Distribution of dinoflagellate cysts in surface sediments from the South Yellow Sea at Autumn

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Outline

- Background
- Materials and methods
- Results and discuss
- Conclusions

Background

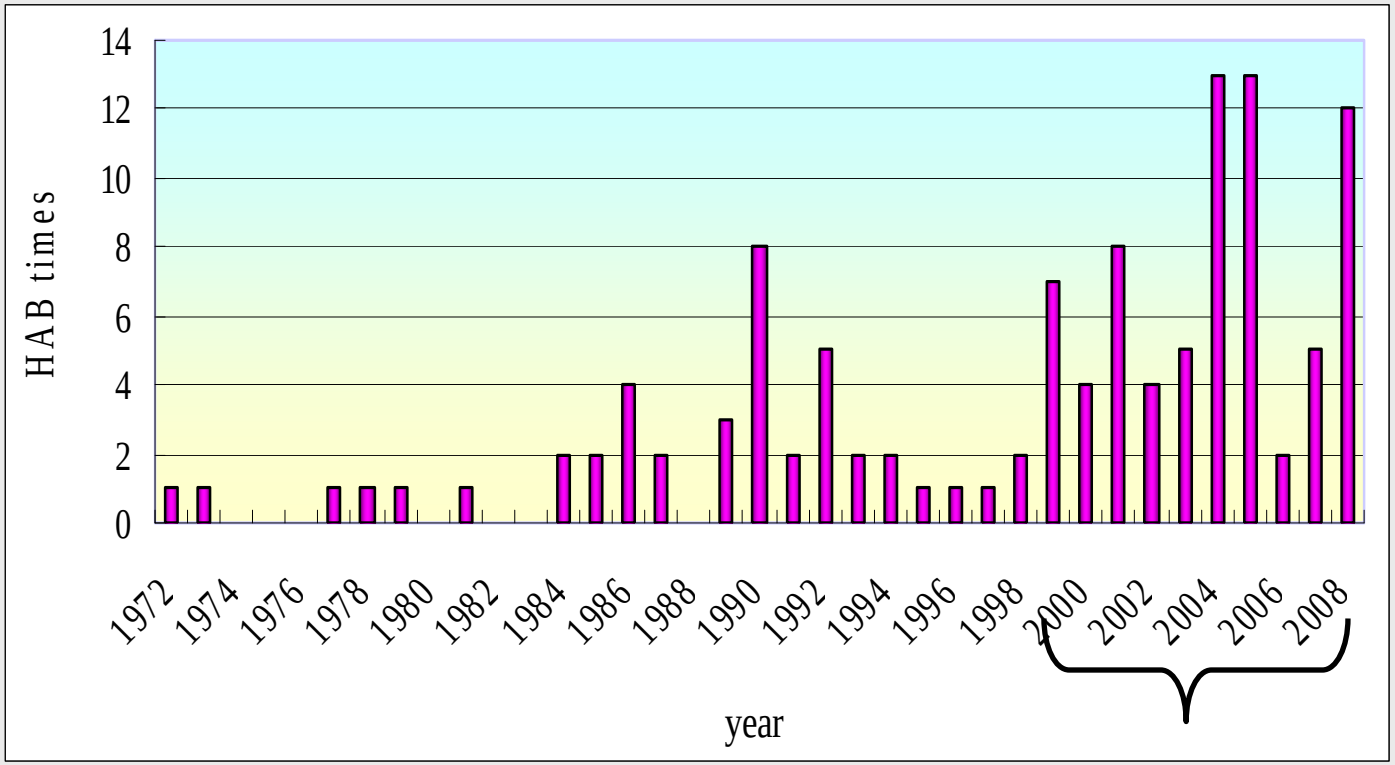
About 200 of the approximate 2000 existing species of marine dinoflagellates are known to form resting cysts as part of their life history.

Cysts play an important role in the life history of many dinoflagellates

Cysts are also important in studies of dinoflagellate ecology and biogeography and bloom.

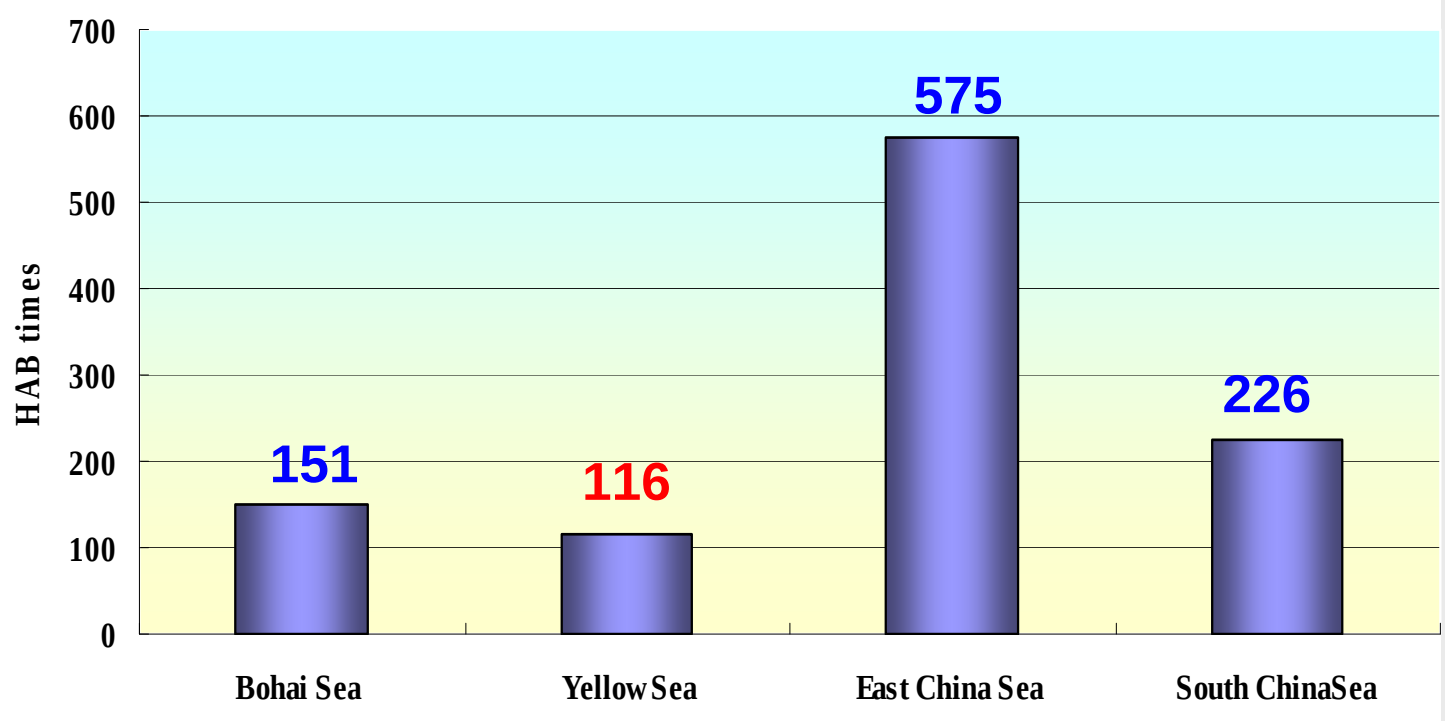
There were less cyst surveys in Yellow Sea. Cho and Matsuoka (2001) conducted relative studies in the Yellow Sea and East China Sea.

HAB in the Yellow Sea



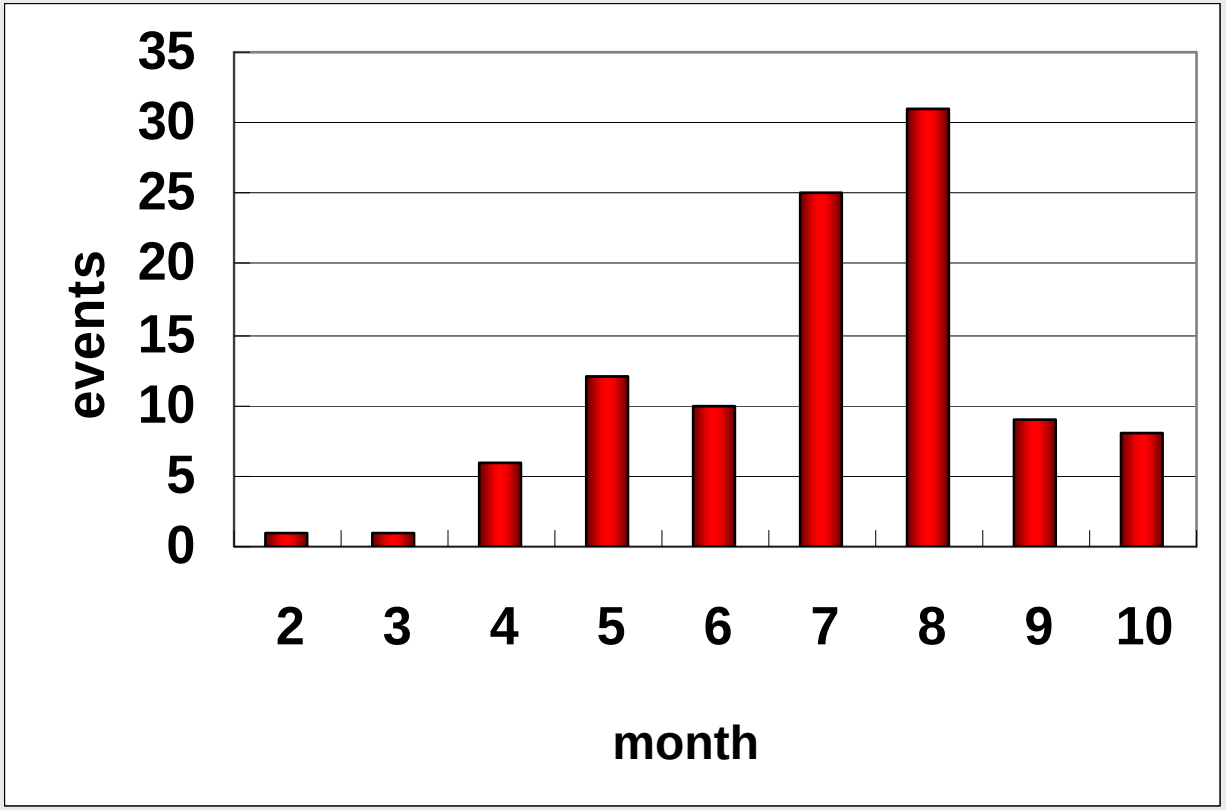
Occurring frequency of HAB in the Yellow Sea

Total HAB events reached 116 in Yellow Sea since 1972, among of them ,73 events occurred in last 10 years



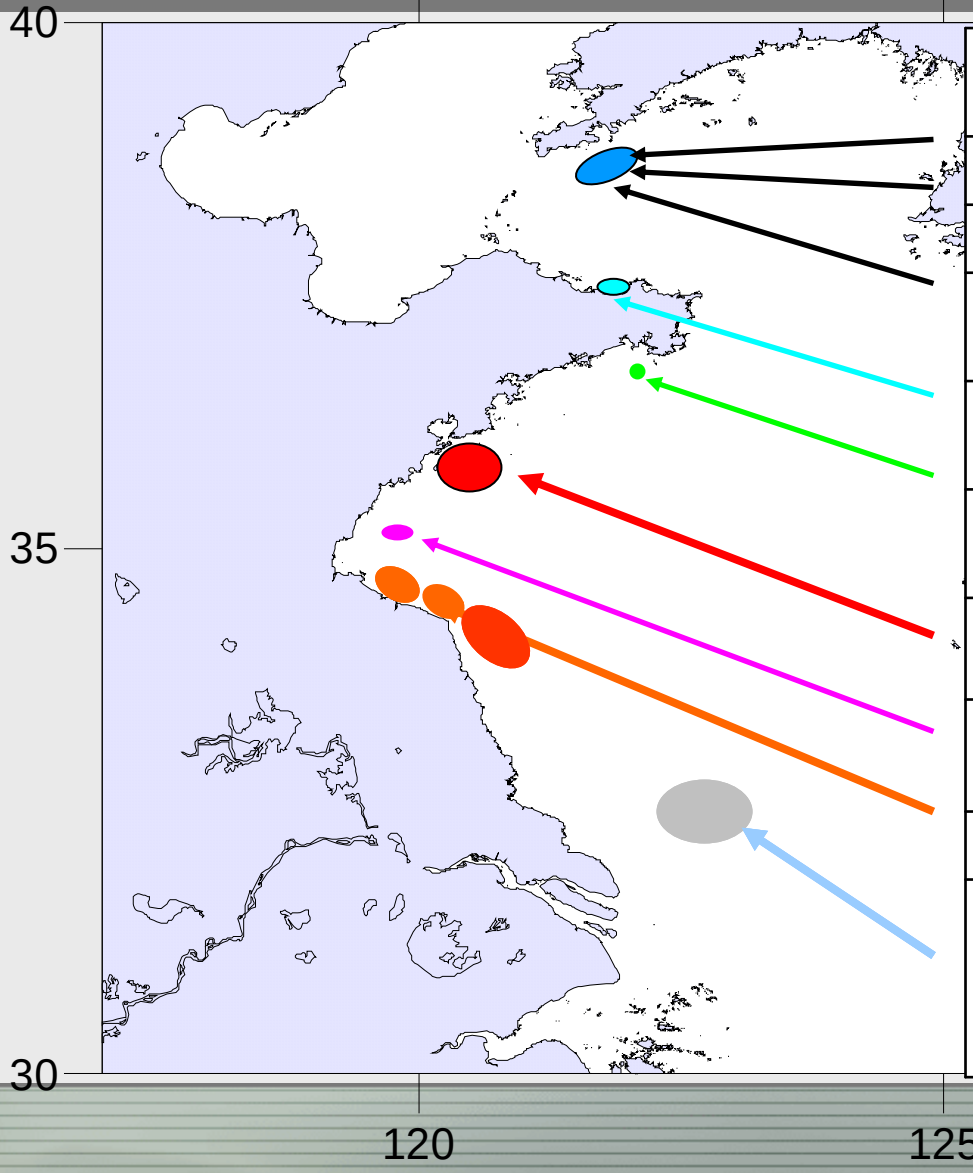
HAB events in yellow sea are the least than other of china seas

The time of occurring HAB in Yellow Sea



The months of HAB occurring frequency higher from May~Oct.

The sites with frequent HAB in west coast of Yellow Sea



regions	Belong to	Province，Position
Dongguang		Liaoning
Dalian bay	Dalian city	Liaoning
zhangzidao	Dalian city	Coastal region of Liaoning
Sishili bay	Yantai city	North of Shandong penisola
Rushan bay	Yantai city	South of Shandong penisola
Jiaozhou bay	Qingdao city	
Rizhao coast	Rizhao city	South of shandong
Haizhou Bay	Lianyunguang	North of Jiangsu
Northern Changjiang river estuary	Rudong	South of Jiangsu

Main harmful dinoflagellates occured bloom in yellow sea were:

***Alexandrium* sp. (may be *A.affine*)**

Gymnodinium catenatum

Akashiwo sanguineau

Scrippsiella trochoidea

Some dominant dinoflagellates:

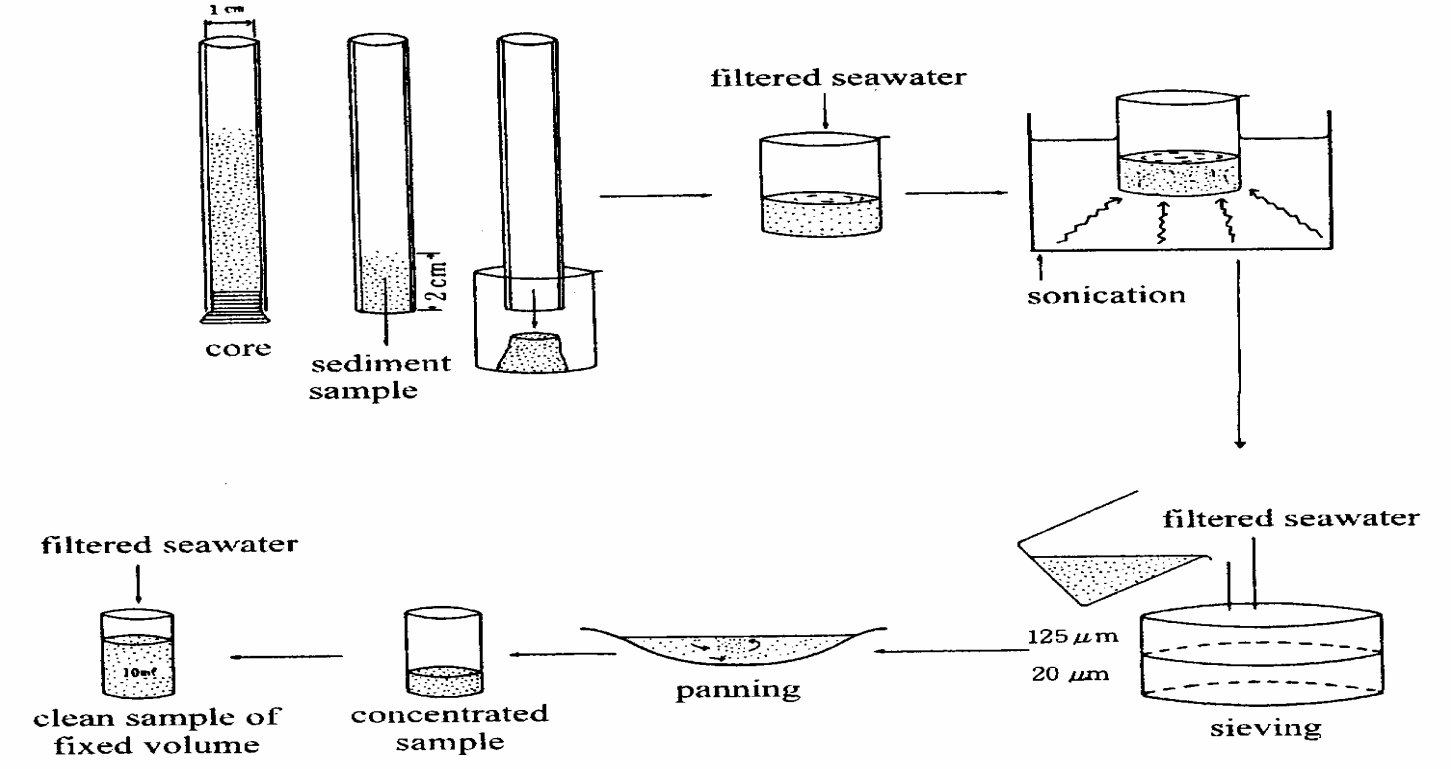
Alexandrium catenalla, Alexandrium tamarense

Alexandrium* sp. *Gonyaulax polgramma,

Diplopsalis lenticula ,Protoperidinium depressum ,

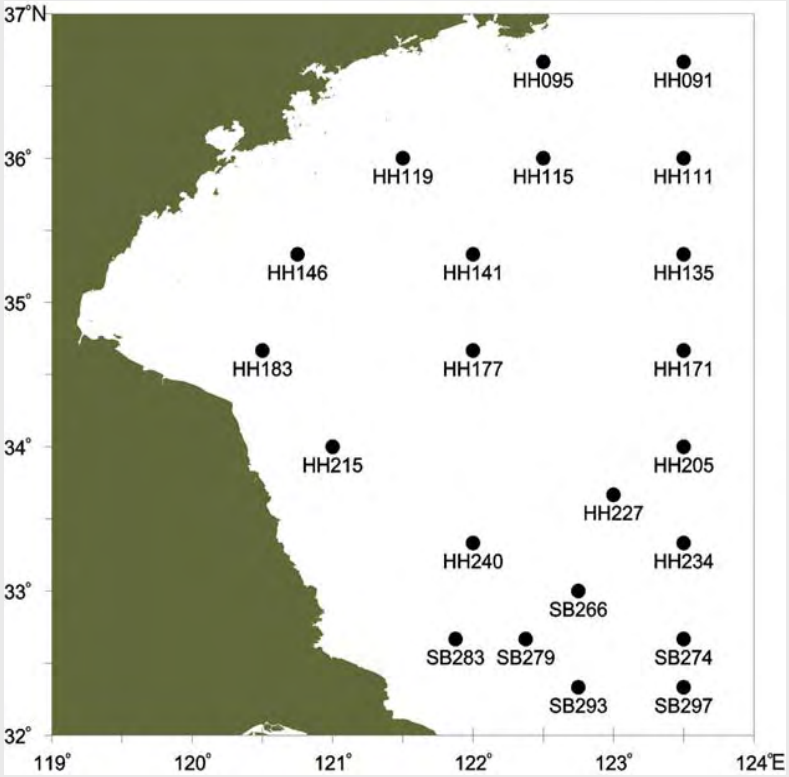
Proto.conicum ,Proto. pellucidum,Proto pentagonum

Materials and methods



Procedure of sieving technique （By MATSUOKA K）

Station setting



Sampling stations in the Yellow Sea

Survey region is located at the South Yellow Sea, 22 stations was set .

Results

1) Composition of dinoflagellate cysts

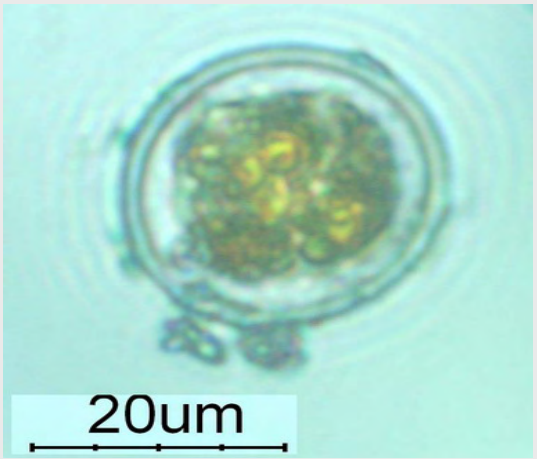
A total of 39 cyst types were identified

Gonyaulacoid group	**13**
Protoperidinioid group	**14**
Calcoidinellid group	**6**
Gymnodinioid group	**3**
Diplopsalid group	**2**
Tuberculodinioid	**1**

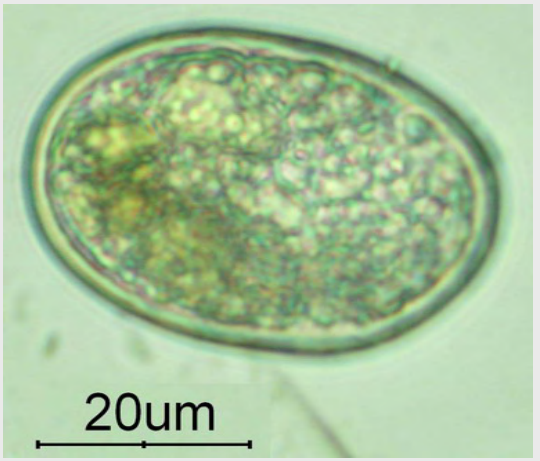
Gonyaulacoid and protoperidinioid groups are relatively abundant at whole area

***Scrippsiella trochoidea* and *Alexandrium tamarense* were the dominant species in the South Yellow Sea**

Alexandrium affine

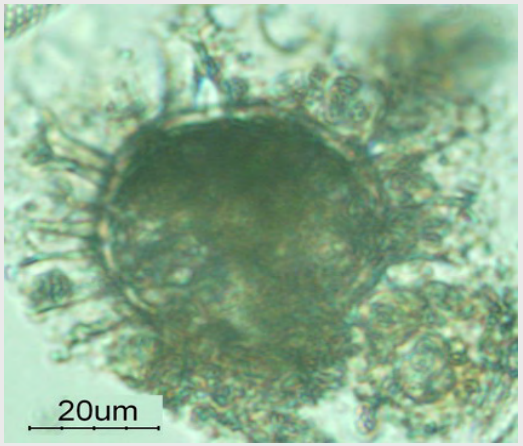


Alexandrium minium

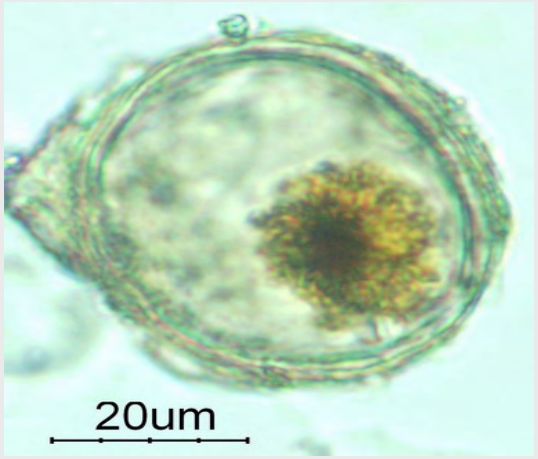


Alexandrium tamarense

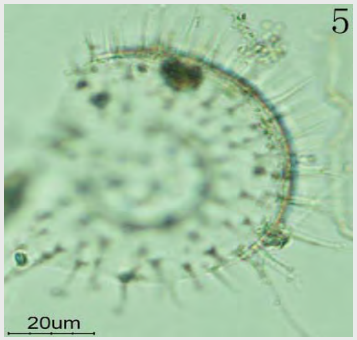
Alexandrium catenella



Spiniferites hyperacanthus



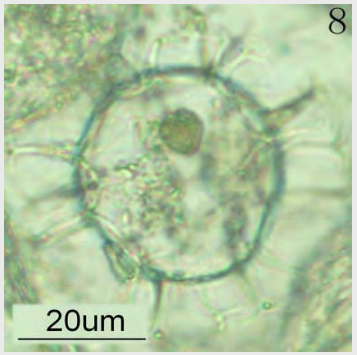
Gonyaulax verior



Lingulodinium polyedra

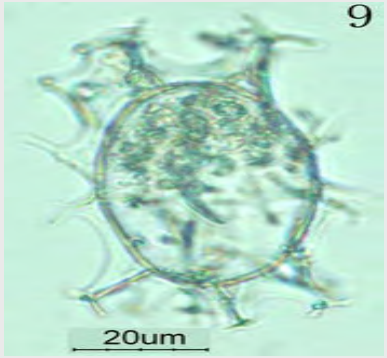
Gonyaulax digitale

Gonyaulax digitale



Gonyaulax spinifera

Gonyaulax spinifera

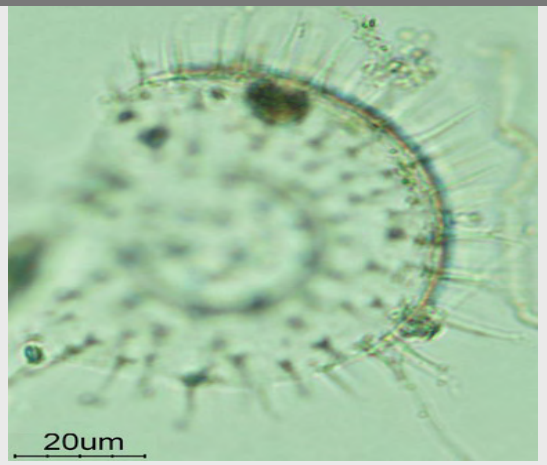


Gonyaulax elongate

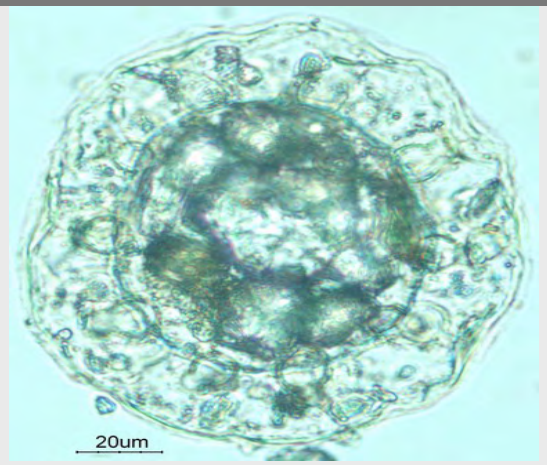
Gonyaulax spinifera

Gonyaulax spinifera

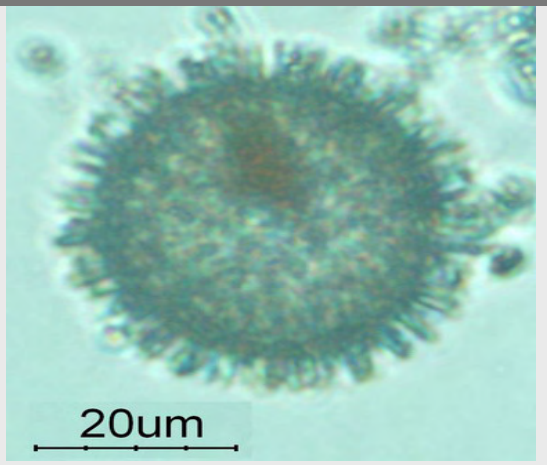
5.；6、7.; 8. *(Spiniferites hyperacanthus)*；9.； 10. *(Spiniferi*



Lingulodinium polyedra

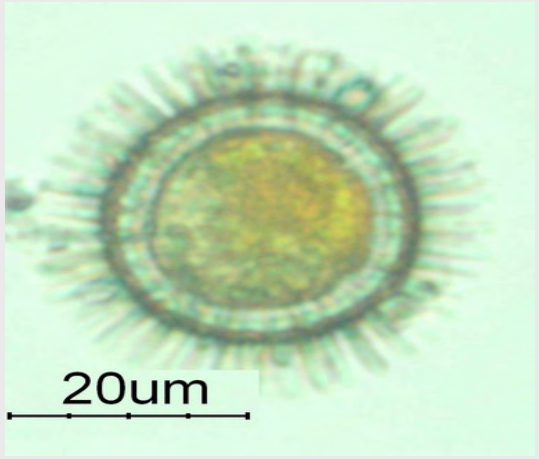


Pyrophacus horolongicum



Scrippsiella trochoide

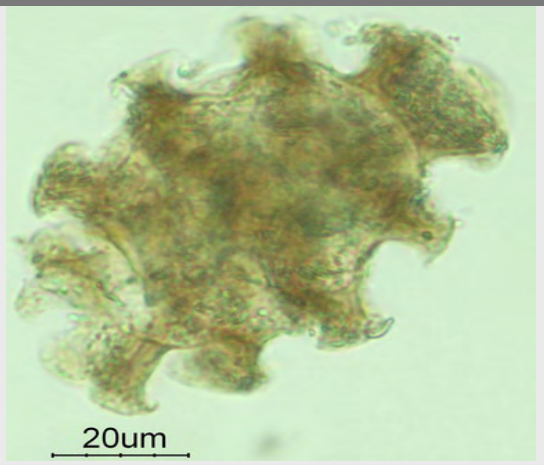
Scrippsiella ramonii



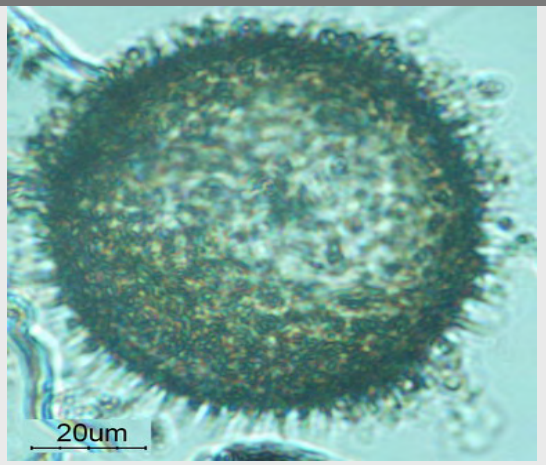
Scrippsiella precaria

Gymnodinium catenatum

Polykrikos schwartzii

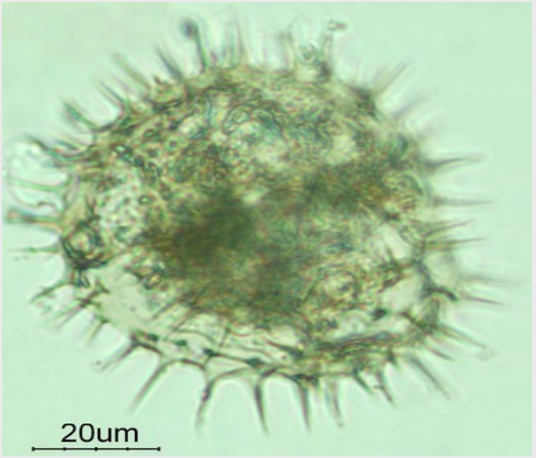


Polykrikos kofoidii

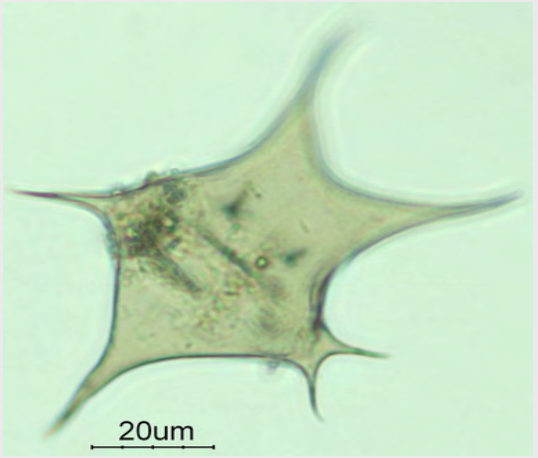


Pheopolykrikos harmannii

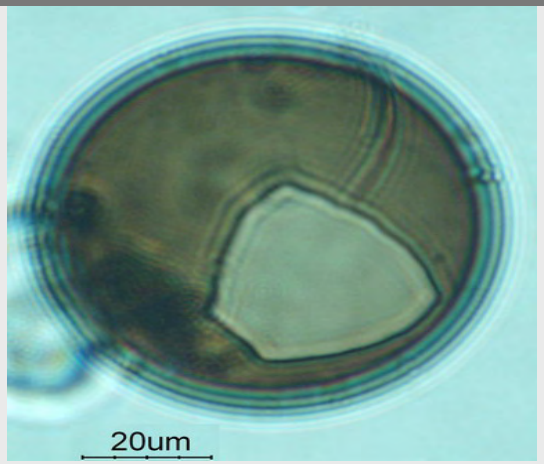
Protoperidinium avellane



Protoperidinium conicum

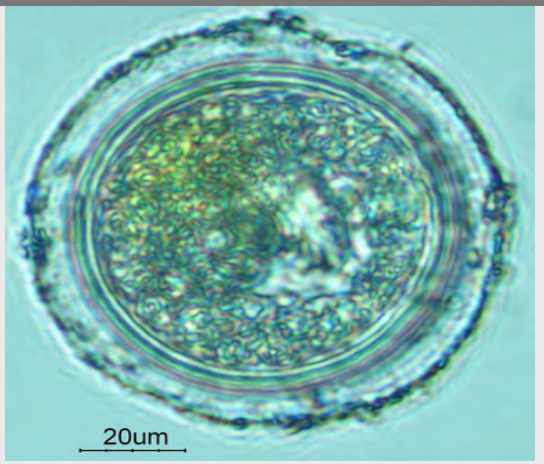


Protoperidinium compressum

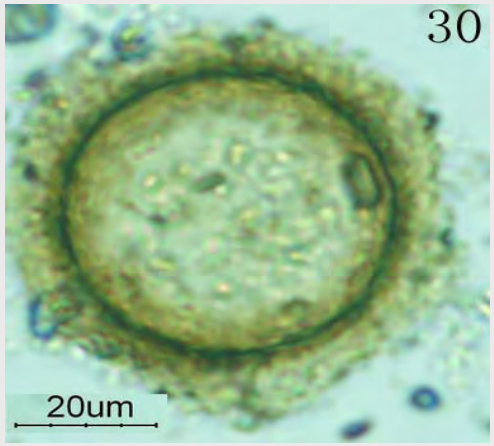


Protoperidinium pentagonum

Diplopsalis lenticula



Fragilidinium mexicanum



Unidentified species

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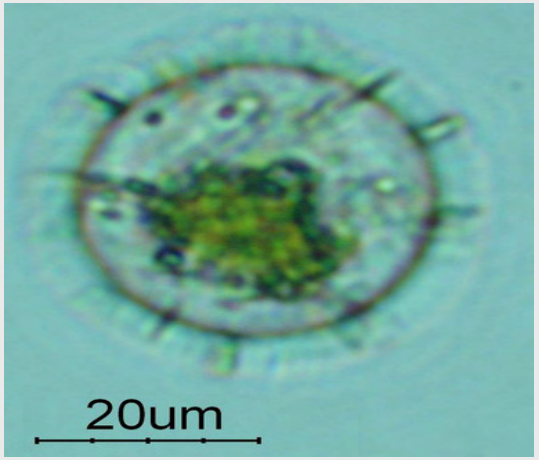

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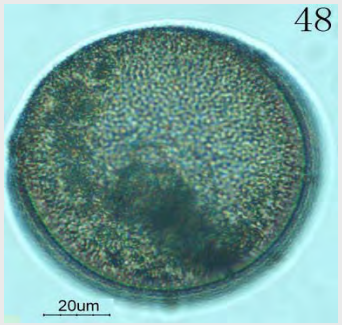
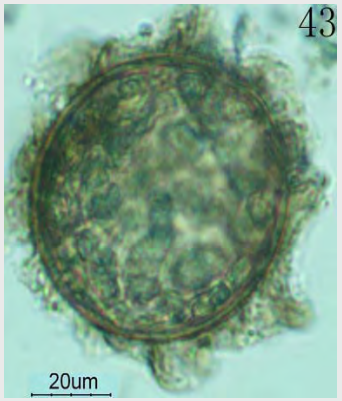
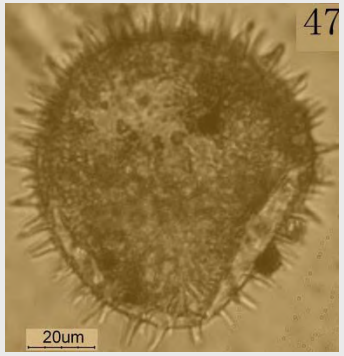
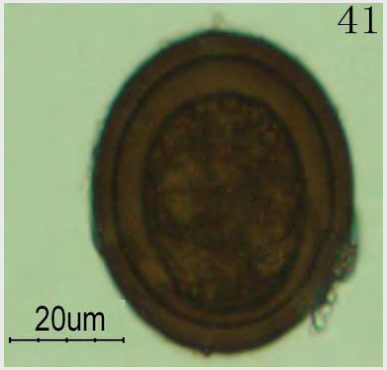
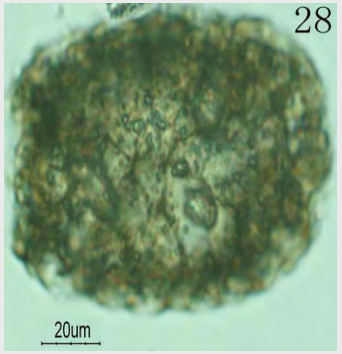








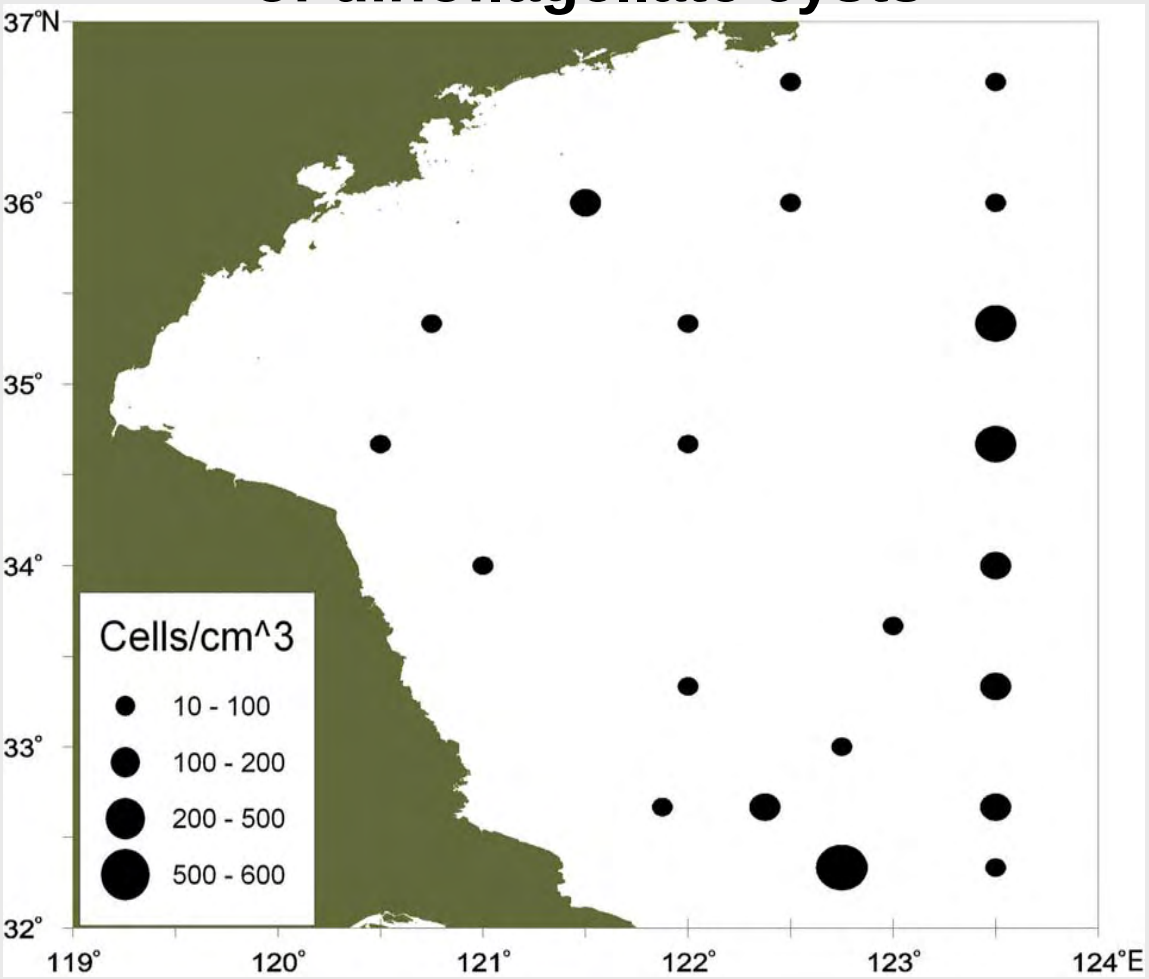


Unidentified species

2) Abundance and distribution of dinoflagellate cysts

- **Cyst density ranged from 10~519 cysts/cm^3 . The average is 107.68cysts/cm3, which is less than the East China Sea and South China Sea.**
- ***Scrippsiella trochoidea* dominated at whole surveyed area**

Distribution of abundance of dinoflagellate cysts



Distribution of cyst density showed that it is higher in the center and south of the surveyed area

Summary

- 39 dinoflagellate cysts is identified in the South Yellow Sea in Autumn, in which the quantity of autotrophic cysts is more than heterotrophic ones. ***Scrippsiella trochoidea*** cysts is widely distributed, and its abundance is also the highest, second dominant cysts are ***Alexandrium*** and ***Gonyarlax***
- The average abundance of dinoflagellate cysts is 107.68cysts/cm3, which is less than the East China Sea and South China Sea. The species and quantity increase from north to south, and from shallow water to deep water, which is especially high in the estuary of Changjiang river and the center of the Yellow Sea.
- The distribution of cysts is related to the sediment type and hydrodynamics. The sediment type of the south of the surveyed area is sandy, and the density of cysts is lower in this area. The reason is probably that the sandy sediment isn't suitable for dinoflagellate cysts, and the muddy sediment is suitable. The stable current also provide good condition for the sedimentation of cysts.

Thank you for your attention !