



Spatio-temporal distribution of nekton community structure and diversity change in Hangzhou Bay, CHINA

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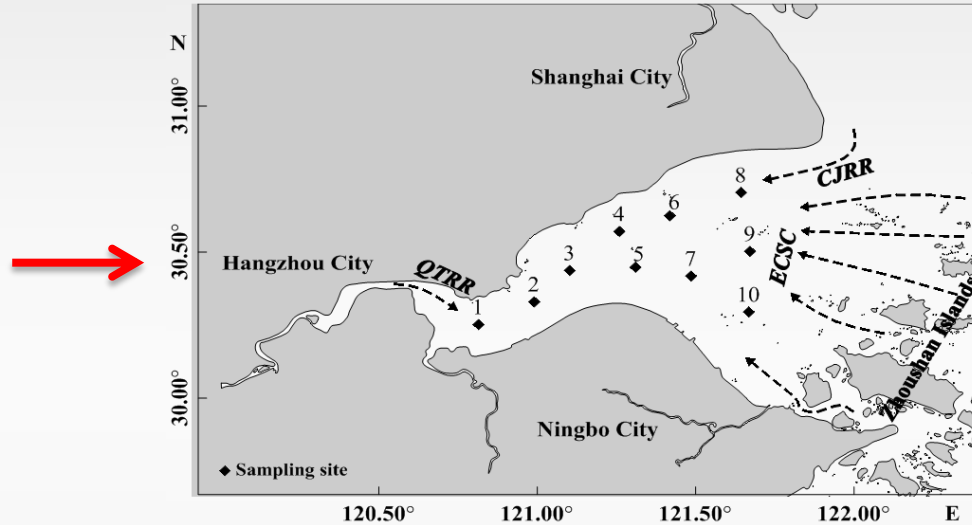
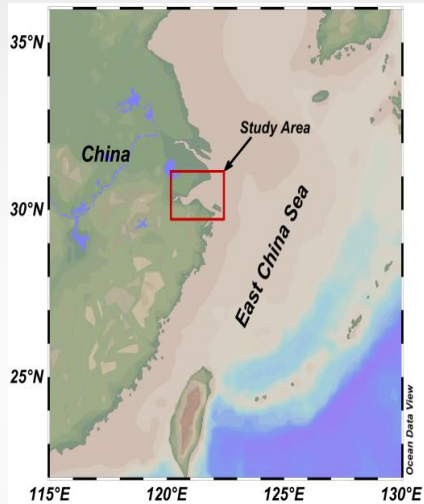


01 PART

Subject background



Subject background



Typical area

Hangzhou Bay

- (1) Estuarine bay (complexity salinity, high turbidity and well-mixed) is closely related to human life and productive activities as a unique ecosystem (Barbier et al., 2011);
- (2) Population dynamics and influence mechanism of nekton in the estuarine bay was seriously disturbed by human activities;
- (3) Estuarine bay waters serve as spawning, feeding and nursery grounds for fish larvae, juvenile and adult nekton (Nyitrai et al., 2012).

02 PART

Research object



Research object



Bait



Food organism



Estuarine nekton

High abundance and biomass of nekton
Complex spatial patterns of nekton

Rich sources of nutrients
Diverse habitats

03 PART

Research results



Research results-1

Nekton assemblages and composition

Eco-group	Species number				Mean Biomass				Mean Abundance			
	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter
Fish	20	15	21	16	108.52±67.68	41.04±27.00	90.99±104.07	136.61±215.36	8.10±11.51	10.61±6.22	13.83±8.35	4.03±3.29
Shrimp	8	11	7	5	8.38±6.68	39.93±26.77	35.48±24.06	2.64±2.27	17.30±14.19	55.12±36.01	80.58±67.27	5.03±3.29
Crab	3	5	5	4	14.55±9.38	2.33±2.77	9.54±10.56	3.93±3.75	2.21±1.85	0.42±0.36	1.55±1.43	0.18±0.11
Total	31	31	33	25	131.46±73.71	83.30±47.44	136.01±108.76	143.18±215.77	27.60±17.88	66.15±39.12	95.96±67.09	9.24±4.86

(1) 57 taxa distributed among 23 families

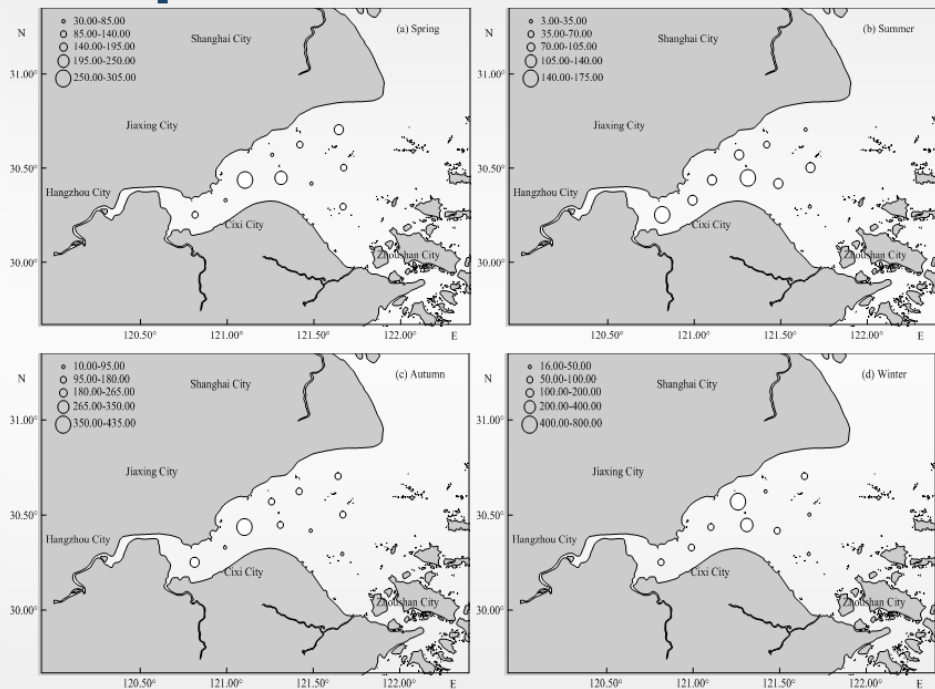
(2) Mean nekton biomass : Winter(fish) > Summer(shrimp)

(3) Mean nekton abundance: Warm seasons(summer, autumn) > cold seasons
(winter, spring)

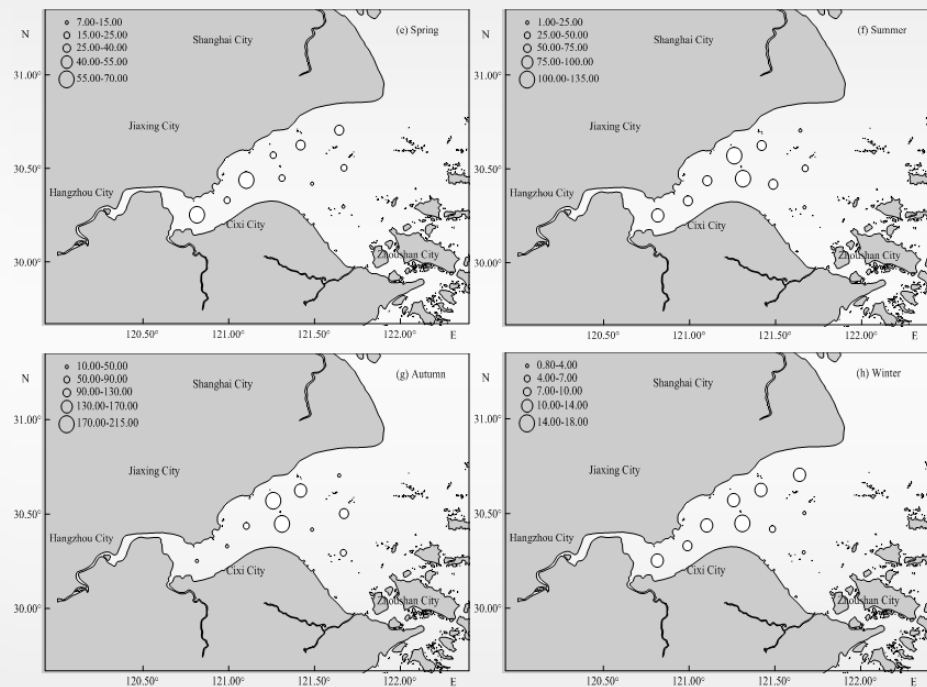
(4) Nekton of HZB were mainly composed of small near-shore species

Research results-2

Spatial distribution of nekton community



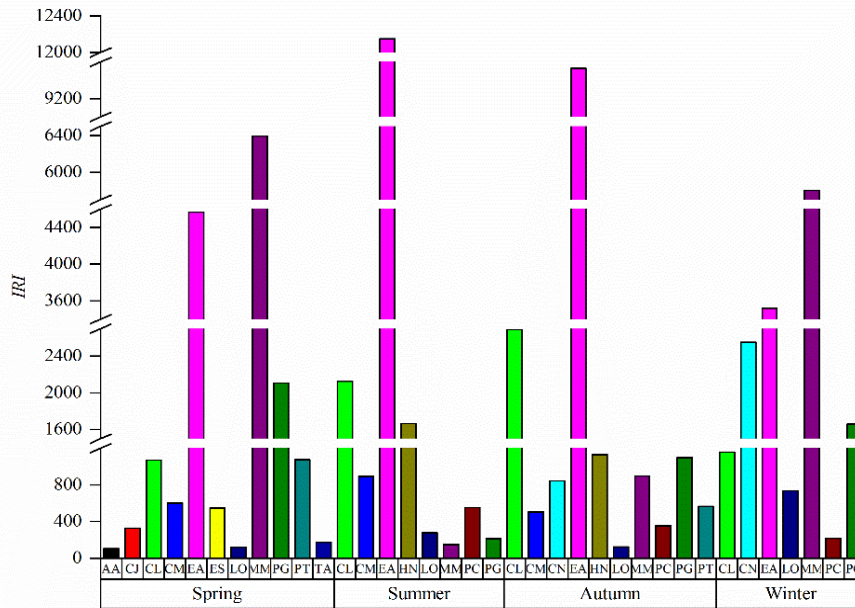
Spatial distribution of nekton biomass (kg/km²) in HZB



Spatial distribution of nekton abundance (×10³ ind./km²) in HZB

Research results-3

Dominant species of nekton



Dominant species ($IRI > 1000$) :

Fish: *Miichthys miiuy*,

Collichthys lucidus;

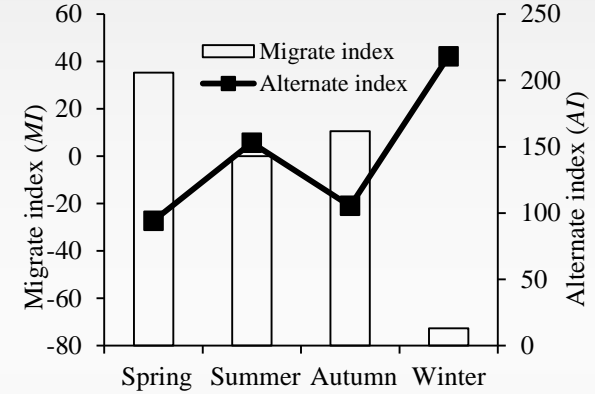
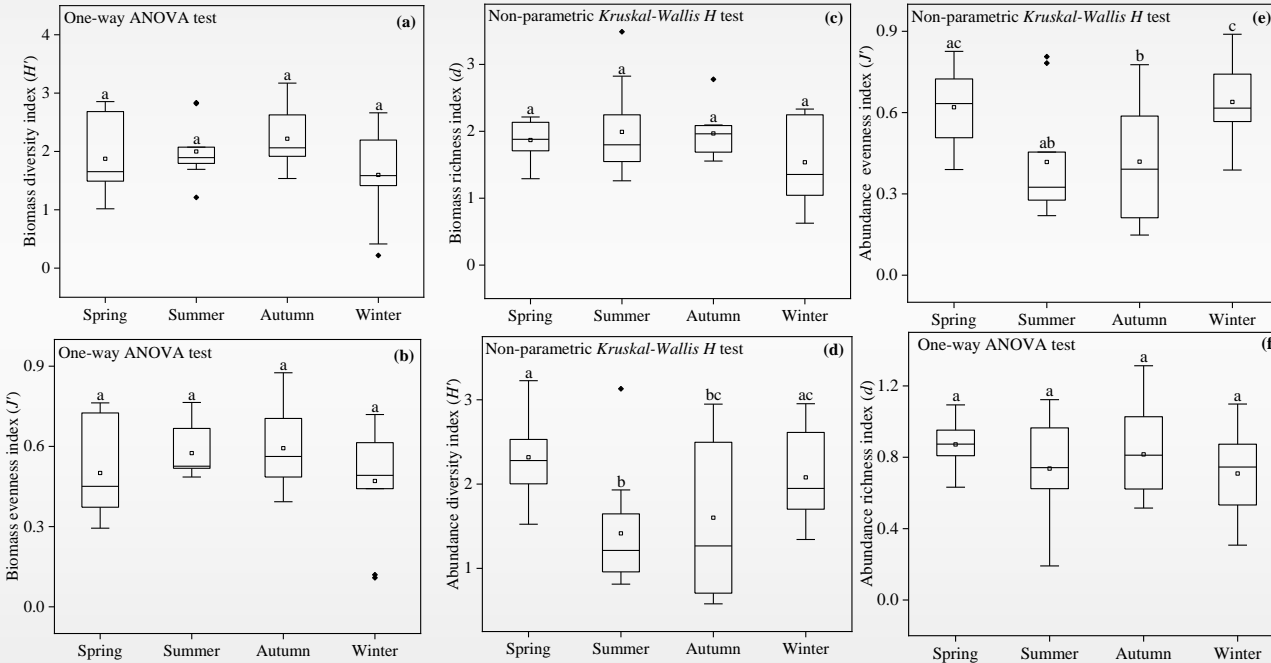
Shrimp: *Exopalaemon*

annandalei, *Palaemon gravieri*;

Crab : *Portunus trituberculatus*.

Research results-4

Nekton species diversity



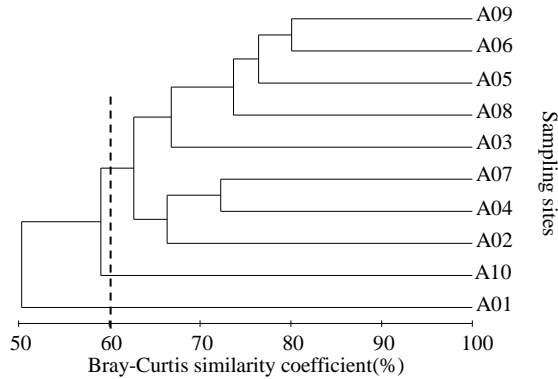
AI : 94 to 218
 MI : -73 to 35
 Large variation and unstable

Diversity index (H'), evenness index (J') and richness index (d):
 (i) Warm seasons > cold seasons (biomass);
 (ii) Opposite result (abundance in H' and J')

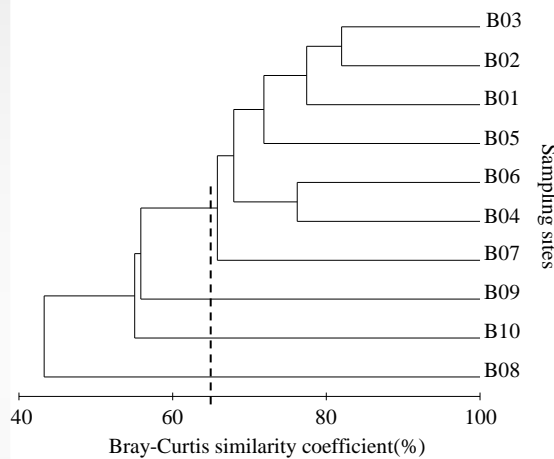
Research results-5

Seasonal differences of nekton community structure

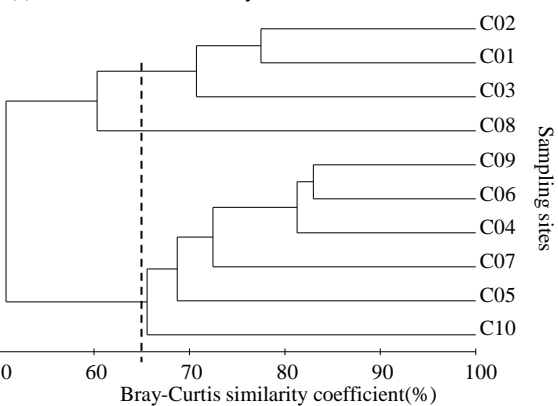
(a) Hierarchical cluster analysis of nekton biomass in spring



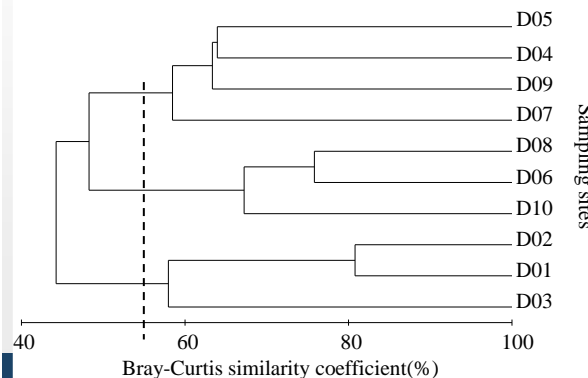
(b) Hierarchical cluster analysis of nekton biomass in summer



(c) Hierarchical cluster analysis of nekton biomass in autumn



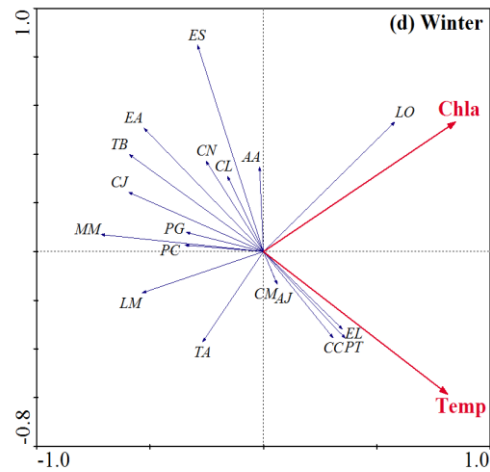
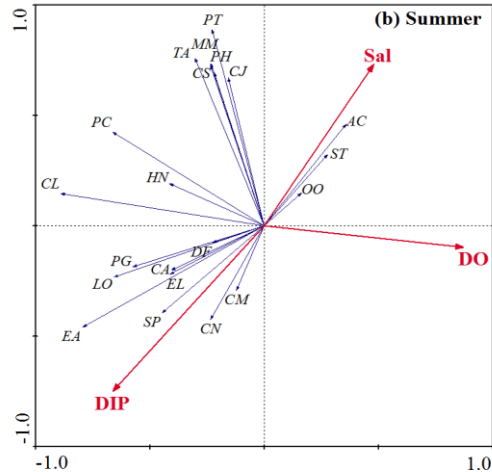
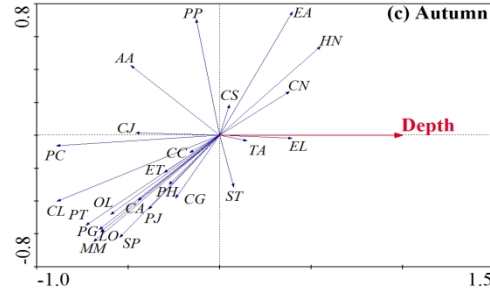
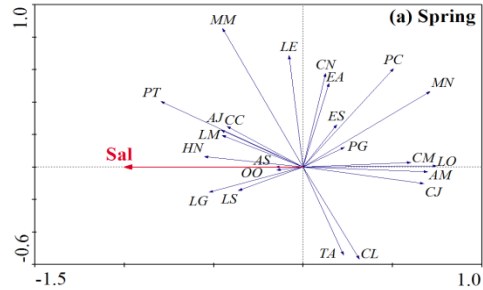
(d) Hierarchical cluster analysis of nekton biomass in winter



- (a) Spring : 3 groups(60%);
 - (b) Summer : 4 groups(65%);
 - (c) Autumn: 3 groups(65%);
 - (d) Winter: 3 groups(55%).
- ANOSIM analysis results :
difference between seasons
reached the significance level
(Global $R=0.616$, $P=0.0001$)

Research results-6

Relationship between nekton and environmental variables



Redundancy analysis (RDA):

- (a) negative correlated with salinity ;
- (b) DO and surface salinity positive correlated; negative correlated with DIP;
- (c) Depth showed a significant positive correlation;
- (d) Chla and surface temperature were highly positive correlated.

04 PART

Summary



Summary

- The community of nekton in Hangzhou Bay showed significant spatio-temporal variation
- With the index of H' , J' , d , AI , and MI , the community was not stable comfortably
- The community of nekton could be divided into 3~4 groups in the 55%~65% similarity levels in four seasons
- Physico-chemical factors were highly correlated with the nekton biomass



Thank you for
your attention !