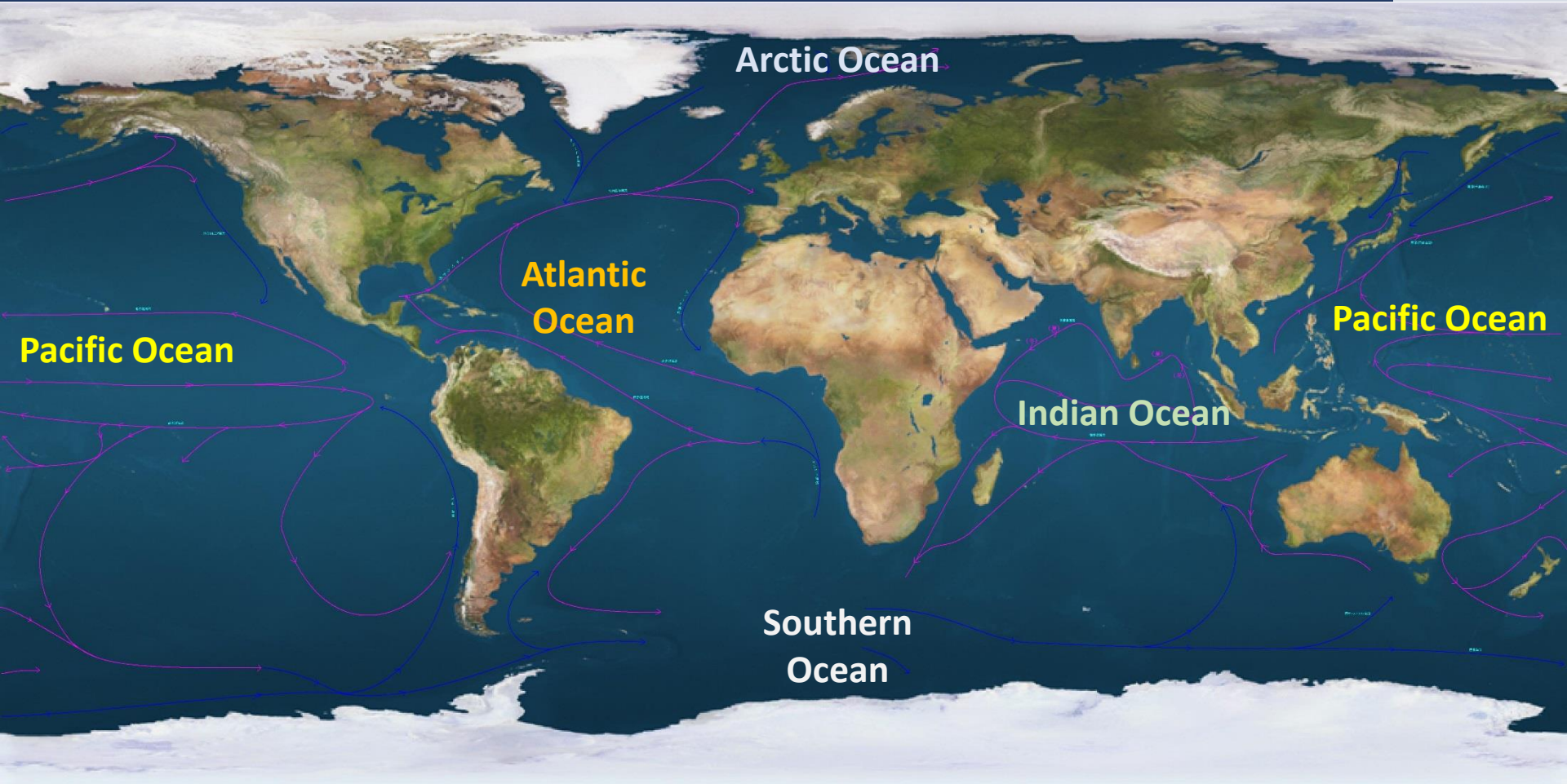
Oceanography and Fishery



Supapong Pattarapongpan
Fishery Oceanographer, FGFOS, RDD
SEAFDEC/TD

Our Ocean

2

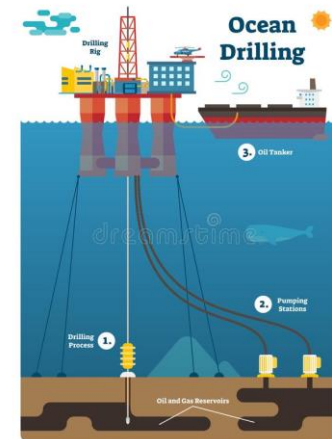
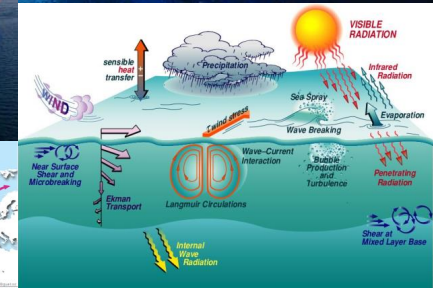
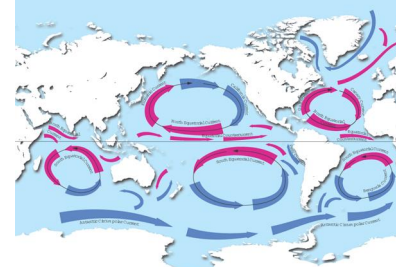
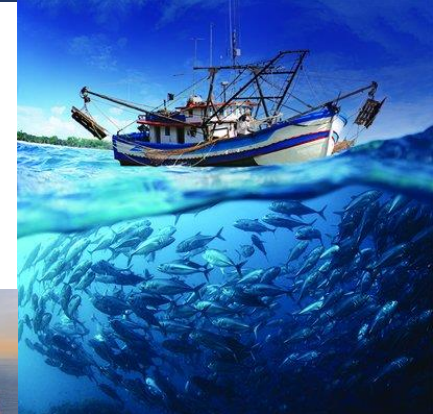


- Oceans comprise **71%** of the Earth's surface
- Oceans contain 97.2% of the water on or near the Earth's surface

Benefits from the oceans

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- Source of Food
- Transportation and Travel
- Environmental control
- Mineral and mining
- Energy sources

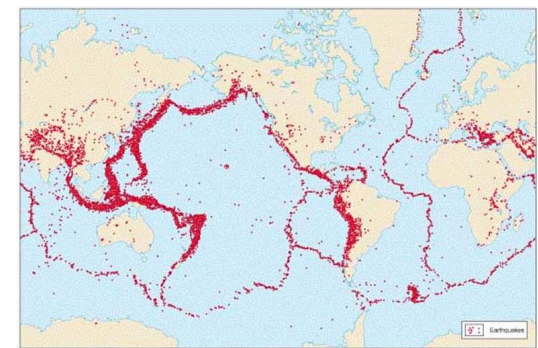
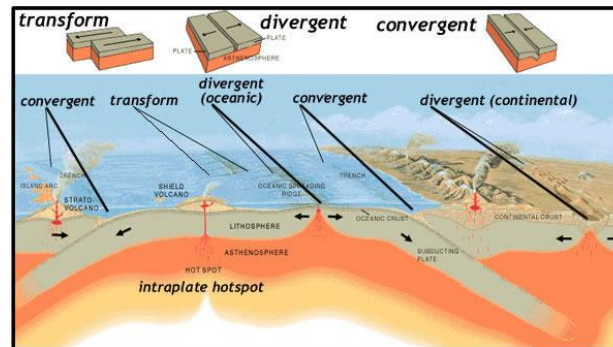
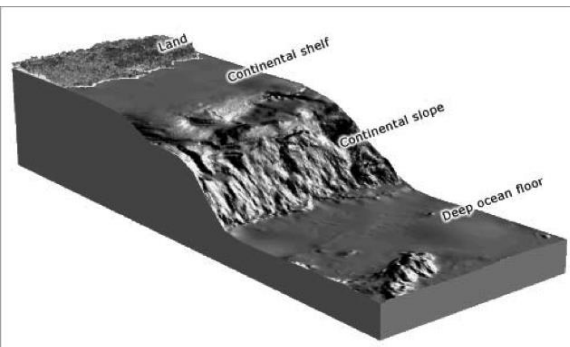
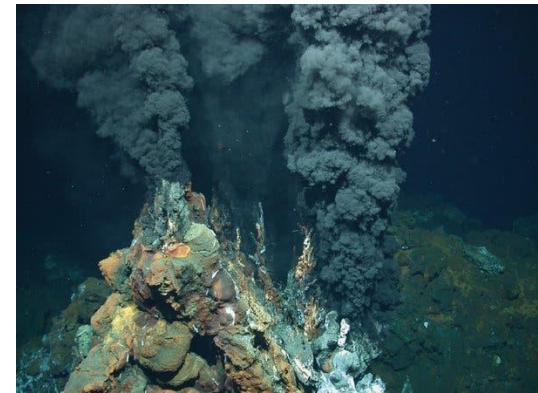
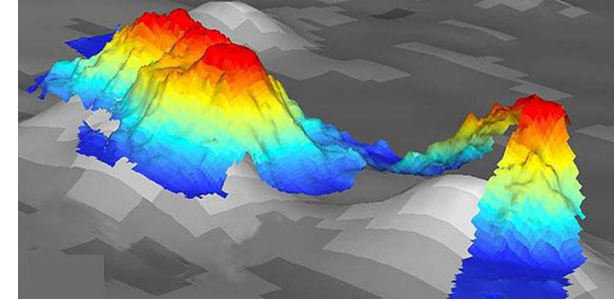


“Oceanography”

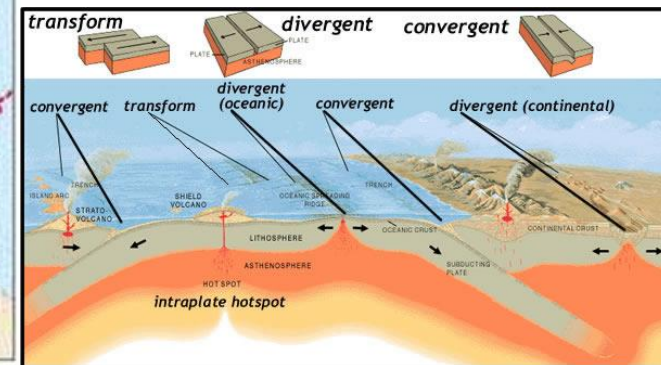
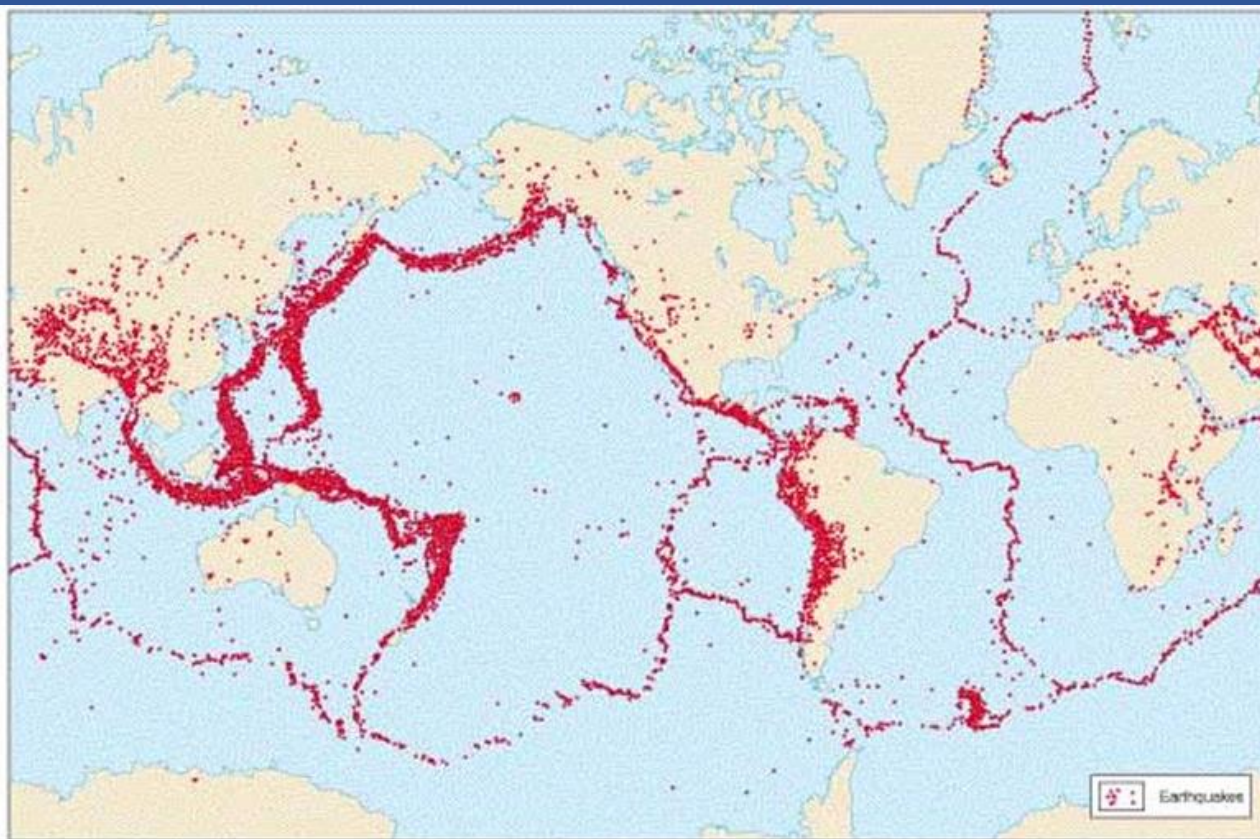
- สมุทรศาสตร์ธรณี-Geological Oceanography
- สมุทรศาสตร์สภาวะ-Physical Oceanography
- สมุทรศาสตร์เคมี-Chemical Oceanography
- สมุทรศาสตร์ชีวภาพ-Biological Oceanography

Geological Oceanography

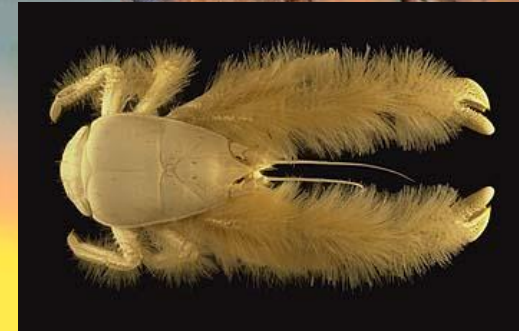
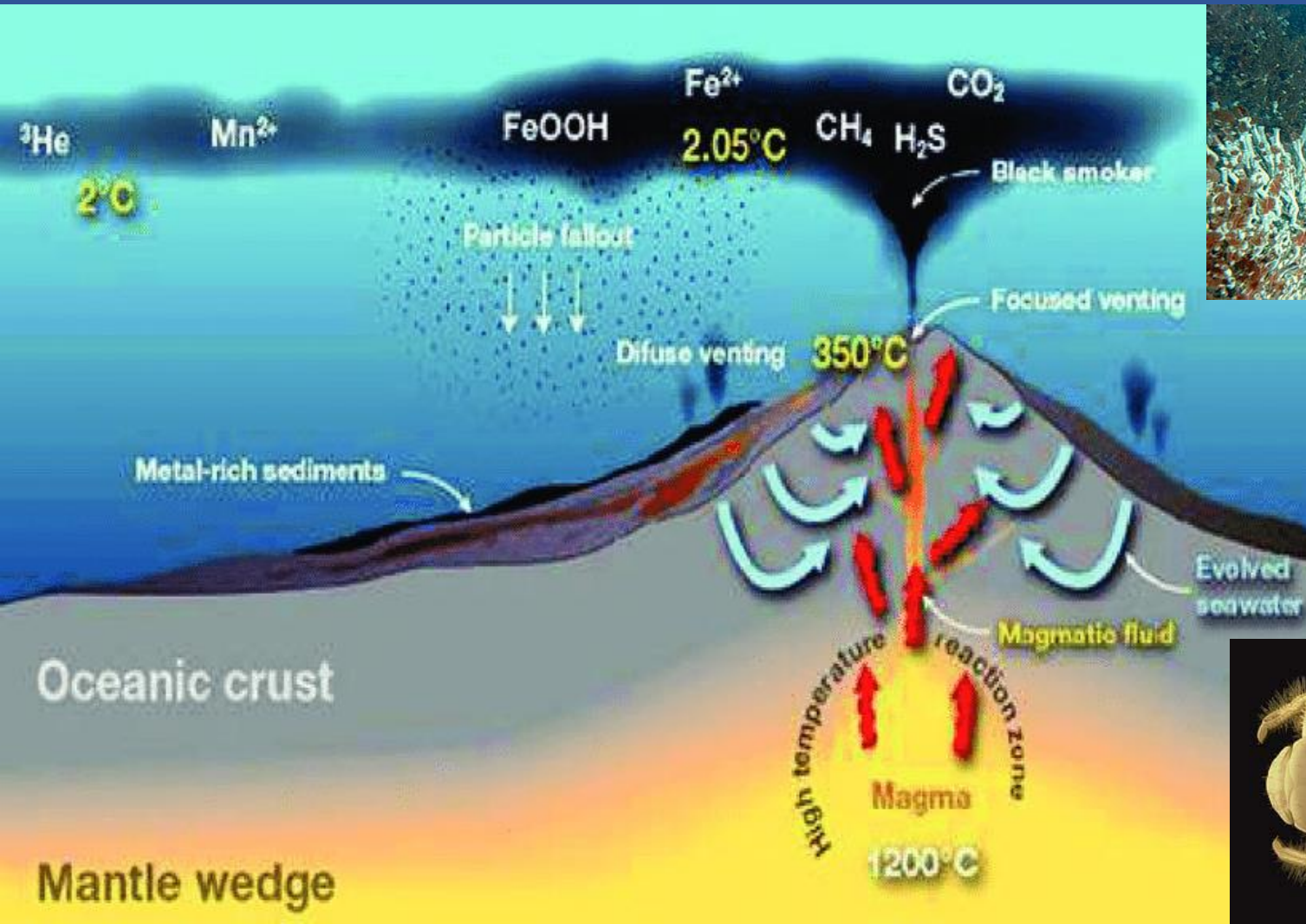
- To understand the property of seafloor
- Including the sedimentation, rock, and the tectonic plate
- The topics including
 - Bathymetry, seafloor profile
 - Mineral and sea mining
 - Tectonic plate movement
 - Hydrothermal vent
 - Record of earthquake
 - Etc.



Geological Oceanography: Ring of fire

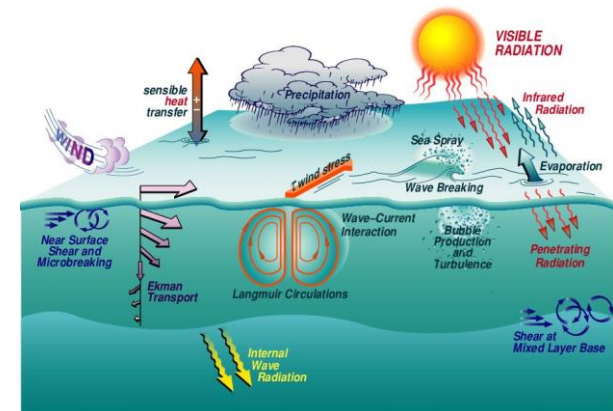
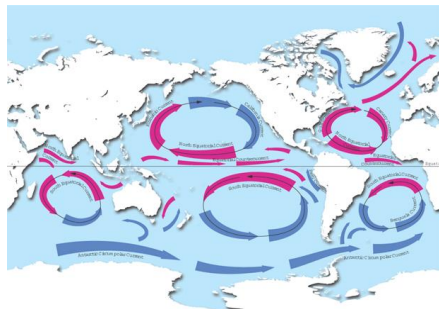
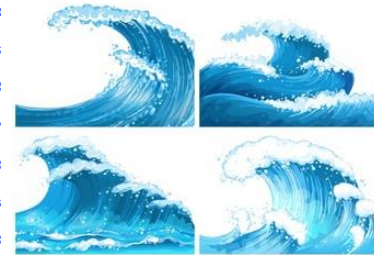
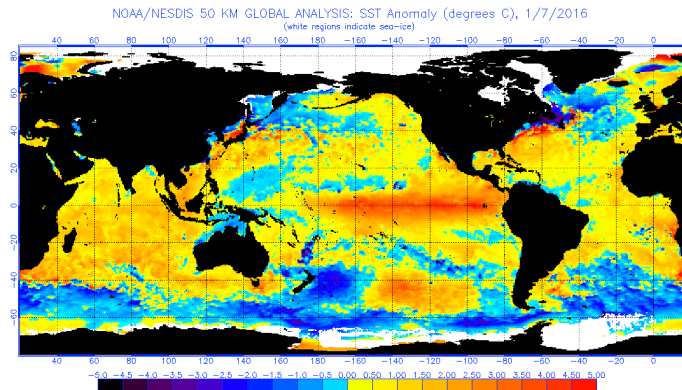
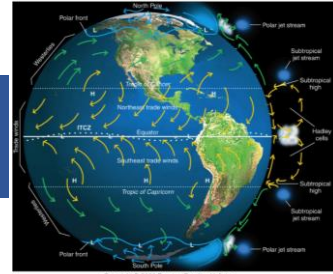


Geological Oceanography: Hydrothermal vent

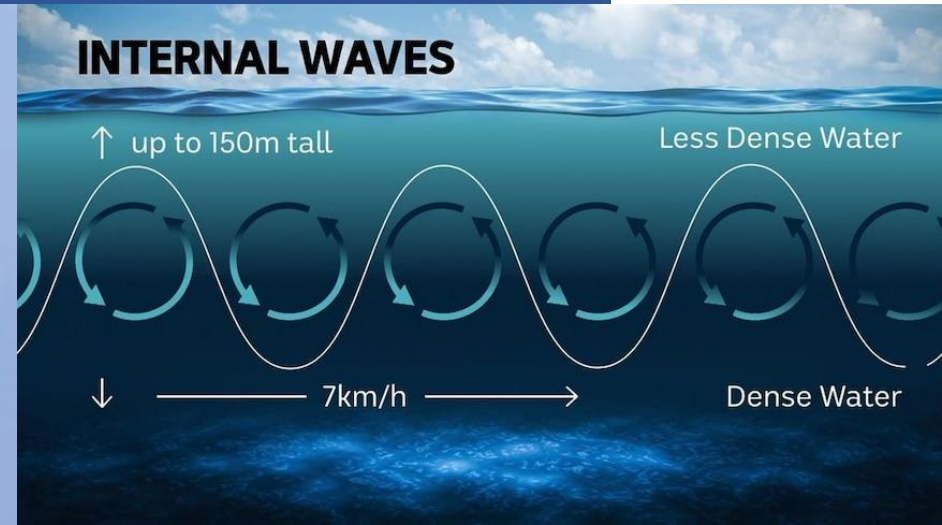


Physical Oceanography

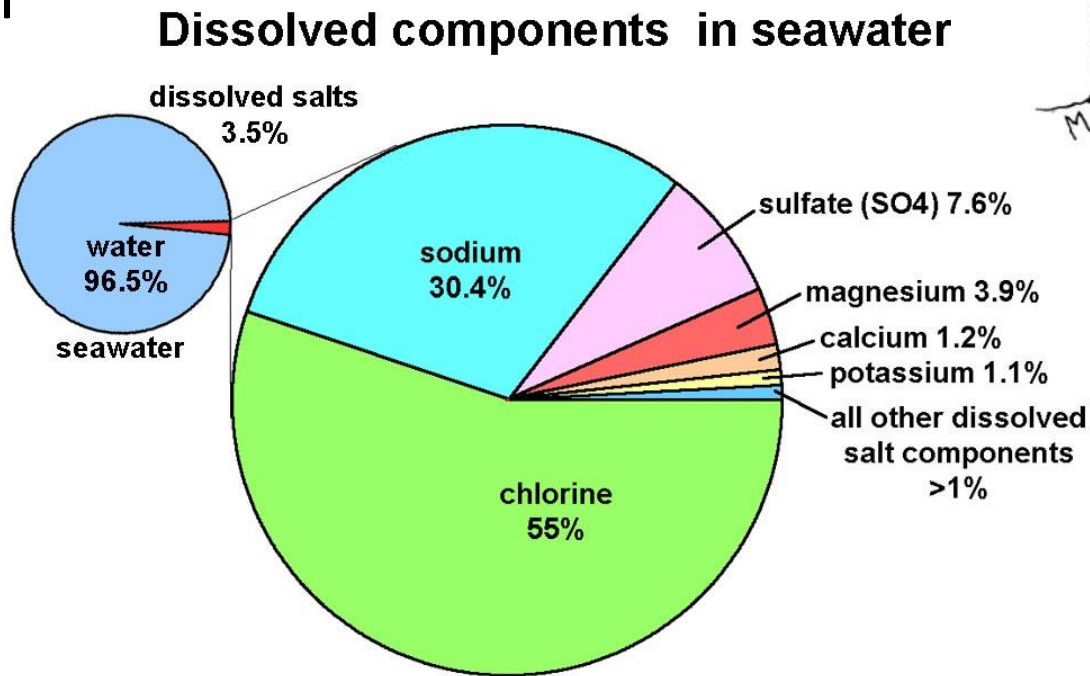
- To study on the physical property of ocean
- To understand more on the property of ocean itself
- The topics such as
 - The wave
 - The effect of wind
 - Tidal change
 - Current circulation
 - Other physical factors.



Physical Oceanography: Internal wave



- Composition of sea water
- The processing controlling
- What kind of chemical compound found in sea water



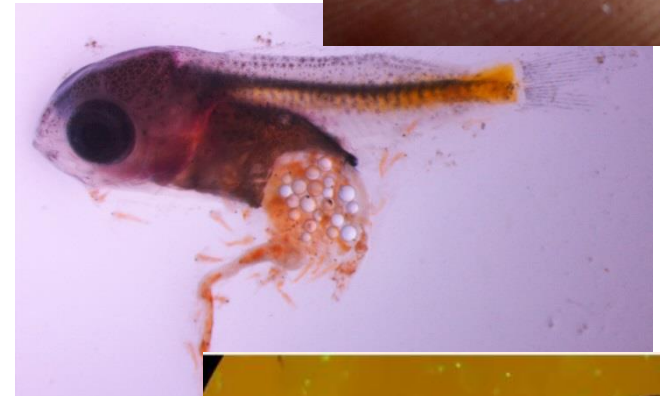
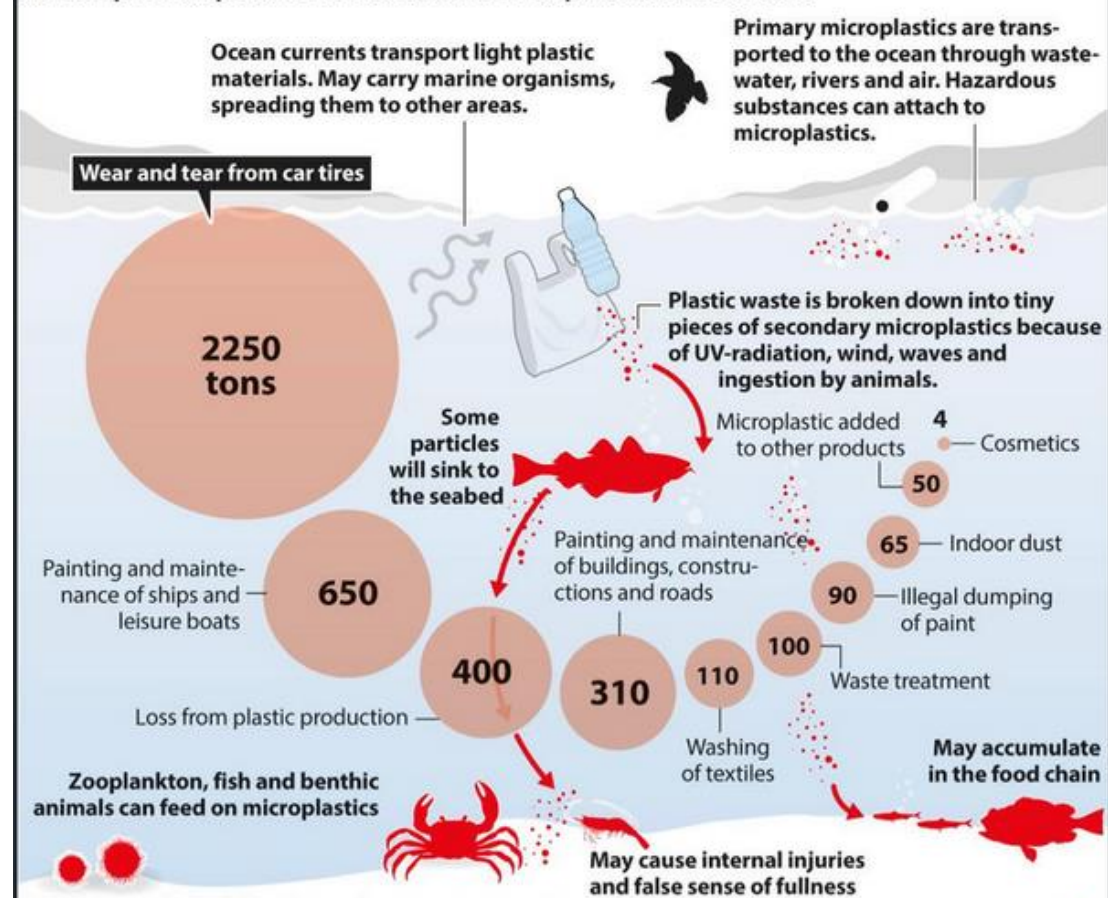
Chemical Oceanography: Marine pollution



Chemical Oceanography: Microplastic

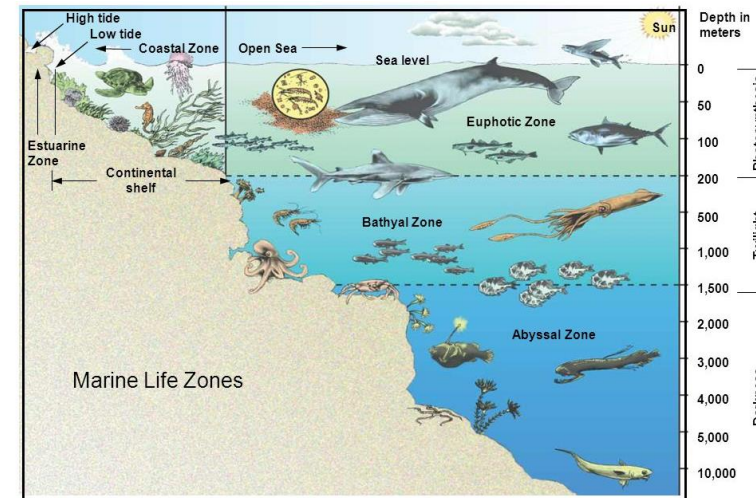
We are filling our oceans with microplastics

Approximately 8000 tons of primary microplastics are generated annually in Norway. About half will end up in the ocean. If 8000 tons of microplastics were dumped in downtown Bergen, its citizens would stand knee deep in microplastics. The main source of microplastic waste is car tires.

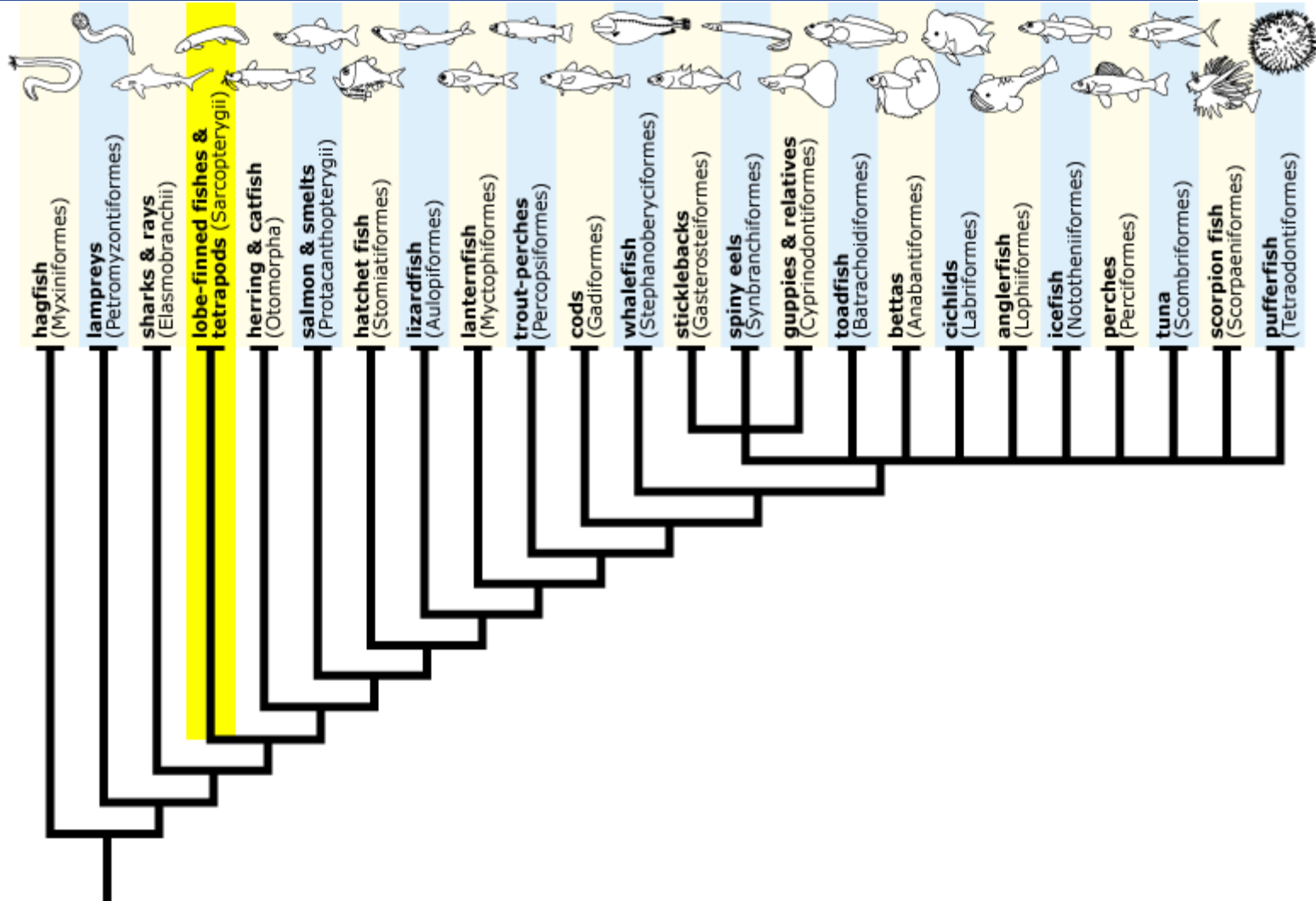


Biological Oceanography

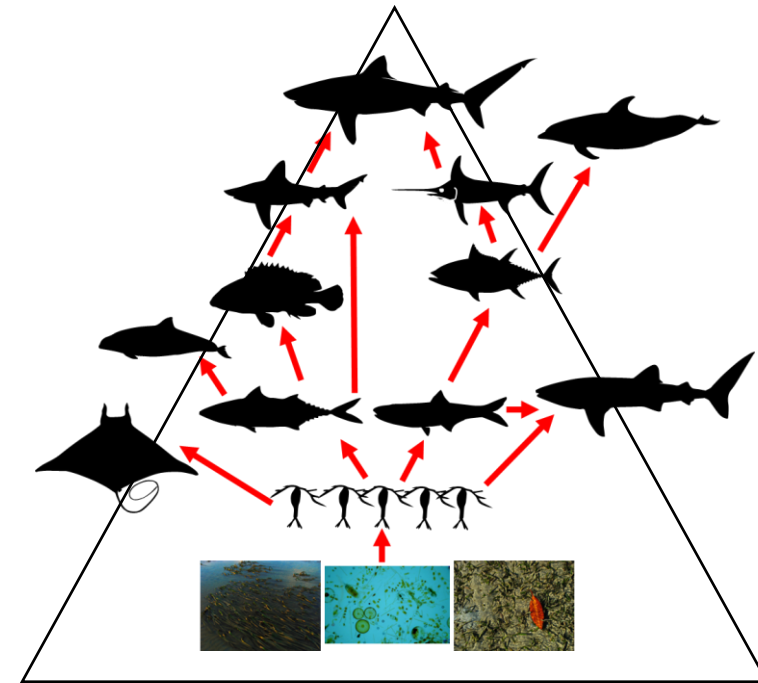
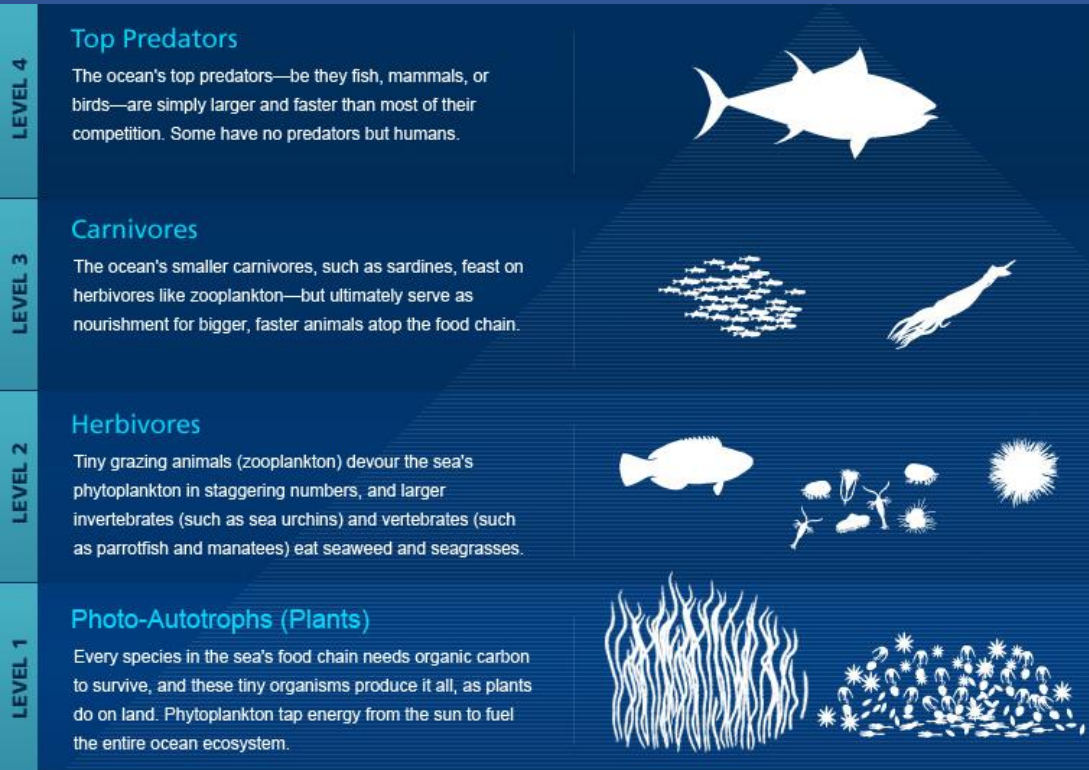
- To study on the marine organism
- Including the biological process
- Topics such as
 - Taxonomy
 - Ecology
 - Distribution
 - Migratory pattern
 - Etc.
- Be the base line information for
 - Fish stock assessment
 - Fishery management



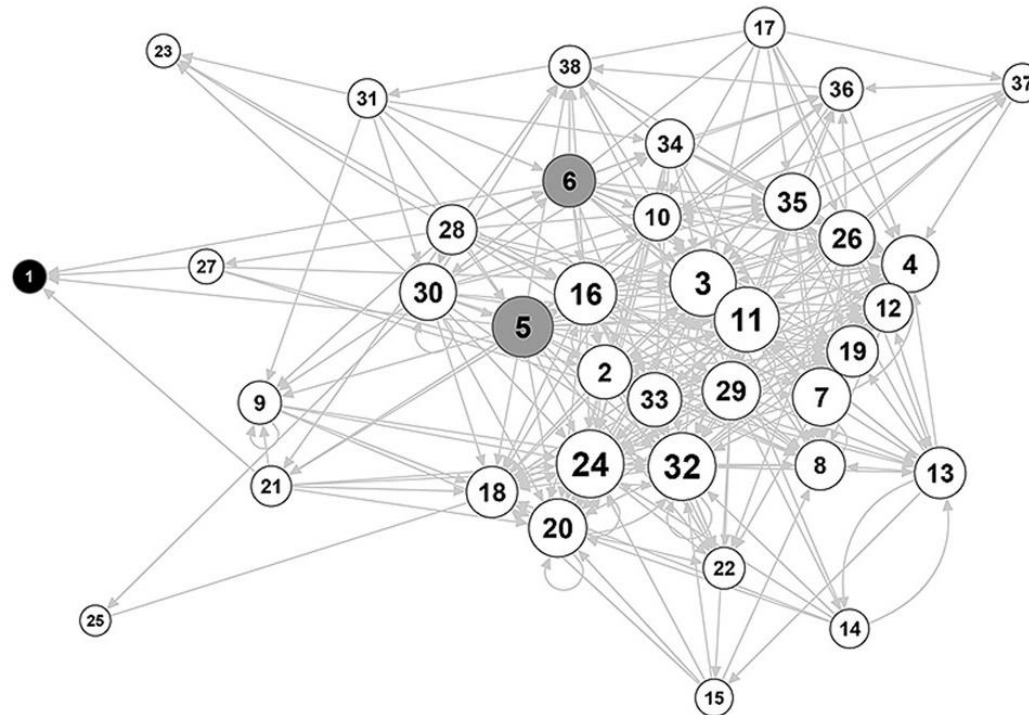
Biological Oceanography: Taxonomy



Biological Oceanography: Ecology



Biological Oceanography: Ecology



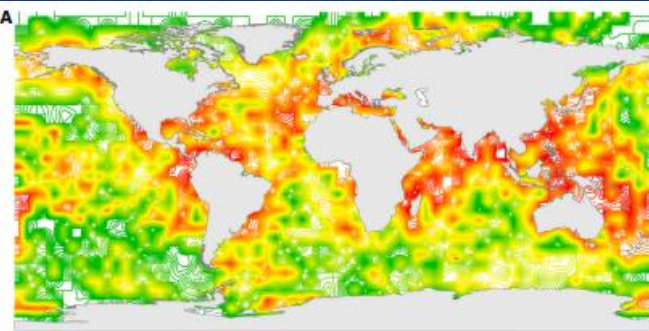
1 Clam_fishers
2 Grouper
3 Large_shark
4 Small_shark
5 Clams
6 Hatchet_clam
7 Snapper
8 Sea_lion

9 Sea_urchin
10 Sea_turtle
11 Squid
12 Cazon
13 Spanish_mackerel
14 Corvina
15 Weakfish
16 Octopus

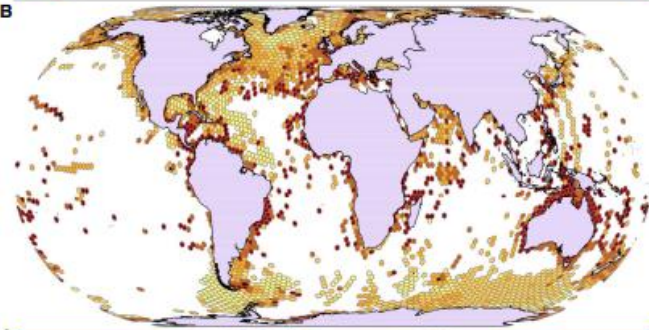
17 Seaweed
18 Gulf_grouper
19 Seabirds
20 Sand_bass
21 Snail
22 Brown_snake
23 Mussel
24 Spotted_cabrilla

25 Silverfish
26 Triggerfish
27 Sea_cucumber
28 Detritus
29 Sardine
30 Zooplankton
31 Phytoplankton
32 Gulf_coney

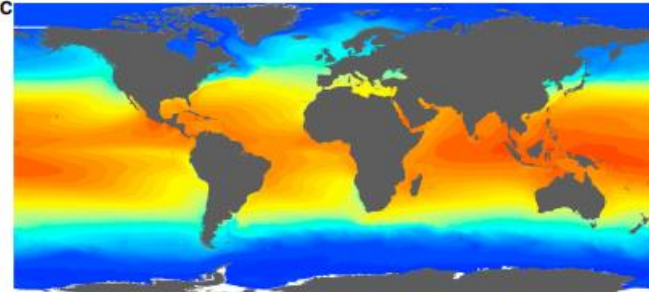
33 Leopard_grouper
34 Shrimp
35 Flounder
36 Clownfish
37 Angelfish
38 Stingray



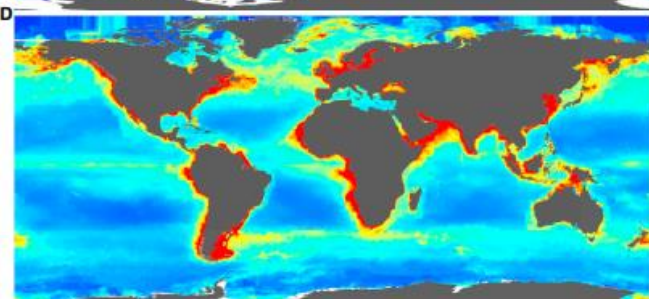
Species richness (contour line)



Species richness (grid)



Water temperature



Primary productivity

Oceanographic instruments

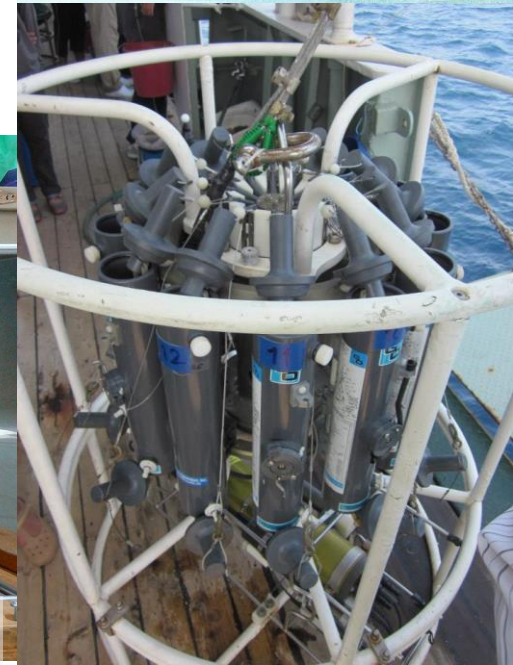
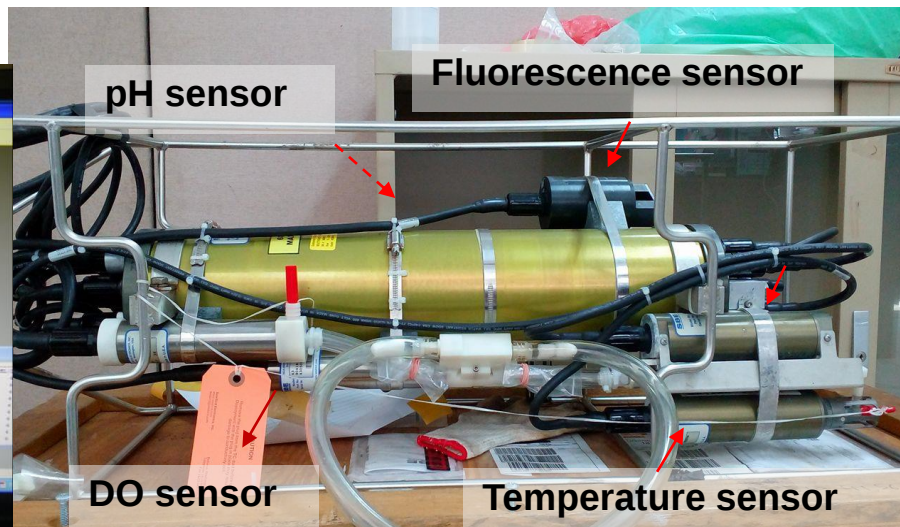
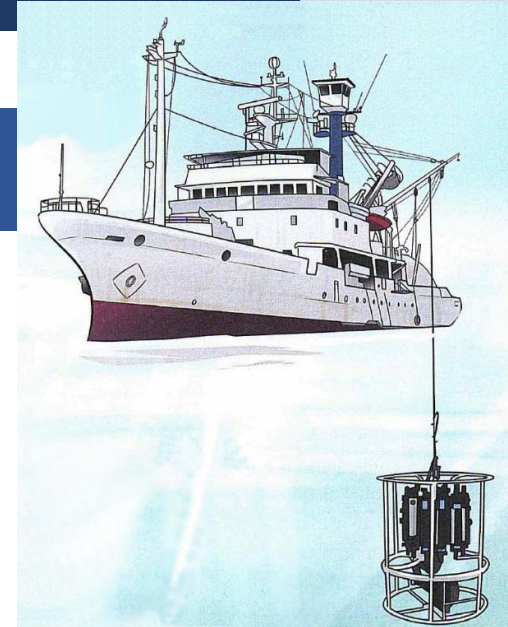
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- The instruments that helping us to measure or sample various oceanographic samples from all purposes.



Conductivity Temperature Depth (CTD)

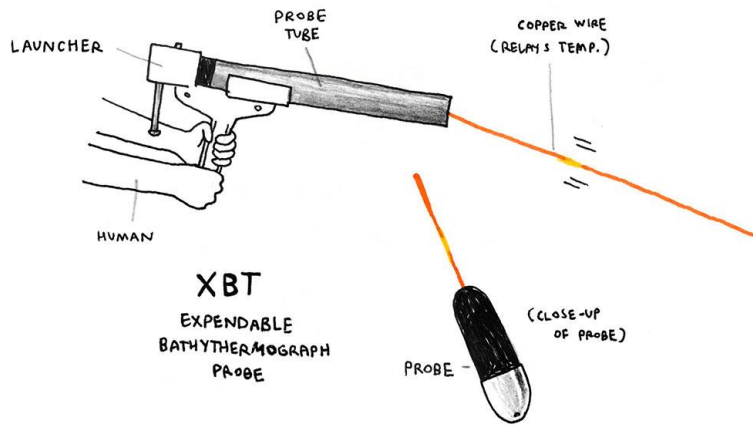
- The maximum operation depth: 6800 meters.
- With frame, it can collect water from 12 depth ranges.
- Can put additional sensors along.
- Send the real time signal to the processing unit onboard.



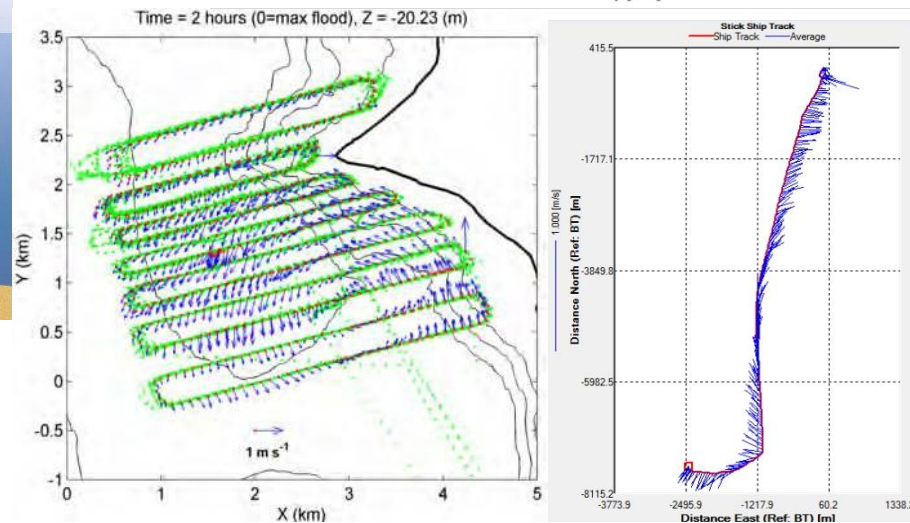
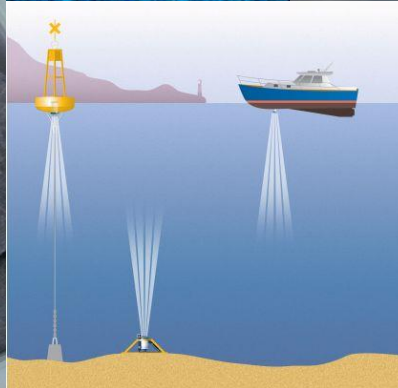
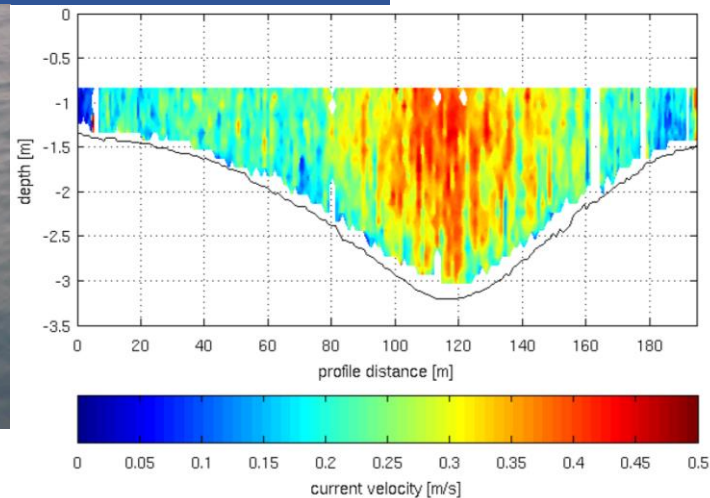
Conductivity Temperature Depth (CTD)



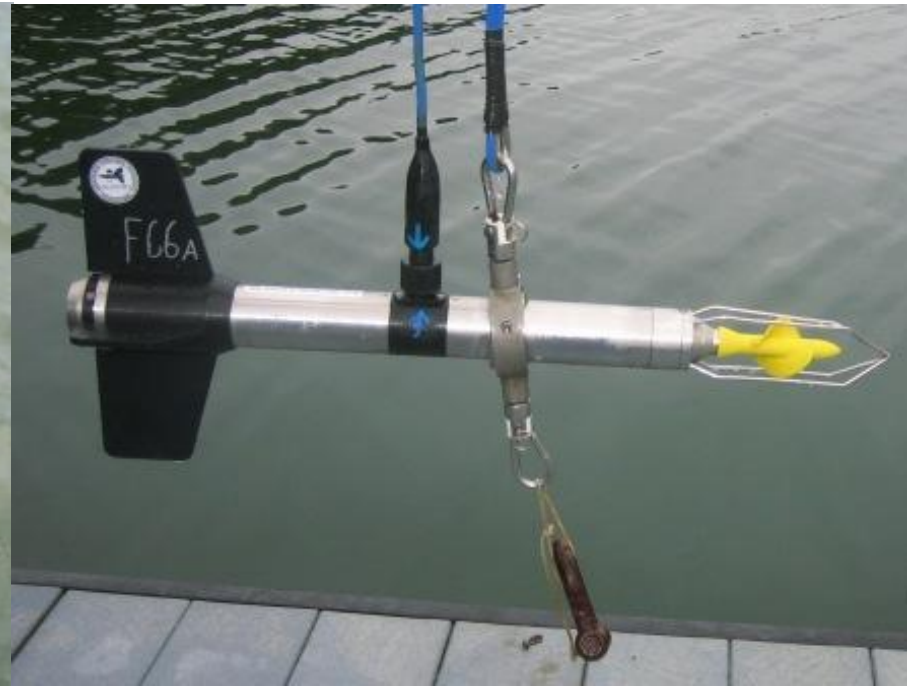
Expendable Bathythermograph Probe (XBT)



Acoustic Doppler Current Profilers (ADCP)

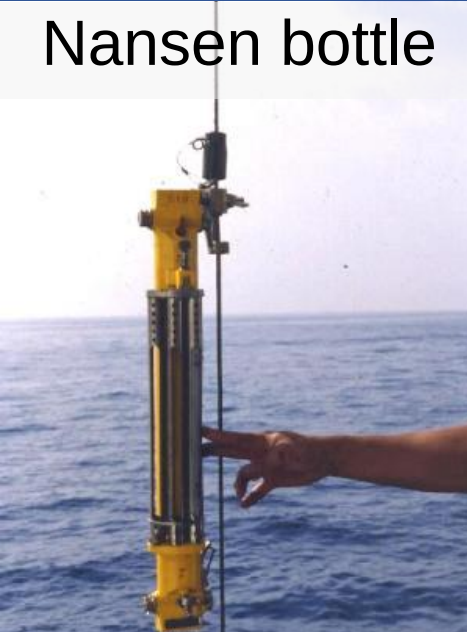


Current Meter



Water Sampler

Nansen bottle



Niskin water sampler



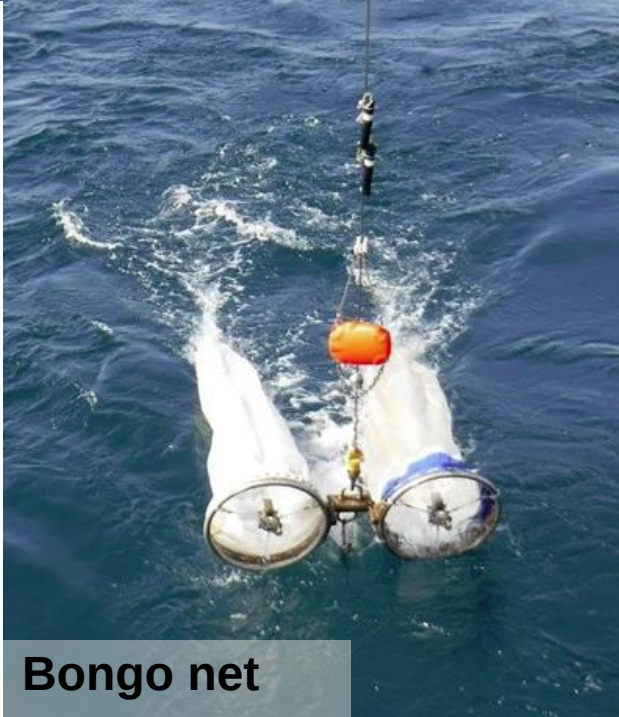
Van Dorn



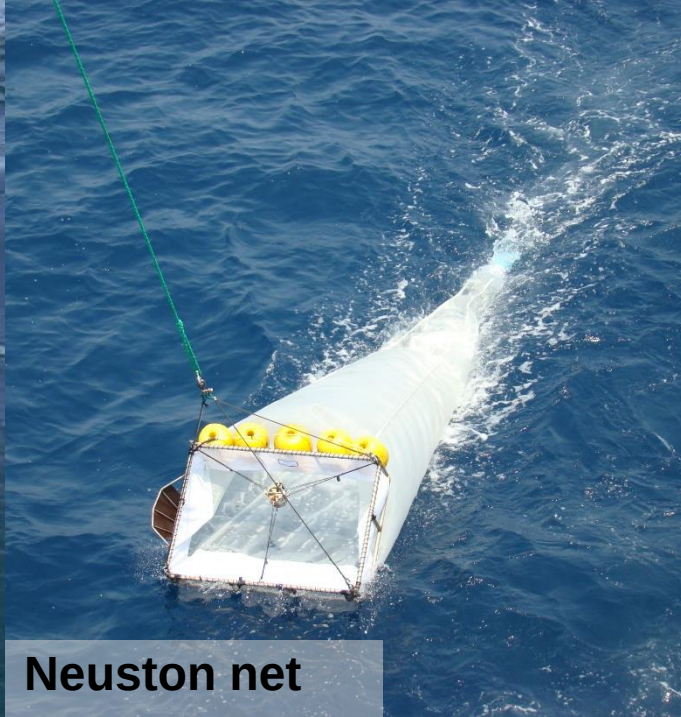
Ruttner water sampler



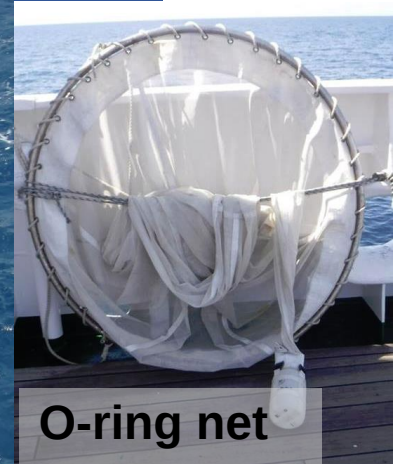
Water Sampler



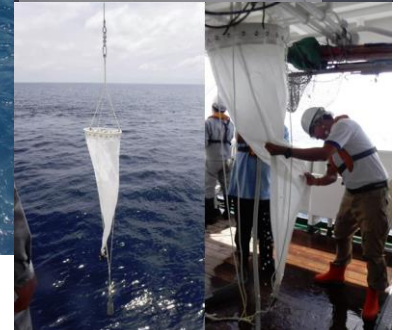
Bongo net



Neuston net

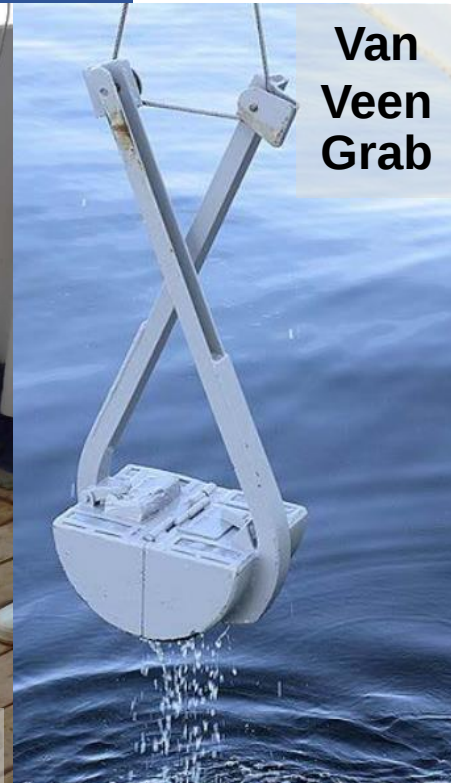
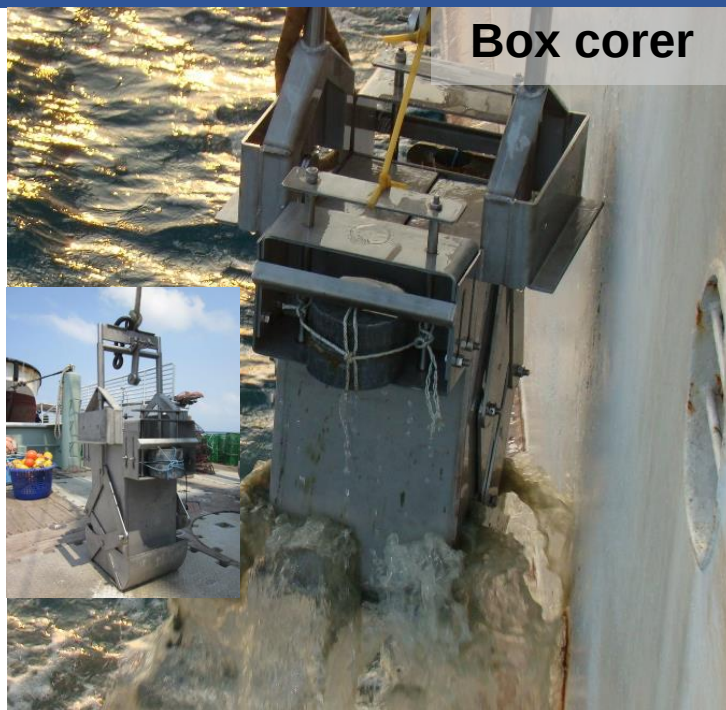


O-ring net



Norpac net for zooplankton

Grab



Ekman Grab

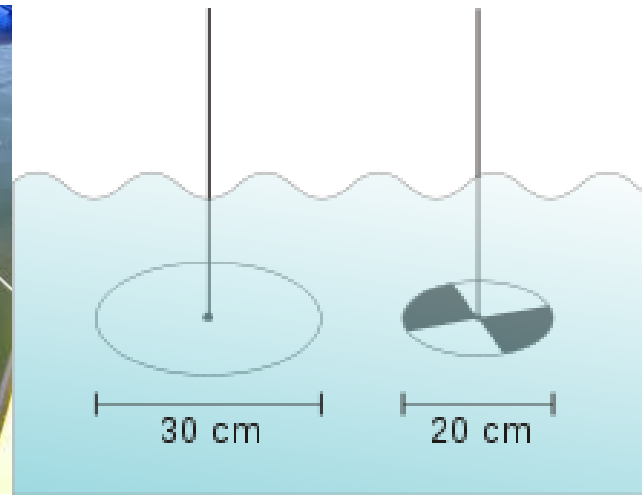
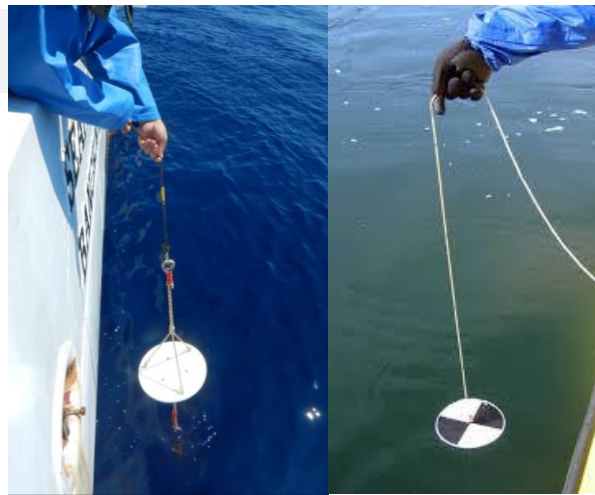
Water surface



Forel scale



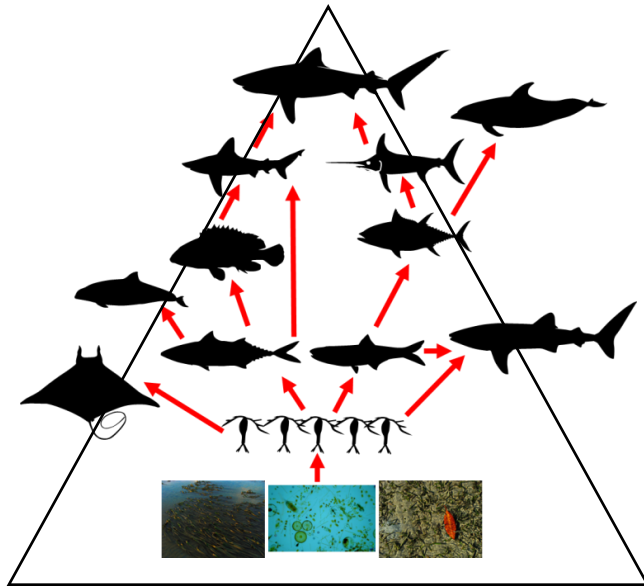
Secchi dish



What is it?

- How the environment effect to the fishery?

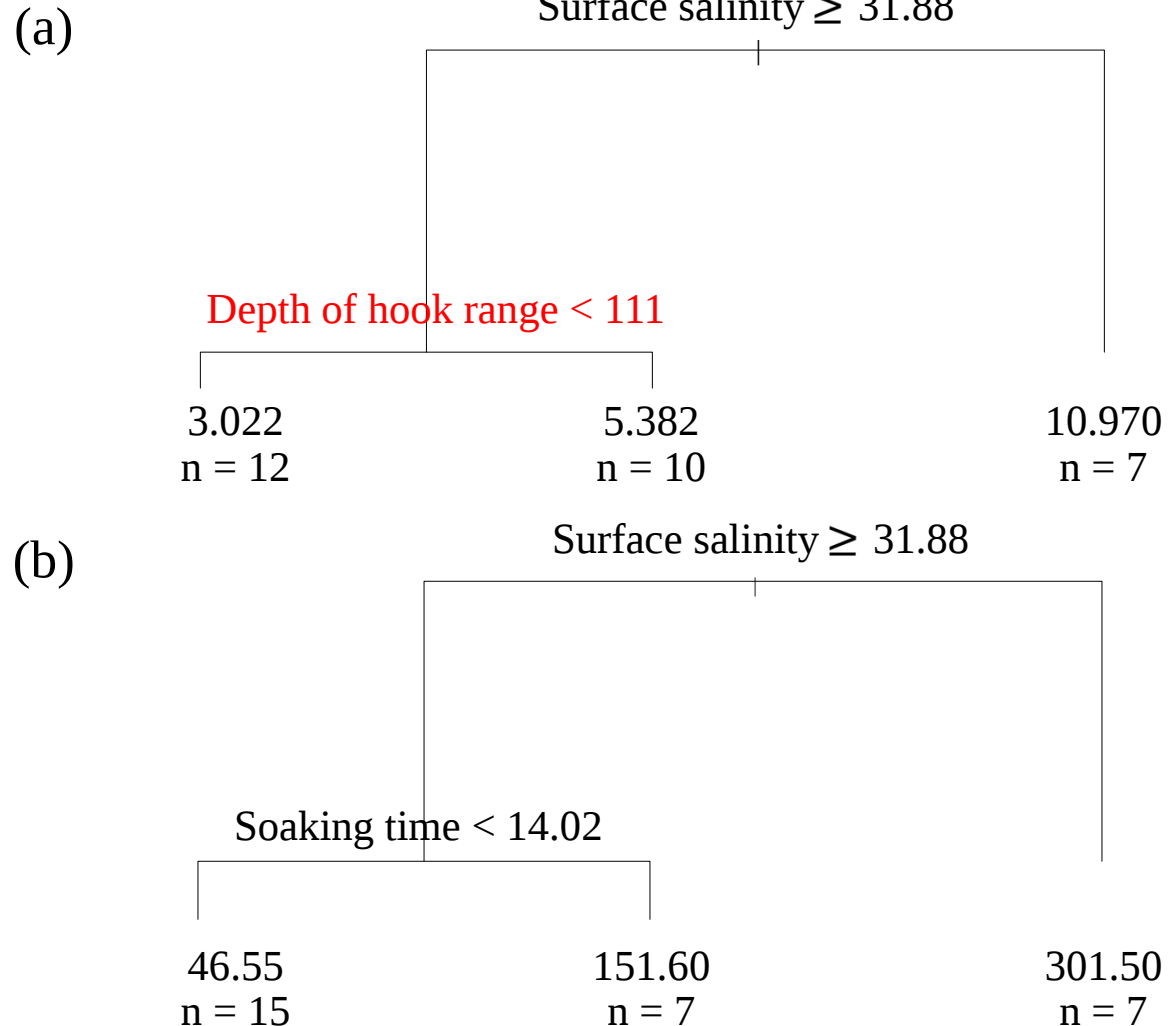
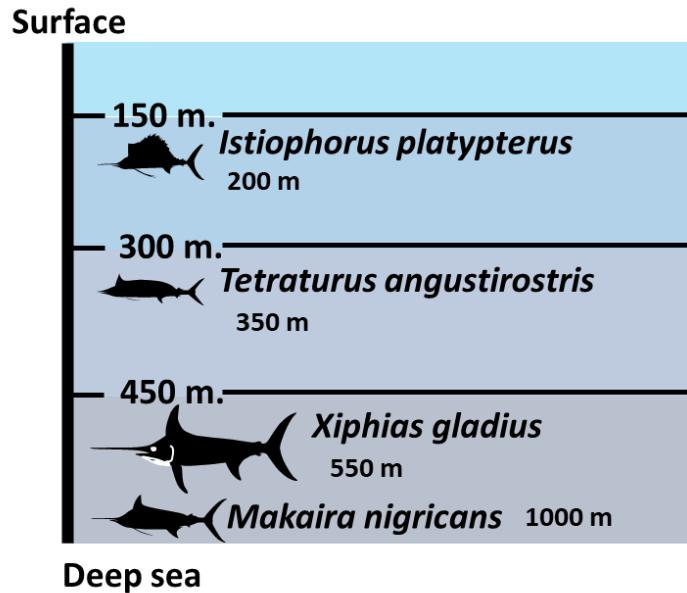
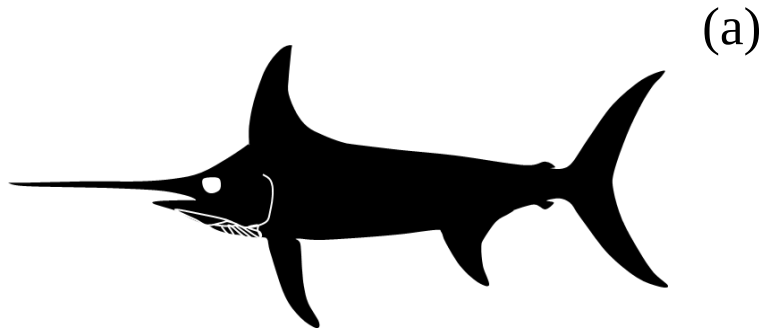
Biotic factor



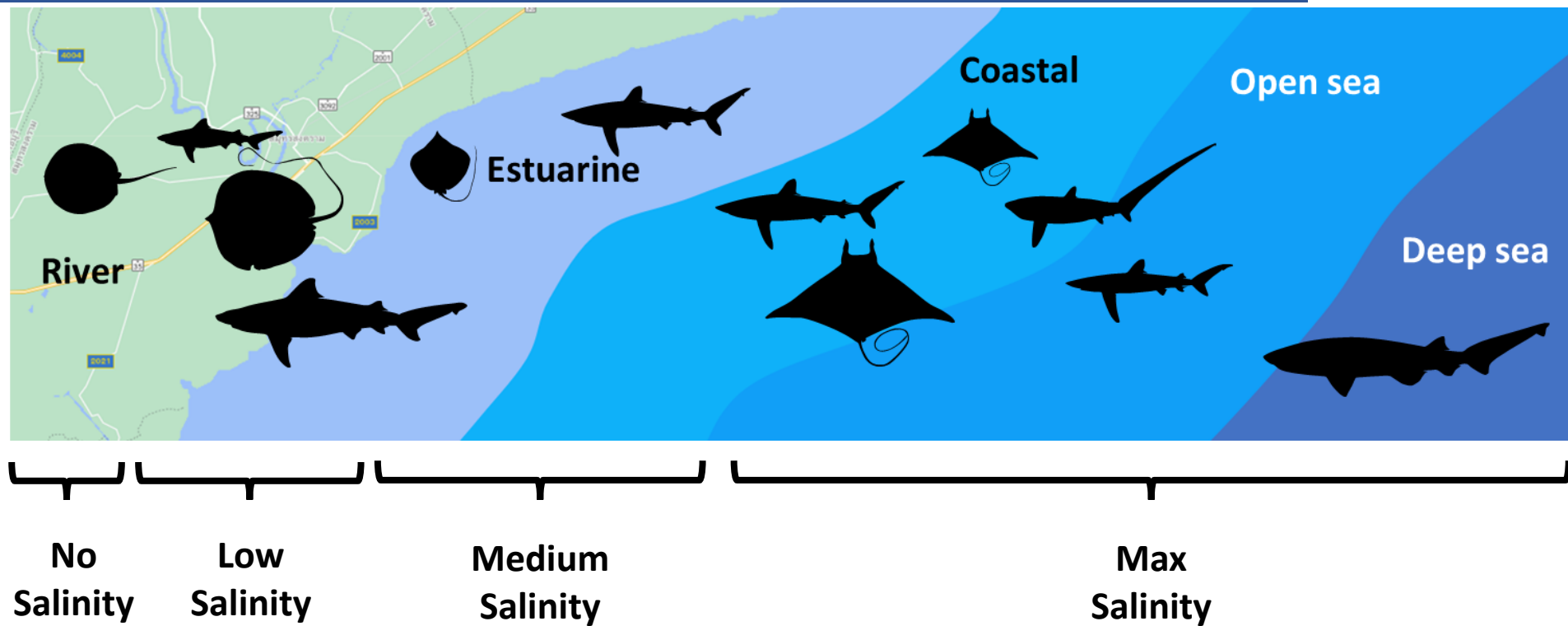
Abiotic factor



The fishing ground selection



Species distribution based on salinity



Thermocline and Phytoplankton abundance

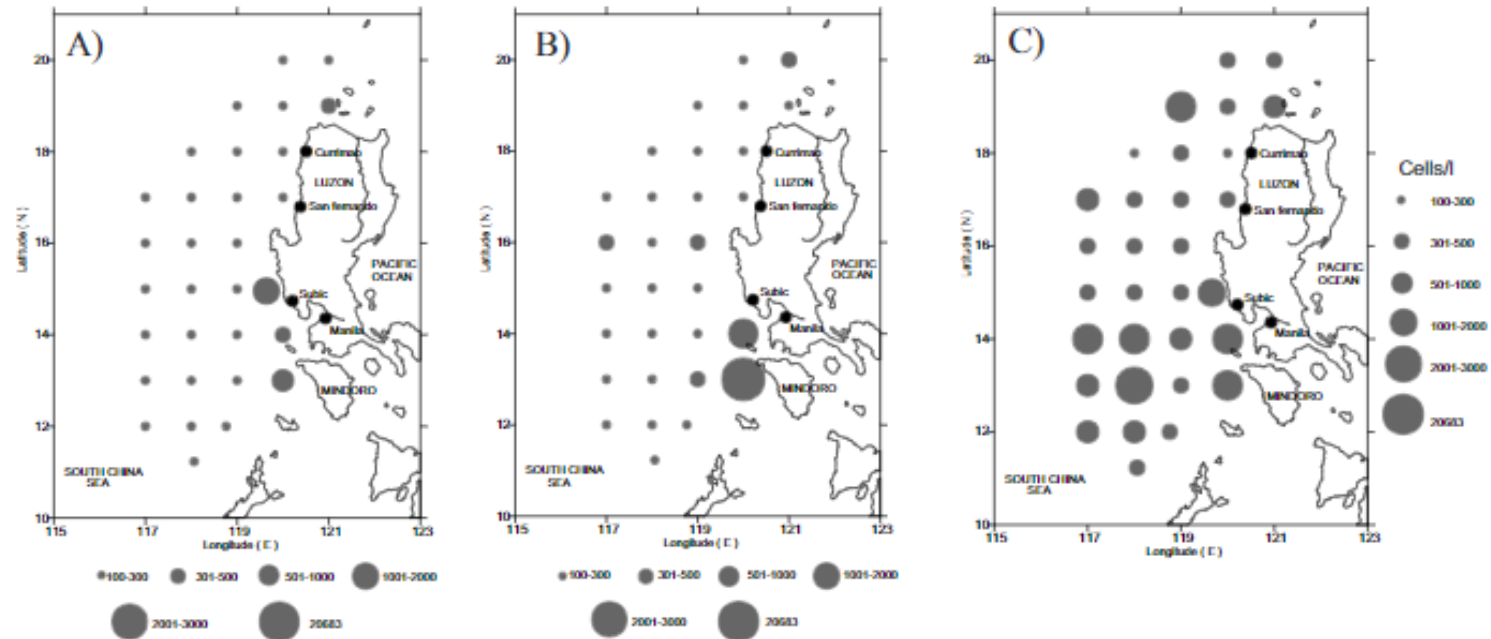


Fig. 7. Phytoplankton densities at different depths.

A: Surface , B: Thermocline depth, C: Chlorophyll maximum depth

Squid response to light



Table 2 Batch and number of squids occupying each channel of light colors

Light color	Number of squid per batch										Total	Avg.
	1	2	3	4	5	6	7	8	9	10		
Red	1	1	1	3	2	3	5	0	1	1	18	1.80
Green	3	17	18	28	17	13	12	11	23	9	151	15.10
Blue	10	33	25	33	47	31	33	27	28	18	285	28.50
White	13	10	28	50	41	26	35	55	28	41	327	32.70
Control	0	2	1	3	1	0	0	0	1	1	9	0.90

**THANK YOU FOR YOUR
KIND ATTENTION**

