University Consortium on Aquatic Sciences
水环境科学研究高校联盟

The 3rd Joint-Postgraduate Symposium

Aquatic Sciences: Current Research and Perspectives

April 11-14, 2011

The Kadoorie Institute - Shek Kong Centre
The University of Hong Kong
Shek Kong, Hong Kong

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- Bio-Rad Laboratories Inc.

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- Prof Gray Williams, Prof David Dudgeon, Prof Yvonne Sadovy, Dr Kenneth Leung, Dr Moriaki Yasuhara, Dr Nancy Karraker, Dr Vengatesen Thiyagarajan, Dr Clement Dumont, Dr Leszek Karczmarski, Dr David Thomson, Dr Nathalie Goodkin

Design of poster, handbook, name tag and symposium webpage

- Mr Kevin K. Y. Ho

Handbook edition

- Mr Ackley C. Lane

We are also grateful to Prof Rudolf Wu, Prof Gray Williams, Prof Minhan Dai, Dr Nancy Karraker, Dr Clemont Dumont, Dr Leszek Karczmarski, Dr Min Liu, Dr Qinhua Fang, Dr Liwu Wu, Dr Chungxiang Ai, Dr Yunwei Dong, Dr Dekui He, Ms Vera Shi, Ms Sylvia Yiu, Ms Cecily Law, Ms Heidi Kwong, Mr Kenneth Choy, Ms Helen Leung, Ms Maria Lo, Ms Lily Ng, Mr Albert Au, Mr Xoni Ma, Ms Cindy Yuen, Ms Pui Sze Li, Ms Bine Xue and Ms Jenny Cheung for their support and help in coordinating the symposium.

Programme

Day 1 Monday, 11 April 2011

8:00 - 9:00	**Breakfast**
9:00 - 9:40	**Registration**
9:40 - 10:20	**Opening ceremony**
10:20 - 10:40	**Activity briefing**
10:40 - 11:20	**Tea break**
	Sub-session 1
11:20 - 11:40	**Production dynamics of *Sulcospira hainanensis* (Gastropoda: Pachychilidae) and its ecological significance in Hong Kong streams** Alex C. Y. YEUNG
11:40 - 12:00	**Differential expression profile of membrane proteins in zebrafish (*Danio rerio*) brain exposed to methyl parathion** Qingyu HUANG
12:00 - 12:20	**Host defense against pathogenic bacteria in mud crab *Scylla paramamosain*** Rongyuan CHEN
12:20 - 12:40	**Population ecology of the giant spiny frog (*Quasipaa spinosa*) in Hong Kong** Ken H. K. CHAN
12:40 - 13:00	**Thermal tolerance of amphibians and their invasive predator in a polluted environment** Edward T. C. LAU
13:00 - 14:00	**Lunch**
14:00 - 14:40	**Guest speech:** **Sustainability, Seafood and Southern China** Prof Yvonne SADOVY

Day 1 (cont.) Monday, 11 April 2011

Sub-session 2

14:40 - 15:00	**Intra-reach heterogeneity of macroinvertebrate trophic origin in a tropical montane stream** Hiromi UNO
15:00 - 15:20	**Early-life history strategies of an endemic Tibetan fish, *Gymnocypris selincuoensis*** Chengzhi DING
15:20 - 15:40	**Hybridization between native barbless carp (*Cyprinus pellegrini*) and introduced common carp (*C. carpio*) in Xingyun Lake, China** Weixing TANG
15:40 - 16:20	**Tea break**

Sub-session 3

16:20 - 16:40	**River health assessment in a large river: bioindicators of fish population** Yintao JIA
16:40 - 17:00	**Study on food selection of the wild large yellow croaker, *Larimichthys crocea* (Richardson), in Guanjing Yang** Jiayi XU
17:00 - 17:20	**Temperature-dependent physiological responses of the marine medaka *Oryzias melastigma*** Adela J. LI
17:20 - 17:40	**Summary**
17:40 - 21:00	**Welcoming dinner**

Day 2 Tuesday, 12 April 2011

8:00 - 9:00	**Breakfast**
	Sub-session 4
9:00 - 9:20	**Nutrients inflection depth abnormal in South China Sea from CHOICE-C Cruise** Chuanjun DU
9:20 - 9:40	**The role of carbonic anhydrase in the regulation of phytoplankton photosynthesis and primary production in the northern South China Sea during the northeast monsoon season** Yuyuan XIE
9:40 - 10:00	**Preliminary results concerning denitrification in the Jiulong River Estuary** Jiezhong WU
10:00 - 10:20	**Numerical simulation research on hypoxia in the Pearl River Estuary in summer** Xuan ZHANG
10:20 - 11:00	**Tea break**
	Sub-session 5
11:00 - 11:20	**Distribution and efflux of dissolved nitrous oxide in a large eutrophic estuarine system: The Pearl River Estuary, China** Hua LIN
11:20 - 11:40	**Effect of eutrophication on growth rates of scleractinian corals from Hong Kong** Michelle I. LUK

Day 2 (cont.) Tuesday, 12 April 2011

Sub-session 5 (cont.)

11:40 - 12:00	**Direct and indirect effects of predation on rhynchocinetid (Caridea) shrimps** Nicolas C. ORY
12:00 - 12:20	**Responses of the black sea urchin *Tetrapygus niger* to its sea star predators *Heliaster helianthus* and *Meyenaster gelatinosus* under field conditions** Juan Diego URRIAGO
12:20 - 12:40	**Reproductive behaviour of mangrove littorinid snails: How do males successfully mate with females?** Terence P. T. NG
12:40 - 13:40	**Lunch**
13:40 - 17:20	**Eco-tour to Kadoorie Farm & Botanic Garden**
17:20 - 17:40	**Summary**
17:40 - 18:00	**Free activity**
18:00 - 19:00	**Dinner**
19:00 - 21:00	**Group discussion for debate**

Day 3 Wednesday, 13 April 2011

8:00 - 9:00	**Breakfast**
	Sub-session 6
9:00 - 9:20	**Abiotic degradation of 9 triazole pesticides in natural water under natural conditions** Shanshan LIN
9:20 - 9:40	**Heavy metal concentration in Deep Bay, Hong Kong** Kwok Chuen CHAU
9:40 - 10:00	**Study of the phytoplankton absorption dynamic of copper** Shirong WANG
10:00 - 10:20	**Are the marine whelks recovering in Iceland and Hong Kong after the global ban of organotin antifouling paints?** Kevin K. Y. HO
10:20 - 10:40	**Imposex and masculinization** Lei GU
10:40 - 11:20	**Tea break**
	Sub-session 7
11:20 - 11:40	**Larval growth and development of the commercial oyster *Crassostrea hongkongenesis* in high-CO_2** Dineshram RAMADOSS
11:40 - 12:00	**Biomineralization response to rising CO_2 by the calcareous tube worm, *Hydroides elegans*** Vera B. S. CHAN
12:00 - 12:20	**Application of the DNA marker technology for genetic analysis in crustacean** Hui ZENG

Day 3 (cont.) Wednesday, 13 April 2011

Sub-session 7 (cont.)

12:20 - 12:40	**Continuous measurements of CO_2 and CH_4 with a wavelength-scanned cavity ring-down spectroscopy instrument** Hongjie WANG
12:40 - 13:00	**An approach to the study of copepod egg banks based on efficient DNA extraction from individual copepod eggs** Zhihuan XU
13:00 - 14:00	**Lunch**
14:00 - 14:20	**Introduction to debate rules**
14:20 - 15:40	**Debate topic 1:** **Complete banning of shark fin import in China WILL / WILL NOT ease shark population declines.** **Debate topic 2:** **China SHOULD / SHOULD NOT encourage the mariculture industry to reduce fishing pressure in the South China Sea.**
15:40 - 16:20	**Tea break**
16:20 - 17:40	**Debate topic 3:** **Turtle jelly industry WILL / WILL NOT cause turtle decline in China.** **Debate topic 4:** **The present ban on exploiting resources from the Antarctic SHOULD / SHOULD NOT be maintained.**
17:40 - 18:00	**Summary**
18:00 - 19:00	**Dinner**
19:00 - 22:00	**Happy Hour**

Day 4 Thursday, 14 April 2011

8:00 - 9:00	**Breakfast**
	Sub-session 8
9:00 - 9:20	**The social behaviour dynamics of Indo-Pacific humpback dolphin (*Sousa chinensis*) in Taiwan** Weilun CHANG
9:20 - 9:40	**Dolphin watching in Hong Kong** Simon W. H. WONG
9:40 - 10:00	**Assessing ecological impacts of human activity in coastal area: using Chinese white dolphin (*Sousa chinensis*) as indicator species** Chunxiu HUANG
10:00 - 10:20	**Comprehensive evaluation on special marine protected resources of Fujian Province** Lu YANG
10:20 - 10:40	**An integrated environmental risk assessment and management framework for safeguarding marine protected areas** Elvis G. B. XU
10:40 - 11:20	**Tea break**
	Sub-session 9
11:20 - 11:40	**Environmental rehabilitation in a rapidly developing urban area of Xiamen, China – A review within the DPSIR model** Xiaoyin ZHANG
11:40 - 12:00	**Impacts assessment of marine reclamations on water quality in Fujian, China** Yifan ZHANG

Day 4 (cont.) Thursday, 14 April 2011

Sub-session 9 (cont.)

12:00 - 12:20	**Marine environment quality assessment in the regional seas** Chenlong HUANG
12:20 - 12:40	**Economic analysis of the main function selection – A case study on coastal main functional zoning of Xiamen Bay** Jingshan CAI
12:40 - 13:00	**Land-based pollution control measures in Xiamen, in perspective of marine environmental carrying capacity of Xiamen Bay** Samuel G. H. WANG
13:00 - 14:00	**Lunch**
14:00 - 18:00	**Eco-tour to Mai Po Nature Reserve**
18:00 - 18:30	**Closing ceremony**
18:30 - 22:00	**Farewell BBQ**

Abstracts

11:20-11:40
Mon, 11th Apr 2011

Production dynamics of *Sulcospira hainanensis* (Gastropoda: Pachychilidae) and its ecological significance in Hong Kong streams

***Alex C. Y. YEUNG, David DUDGEON**
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Most aquatic benthic insects are amphibiotic, spending their larval stages in water but adult stages on land. A significant proportion of their secondary production is exported to the terrestrial environment following adult emergence, and they are prey of riparian insectivores, hence affecting the distribution of birds, spiders, etc. However, the production of fully aquatic animals, such as *Sulcospira hainanensis*, the most abundant gastropod in Hong Kong hillstreams, stays in the aquatic environment. This study will determine whether the proportion of annual benthic production remaining in streams attributable to *S. hainanensis* is greater or less than the production by emerging insects. The results will have implications for the extent of land-water transfers of energy and nutrients along tropical streams, which has received little attention to date.

During the 1-year study, population-based cohort and non-cohort methods will be applied to estimate annual production of *Sulcospira hainanensis* in 4 streams with different riparian shading and different food base. The production estimates will also serve as an extended life table analysis, revealing population growth rate and life expectancy. A pilot study was conducted to determine site-specific sampling strategies, including appropriate sample size and sampling device. Results showed that around 20-25 samples taken by Surber samplers in each stream gave representative measures of population density and size-frequency distribution to estimate production.

Competition for algal food on stones of *Sulcospira hainanensis* with other benthic macroinvertebrates would be concurrently studied to determine the influence of this gastropod on benthic insects and algal standing crops in streams.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:40-12:00
Mon, 11th Apr 2011

Differential expression profile of membrane proteins in zebrafish (*Danio rerio*) brain exposed to methyl parathion

***Qingyu HUANG, Heqing HUANG**
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Methyl parathion (MP) is an organophosphorus pesticide used worldwide, and it has been associated with a wide spectrum of toxic effects on organisms in the environment. This study investigated the changes in protein profile of enriched membrane fraction from zebrafish (*Danio rerio*) brain exposed to three concentrations (0.5, 1 and 2 mg/L) of MP. Two-dimensional gel electrophoresis (2D-PAGE) revealed that the abundance of 21 protein spots was remarkably altered in response to MP exposure. By matrix-assisted laser desorption/ ionization time-of-flight mass spectrometry (MALDI-TOF MS/MS) and database searching, 16 proteins were identified as membrane proteins, among which 8 proteins were down-regulated, while 8 were up-regulated. Furthermore, the expression levels of differential membrane proteins were validated by Western blotting and quantitative real-time PCR. These proteins are mainly involved in oxidative stress response, signal transduction, metabolism, protein synthesis and degradation, neuroplasticity and regeneration as well as synaptic transmission. These results may aid our understanding of the mechanism of MP-induced neurotoxicity and provide the possibility of the establishment of candidate biomarkers of MP.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:00-12:20
Mon, 11th Apr 2011

Host defense against pathogenic bacteria in mud crab *Scylla paramamosain*

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Invertebrates including crab rely solely on multiple innate immune defenses to combat microbial infections. To identify the frontline defense molecules against microbial infection in the crab *Scylla paramamosain*, a live crab pathogenic microbe, *Vibrio parahaemolyticus*, was recruited as an affinity matrix to isolate innate immune factors from crab hemocytes lysate. Interestingly, a serine proteinase homolog (Sp-SPH) was obtained together with an antimicrobial peptide-antilipopolysaccharide factor (Sp-ALF). Furthermore, the Sp-SPH mRNA expression showed a statistically significant increase ($P < 0.05$) in both hemocyte and subcuticular epidermis at 24 h, and in gill at 96 h after challenge of *V. parahaemolyticus*. On the other side, recombinant Sp-ALFs also have been showed to have a strong antimicrobial activity against a wide range of bacteria including *V. parahaemolyticus*. These results implied that both the AMPs and a putative melanization pathway might work together in the bacterial killing and elimination in the crab.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:20-12:40
Mon, 11th Apr 2011

Population ecology of the giant spiny frog (*Quasipaa spinosa*) in Hong Kong

***Ken H. K. CHAN, Nancy E. KARRAKER**
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Global amphibian declines have received increasing conservation concern, with about 30% of amphibian species now listed by IUCN as threatened. A large proportion of the amphibian fauna in China (27%) are currently classified as extinct or threatened on IUCN Red List. However, China has only recently started conservation assessments for amphibians, with conservation efforts being impeded by the lack of baseline ecological information. Giant spiny frog (*Quasipaa spinosa*) is a large stream breeding frog that inhabits only moderate to high-elevation forest. It occurs mainly in south China with a small population into northern Vietnam. In China, despite its China Red List and IUCN Red list status as Vulnerable, *Q. spinosa* is frequently hunted for food. I studied populations of *Q. spinosa* in Hong Kong by mark-recapture method. Density of frog ranges between 25 – 40 individuals per 200 m stream. Movement by individual frogs is limited, implying the species is territorial. Diet study revealed that *Q. spinosa* prey on mostly terrestrial insects. *Q. spinosa* is among the top predators of the food web in the forest stream ecosystem. Research on *Q. spinosa* in mainland China has focused primarily on breeding techniques on captive populations. More research on population ecology is needed to establish baseline information essential for development of comprehensive conservation programs for the amphibians of China.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:40-13:00
Mon, 11th Apr 2011

Thermal tolerance of amphibians and their invasive predator in a polluted environment

***Edward T. C. LAU, Kenneth M. Y. LEUNG, Nancy E. KARRAKER**
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Amphibians play considerable ecological roles in both freshwater and terrestrial environments, acting as ecosystem engineers, keystone species, and linking energy and nutrient flow between aquatic and terrestrial habitats. Yet, drastic declines have been observed in many amphibian populations in recent decades and about one-third of all known amphibian species are threatened by extinction. Amphibians are generally considered sensitive indicators of environmental health, and recent declines may signal ailing ecosystems. Important threats to amphibian populations include habitat loss, invasive species, over-exploitation, pollution and climate change, and these threats may act together, either additively or synergistically. Yet, we still know very little about the role and magnitude of synergistic effects among these stressors. I will investigate the importance of and relationships among pollution, climate change and invasive species, on lowland wetland amphibians in Hong Kong. I will compare the lethal concentrations of several commonly used agricultural pesticides on the target amphibian and invasive species, and investigate whether synergistic effects of thermal stress and pesticides exist by measuring critical thermal limits, oxygen consumption, heat shock protein expression, growth and mortality. Information generated from this study will be useful in developing conservation measures to better protect local amphibian populations.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

14:40-15:00
Mon, 11th Apr 2011

Intra-reach heterogeneity of macroinvertebrate trophic origin in a tropical montane stream

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We investigated intra-reach-scale heterogeneity in autochthony of macroinvertebrate assemblages in a pristine montane stream in Borneo Island, Malaysia. Within a 300m at the altitude of 1600m, we set twelve sampling sites categorizing into four habitat types in relation to riffle-pool and canopy cover conditions; i.e., open-pool, open-riffle, close-pool and close riffle. With three replicates of each habitat, we quantitatively sampled macro invertebrates and their potential food sources, and measured their carbon and nitrogen stable isotope ratios. We estimated reliance on autochthonous sources for each taxon using a two-source isotope mixing model. Most invertebrates depended both on autochthonous and allochthonous sources, while a few invertebrates mostly depended on autochthonous sources. For most of taxa there were no spatial variation in their isotopic signatures among the habitats, whereas some scrapers showed habitat-specificity reflecting isotopic variation in epilithon among habitats. We estimated the autochthony of macroinvertebrate assemblages for each habitat, summing up autochthonous biomass of each taxon. The autochthony of assemblage was significantly higher in riffles than in pools, and in riffle high canopy openness raised the autochthony of benthic assemblages.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

15:00-15:20
Mon, 11th Apr 2011

Early-life history strategies of an endemic Tibetan fish, *Gymnocypris selincuoensis*

***Chengzhi DING, Yifeng CHEN, Dekui HE**
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Shizothoracine fishes are the only group with the family Cyprinidae adapted to the severe environment of the Qinghai-Tibetan, constitute a major component of the plateau fish fauna. The origin and evolution of Schizothoracinae fishes were related to the uplifting of the Qinghai-Tibetan Plateau, besides, they also plays a critical role in maintaining the balance of most lake and river ecosystems in Qinghai-Tibetan Plateau. However there is virtually no information on the early-life history of Schizothoracinae fishes. Selincuo Naked Carp (*Gymnocypris Selincuoensis*) was the only fish in Selincuo Lake, which is the largest lake in Tibetan Autonomous Area and lies on the North Tibetan Plateau (4530 m above sea level). In this study, larvae of Selincuo Naked Carp were discovered in three tributaries (Zagenzangbu River, ZGZB; Alizangbu River, ALZB; Boquzangbu River, BQZB) and an affiliated shallow lake (Dongquncuo Lake, DQC) of Selincuo Lake, samples were collected approximately every other week from May 27 to June 22, 2010. The vertical distribution of larvae was observed, yolk-soc larvae were concentrated in the bottom layers during daytime and late stage larvae were concentrated in the upper water layers during daytime. The age in days of larvae was estimated by daily growth increments, and then the hatching date of individuals was calculated. Hatching date of larvae were variation in different sampling spot, the larvae captured in ZGZB has the earliest hatching date ranged between 28 April to 20 May, and the larvae captured in ALZB has the latest hatching date ranged between 8 May to 1 June. Hatching date had a significant effect on larval growth rates, the earlier hatching cohort has higher growth rates (0.25 mm/day) and later hatching cohort has lower growth rates (0.089 mm/day). Variation of early-life history patterns (earlier hatching-higher growth rates and later hatching-lower growth rates) may adapt to different environmental conditions of habitats.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

15:20-15:40
Mon, 11th Apr 2011

Hybridization between native barbless carp (*Cyprinus pellegrini*) and introduced common carp (*C. carpio*) in Xingyun Lake, China

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Hybridization with introduced fish species is an important threat to native fish species. We documented a case of hybridization between native barbless carp (*Cyprinus pellegrini*) and introduced common carp (*C. carpio*) in Xingyun Lake of Yunnan-Guizhou plateau of China, using a detailed morphological analysis as well as genetic analysis of nine microsatellite loci for a contemporary Xingyun Lake sample and reference samples. Most individuals of the Xingyun Lake sample exhibited intermediate morphology, strongly suggesting extensive hybridization between barless carp and common carp. However, individual admixture coefficients based on microsatellite data exhibited a bimodal distribution in the Xingyun Lake sample, suggesting the existence of two different genetic groups of barbless carp and common carp. The individuals genetically assigned to barbless carp contained a significantly higher proportion of morphologically intermediate individuals than the ones genetically assigned to common carp, suggesting asymmetrical introgression between barbless carp and common carp, mainly towards the former.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

16:20-16:40
Mon, 11th Apr 2011

River health assessment in a large river: bioindicators of fish population

***Yintao JIA, Yefeng CHEN**
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Biological indicators for large river in China are poorly developed. This study evaluates the bioindicators of fish population approach in the upper Dongjiang River and Zengjiang River, which are major source of water for Guangdong Prov. (Guangzhou, Shenzhen and Dongguan city) and Hong Kong region. *Xenocypris davidi* and *Hemibarbus labeo* were selected as indicator species. Multiple Factor Analysis was used for estimating expected response to stress of 8 candidate metrics, and then metrics were screened with its stability and responsiveness. Finally, standard length, growth rate, average age and fecundity metrics were selected for *X. davidi*, and standard length, weight, growth rate, average age, and GSI metrics for *H. labeo*. Assessment results were obtained by comparing metric values with reference condition. To ensure validity of the assessment results, we compared with the results of human disturbance. The major changes in the river condition, for example, nutrient increased, disturbance caused population decreases or recruitment failed, water pollution, were consistent with environmental changes caused by human disturbance. The validated results showed our method was suitable for assessing the river health of upper Dongjiang River and Zengjiang River.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

16:40-17:00
Mon, 11th Apr 2011

Study on food selection of the wild large yellow croaker, *Larimichthys crocea* (Richardson), in Guanjing Yang

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To clarify the dietary composition of the wild large yellow croaker (*Larimichthys crocea*), 579 specimens, collected in the waters of Guanjing Yang, Fujian province, during June 2010, were examined for stomach contents. Parameters such as occurrence frequency (*F*%), individual number (*N*%), weight percentage (*W*%) and index of relative importance (*IRI*) were adopted in the study. Food list was compared with zooplankton component and nektonic organism of water area near the sampling areas. It is indicated that as many as 32 species occurred in the diet, and the wild large yellow croaker mainly preys on decapoda, fishes, euphausiacea, mysidacea, amphipoda, crabs, copepoda and Stomatopoda. Decapoda (%*IRI*=55.97%) and fish (%*IRI*=26.61%) were found to be the most important prey groups in the diet. Euphausiacea (%*IRI*=10.01%) and mysidacea (%*IRI*=3.2%) constituted the second most important prey groups. *Leptochela gracilis* (*IRI*=976.10,%*IRI*=59.80%) and *Pseudeuphausia sinica* (*IRI*=505.27, % *IRI*=30.95%), were the most important species as preys. So the wild large yellow croaker is omnivorous, mainly feeding on decapoda, fishes, and macro zooplankton. The trophic level of the wild large yellow croaker is lower than nektonic-animal feeders but higher than planktonic-animal feeders. The dominant species of the zooplankton component in the water area was copepoda mainly including *Acartia pacifica* (*Y*=0.14), *Labidocera bipinnata* (*Y*=0.09), *Calanus sinicus* (*Y*=0.06), *et al*. The percentage of mean abundance of euphausiacea and mysidacea was 0.83% in total. Decapoda was the most abundant group which is trapped in the water area. Fish and crabs were the second major groups for nektonic organism in the Guanjing Yang area. Presumably the wild large yellow croaker presents a prominent selectivity for food. It prefers decapoda in small size, fish larva, euphausiacea and mysidacea to other groups. This selection is aimed to swallow species of appropriate size. Information on the feeding habit and food selection of the wild large yellow croaker was limited. Therefore, it is necessary to update the statistics about the feeding habit of the wild large yellow croaker and improve a further research.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

17:00-17:20
Mon, 11th Apr 2011

Temperature-dependent physiological responses of the marine medaka *Oryzias melastigma*

***Adela J. LI, Priscilla T. Y. LEUNG, Kenneth M. Y. LEUNG**
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According to the latest report of Intergovernmental Panel on Climate Change (IPCC), there will be increasing incidence of extreme temperature events worldwide due to the anthropogenically driven climate change. Most aquatic animals are ectothermic and their metabolism is highly temperature-dependent. This study aims to gain better understanding on the effects of temperature on the marine medaka fish *Oryzias melastigma* through measurement of oxygen consumption rate (OCR) and heat shock proteins (HSPs) expression. Thermal acclimation was conducted by increasing or decreasing temperature at the rate of 1°C/10 min and 2°C/day in a stepwise manner. The results showed that OCR was relative low from 26 to 30 °C and gradually increased and peaked around 24°C and 36-39°C. Their OCR reduced when the temperature was further increased or decreased. At the thermal extremes, the fish might have switched to anaerobic respiration for compensating the mismatched energy demand. Also, a significant up-regulation was recorded at 10, 32 and 38°C for HSP 70 and at 38°C only for HSP 90. The over expression of these molecular chaperones represents a stress response to protecting the cellular structure and function at the thermal extremes. It is deduced that overall energy reserve will be depleted at such stressful conditions because the animal needs energy to synthesize functional proteins such as HSPs. More information will be given on the expression of HSP 20 and lactate dehydrogenase to further elucidate the thermal stress response of the fish.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:00-9:20
Tue, 12th Apr 2011

Nutrients inflection depth abnormal in South China Sea from CHOICE-C Cruise

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In South China Sea, the inflection depth of nutrients normally is between 50-70m, a little deeper than the mixed layer depth. I analyzed the data of the CHOICE-C winter cruise, two stations of the S4 section which near the Luzon strait, the inflection depth of the nutrients is more than 150m. What controls the distribution like this? In the figure of horizontal distribution of the temperature and salinity, we can clearly see there is a high temperature and salinity water exists in the S4 section. The result from the satellite is agreed with the horizontal distribution of the temperature and salinity, there exist a high seawater transparency and low chlorophyll region. I analyzed the T-S diagram, the character of the water is more close to the kuroshio water, so I summarize it maybe the intrusion of the kuroshio water, and there is a warm eddy exist and I primarily explain the potential influence on the biogeochemistry.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:20-9:40
Tue, 12th Apr 2011

The role of carbonic anhydrase in the regulation of phytoplankton photosynthesis and primary production in the northern South China Sea during the northeast monsoon season

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The carbonic anhydrase (CA) is considered as an important enzyme in the process of primary production of phytoplankton. We present the results of a field study in the northern South China Sea (NSCS) during the northeast monsoon season (2010 Nov.). The enzyme activity of CA was investigated through the effect of the specific CA inhibitors acetazolamide (AZ) and ethoxyzolamide (EZ) on the P-I curve parameters. The results showed two patterns: (1) in the regions of coastal water, the inhibitor EZ mainly affects the initial slope (α) of P-I curve to reduce the photosynthetic rate (~50% inhibition when $\alpha > 0.03$); (2) in the regions of deep water, the inhibitor EZ caused more severe photo-inhibition in the high irradiance levels the phytoplankton was exposed to in the sea surface. And the effect of inhibitor AZ showed more variability within different regions and size-fractions. The results revealed that the different roles of CA depending on the diversity of phytoplankton assemblage structure. Through the comparison with the data we got in other seasons, we considered that the reduction of photo-inhibition by the together effect of higher intracellular CA activity and deeper mixing layer depths was the important factors for the higher primary production in the northeast monsoon season than in the southwest monsoon season in the NSCS basin.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:40-10:00
Tue, 12th Apr 2011

Preliminary results concerning denitrification in the Jiulong River Estuary

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Water samples from 17 sites along the Jiulong River Estuary continuum were collected in summer (July, 2010) and winter (January, 2011). As end-products of denitrification, dissolved N_2 was measured by N_2:Ar method using MIMS (HPR-40), while the concentration of nitrous oxide dissolved in water was determined by Purge and Trap-Gas Chromatography. The result showed a significant spatial variance of net increase of dissolved N_2 (ranging between -28.8 and 66.8 μmol L^{-1}) and nitrous oxide (ranging between 4.3 and 102.8 nmol L^{-1}, average 2.7‰ of total end-products) in the Jiulong River Estuary. The net increase of dissolved N_2 and N_2O decreased gradually from river sites to sea sites. Dissolved nitrous oxide was supersaturated by 170%-1063% in all studied sites. The air-sea fluxes of N_2 ranged between -17.6 and 53.2 mmol m^{-2} d^{-1}, and N_2O ranged between 5.2 and 70.4 μmol m^{-2} d^{-1}. The result indicated that water temperature was a key factor influencing denitrification rate. Denitrification rate and its spatial pattern is mainly controlled by nitrate level in river sites but by salinity gradient due to tidal mixing in sea sites.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

10:00-10:20
Tue, 12th Apr 2011

Numerical simulation research on hypoxia in the Pearl River Estuary in summer

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With the fast growing of economy and industrialization, large amounts of domestic sewage and industrial waste water is dumped into Pearl River Estuary, leading to water quality declination and water oxygen depletion. Usually waterbody with dissolved oxygen less than 4mg/l is considered as hypoxia. Hypoxia has been severely affected the ecosystem balance of the water with the direct detriment of the death of aquatic lives.
Hypoxia phenomenon has been frequently reported in the west side of the Pearl River Estuary in summer, where the water depth is shallow. Besides, it has been also observed in the watercourse up to Guangzhou in winter. Due to the intrusion of sea water, the salinity near Humen outlet can reach to 5-10psu sometimes. In this study, mainly focused on summer, a three-dimensional ecological model was used to study this hypoxia phenomenon in the bottom of Pearl River Estuary. The results show that dominating reasons resulting to this phenomenon are the salt-front and the oxygen-consumption organic materials decomposition in the bottom of the water, which is primarily derived from rivers. Strong tidal processes and disturbing wind can weaken the hypoxia formation by enhancing the vertical mixing. As one of the main nutrients that engages in the circulation of the ecosystem, the increased phosphate load from rivers boosts chlorophyll growth on the continental shelf outside the Estuary, decreases the N/P ratio to 16. But suitable hydrodynamic conditions are also necessary if red tide happens, which can induces the hypoxia.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:00-11:20
Tue, 12th Apr 2011

Distribution and efflux of dissolved nitrous oxide in a large eutrophic estuarine system: The Pearl River Estuary, China

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Dissolved Nitrous oxide (N_2O) is an important greenhouse gas, playing a significant role in the global climate system. The world ocean is believed to be a net natural source of atmospheric N_2O, among which the estuaries are estimated to account for approximately 60% of total marine N_2O emissions. In this presentation, we examined the spatial distribution and seasonal variations of N_2O in a large perturbed estuary, the Pearl River Estuary (PRE), based on six cruises covering primarily a wet and dry seasonal cycle.

In the PRE, the entire estuary was always supersaturated with N_2O during our survey seasons. Concentrations of N_2O ranged from 246 nmol kg^{-1} (42 times supersaturated) in the O_2-depleted upper estuary, down to about 7 nmol kg^{-1} (slight supersaturated) at the mouth of the estuary. The distribution of N_2O showed coherent relationships with the distribution patterns of ammonium, oxygen, nitrate and nitrification activity. On the basis of a seasonal and zonal distribution of N_2O, the annual water-air N_2O emission from the PRE was estimated to be ~3.7×10^7 mol, which is account for approximately 30% of CO_2 emission in the PRE converting to equivalent greenhouse effect.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:20-11:40
Tue, 12th Apr 2011

Effect of eutrophication on growth rates of scleractinian corals from Hong Kong

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Scleractinian corals are the key contributors to coral reef formation. Therefore, its health is of high ecological concern. Nutrient enrichment has long been considered one of the major causes of coral reef degradation around the world, where high levels of nutrients lead to rapid growth of macroalgae and benthic filter-feeders, such as sponges and bryozoans, which would outcompete corals for space, in turn affecting coral larval settlement and recruitment. Eutrophication may also increase the growth of faster-growing macroalgae, resulting in shading of the corals and consequent reduction of photosynthesis by their endosymbiotic zooxanthellae. However, recent *in situ* studies suggest that nutrient enrichment from fish farms can actually enhance the growth and reproductive potential of scleractinian corals in nearby areas. In Hong Kong, wastewater discharge from the Pearl River Estuary is a major reason for relatively high and increasing nutrient levels. Local fish farms may also be another source of nutrients to coral areas. HKSAR government data show an increase in nitrogen levels (i.e. nitrate) over the past two decades. At present, the effect of high nutrient levels on growth rates of local scleractinian corals is not known, since it would depend on the proportion of autotrophy versus heterotrophy of local corals, which has not yet been determined. This study will establish the mode of nutrition of selected coral species, and thus investigate whether elevated nutrient levels will promote or be detrimental to coral growth rates.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:40-12:00
Tue, 12th Apr 2011

Direct and indirect effects of predation on rhynchocinetid (Caridea) shrimps

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The loss of apex-predators can disrupt the whole structure of food webs. Predicting the intensity and the direction of such changes remains challenging for ecologists; it requires to comprehend the key mechanisms regulating predator-prey interactions. Predators can directly affect their prey by killing them (lethal effects) or indirectly by inducing behavioural and morphological responses from the prey (risk effects). Although risk effects can be strong, they have often been neglected in predator-prey models.
I examined the relationship between the rock shrimp *Rhynchocinetes typus* and predatory fishes along the north-central rocky shore of Chile during the summer 2010-11. A field survey revealed that fish and shrimp abundances were negatively associated. Tethering experiments indicated a positive relationship between fish abundance and relative predation intensity on shrimp. Body-size distributions of shrimp were skewed toward larger individuals at sites where predation was lower. These results, supported by a large proportion of large *R. typus* found in fish stomachs, may indicate a higher intensity of predation on large individuals. *In situ* boldness experiments pointed out that shrimp remain cryptic at sites with a high predation intensity, which suggests an individual plasticity in risk-taking behaviours.
This study provides for the first time descriptive and empirical evidences in the field of direct and indirect effects of predation on the dynamics of *Rhynchocinetes typus* populations. These results are valuable to better understand the ecological role of these shrimp as prey of subtidal food webs.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:00-12:20
Tue, 12th Apr 2011

Responses of the black sea urchin *Tetrapygus niger* to its sea star predators *Heliaster helianthus* and *Meyenaster gelatinosus* under field conditions

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We ran field experiments under wave conditions (in the subtidal zone in Chile) to examine responses of the sea urchin *Tetrapygus niger* to predatory seastars. Trials involving simulated attacks showed that the urchin differentiated between predatory and non-predatory seastars. We compared the urchin's responses to different threat levels presented by the two predatory seastars, *Heliaster helianthus* and *Meyenaster gelatinosus*, first simulated attack, then mere contact, and subsequently seastars placed at different distances from the urchin. In trials with both seastars, 100% responded to stimulated attacks and contact. The proportion decreased with distance and more rapidly in the trials with *H. helianthus* (0 % at 30 cm) than with *M. gelatinosus* (33 % at 50 cm). Urchins generally responded more rapidly to *M. gelatinosus*. When a seastar was added to circular areas where undisturbed urchins were present, urchins fled more rapidly in trials with *M. gelatinosus* than with *H. helianthus*. Our observations suggest that *M. gelatinosus* represents a stronger predatory threat than *H. helianthus* and this corresponds to field observations showing that urchins are more frequently consumed by *M. gelatinosus*. These are the first experiments demonstrating distance chemodetection by marine invertebrates under wave conditions.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:20-12:40
Tue, 12th Apr 2011

Reproductive behaviour of mangrove littorinid snails: How do males successfully mate with females?

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Diverse reproductive behaviours in animals are developed to increase individual fitness. Some behavioural traits are selected to overcome environmental constraints, whereas others are evolved through sexual selection to maximize reproductive success. Most littorinid snails in the genus *Littoraria* inhabit mangrove trees in the Indo-Pacific region. Searching for mates within the complex 3-dimensional habitat of tree leaves, branches and trunks would appear a difficult task for these snails. Field studies of two co-occurring species in Hong Kong, *Littoraria ardouiniana* and *L. melanostoma*, however, showed that these species can successfully locate mates as over 90% of mating pairs were 'true' pairs (a male mating with a conspecific female). This success is achieved through males of both species following mucus trails to locate conspecific females during the mating season. In both species, males were also capable of detecting the direction (polarity) of the trails of conspecific females. "Fighting" behaviour, which involves two males aggressively pushing each other when they encounter a female, was also observed in *L. ardouiniana* but not in *L. melanostoma*. Such aggressive behaviour during mate acquisition can be attributed to the male-biased sex ratio in natural populations of *L. ardouiniana*, which may drive competition for mates amongst males.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:00-9:20
Wed, 13th Apr 2011

Abiotic degradation of 9 triazole pesticides in natural water under natural conditions

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Triazole pesticides enter aquatic environments through deposition, surface runoff etc. and pose impacts on aquatic organisms and aquatic ecosystem. In this study, the abiotic degradation (hydrolysis and photolysis) of 9 triazole pesticides (triadimefon, paclobutrazol, hexaconazole, uniconazole, myclobutanil, flusilazol, propiconazol, tebuconazole, difenoconazole) in river water and sea water under outdoor conditions were investigated.
Results showed that hydrolysis and photolysis processes of 9 target pesticides in different water matrixes accorded with first-order kinetics equation. Hydrolysis half-lives of 9 target pesticides in ultra-pure water, river water and seawater were 239.0~630.0 d, 68.6~87.7 d, 117.5~210.0 d, respectively, while photolysis half-lives ranged within 8.8~26.3 d, 10.6~41.5 d, 15.6~577.5 d, respectively. pH mainly affected hydrolysis rates. The expression was the higher pH lead to the shorter half-lives. Both direct and indirect photolysis simultaneously happened for 9 target pesticides, but direct photolysis was found dominant for triadimefon and uniconazole. Particulate and/or dissolved organic matter (DOM) in seawater showed stronger promotion effect on degradation rate than in river water, whereas inorganic ions greatly slowed degradation rates. The degradation mechanism of trazole pesticides deserved further study.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:20-9:40
Wed, 13th Apr 2011

Heavy metal concentration in Deep Bay, Hong Kong

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Deep Bay (22° 30’ N, 114° 00’ E) is situated at the northeastern part of Hong Kong, at which the brackish water from the Pearl River Estuary meets and interacts with fresh water from the Shenzhen, Shan Pui and Kam Tin River, constructing an ecosystem with high bio-diversity and complexity. Estuarine environments are known to be impacted by the deposition and accumulation of heavy metals, including cadmium (Cd), cobalt (Co), copper (Cu), nickel (Ni), lead (Pb) and zinc (Zn). These physical processes could lead to large scale environmental impacts to the natural ecosystem in Deep Bay.

In the last three decades, new town developments in Hong Kong as well as economic and industrial development in Guangzhou have increased the supply of heavy metals, and thus the quality of the river water and sediment in Deep Bay are deteriorating. A detailed study of accumulation as well as sources of heavy metal concentration is required to address the extent of ecological risk imposed by the anthropogenic activities.

In this research, two 3m cores will be collected from the mudflat in Deep Bay. The change of heavy metal concentrations including the atmospheric deposition of Pb in the last 100 years will be examined by the application of ICP-AES and ICP-MS, respectively, so as to assess the quality of sediment and provide information for further eco-toxicological studies in Deep Bay.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:40-10:00
Wed, 13th Apr 2011

Study of the phytoplankton absorption dynamic of copper

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Though copper is a heavy metal, it's one of the most important trace elements which has a significant influence on phytoplankton's activity and productivity. Proper concentration of copper would contribute to the growth of phytoplankton, otherwise it would inhibit them. With the development of the economy, however, so much waste water is poured directly into the ocean. Thus concentration of copper is gradually increasing, which in turn is impacting humans in a negative way. The studies on the concentration and distribution of copper ion and the influence of copper on phytoplankton have developed gradually. But the research based on the absorption dynamic of copper of the phytoplankton is quite rare.
So the work is to find the model which accommodates various types of phytoplankton. Firstly, Choose one kind of algae as the working object, let the algae live in the surroundings of the different concentration of copper ion. Discover the relationship between the concentration and set up a model to describe the growth with time. Then do a series of checkout and modification so that it can fit all varying circumstances. Secondly, choose other two algae's, in which the sizes are quite different with the first one and do the similar steps of the first one. Finally, use the model which is established to follow up, if it can fit other algae's. If the model doesn't fit some algae's, modify the constant until the model fit all the algae's.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

10:00-10:20
Wed, 13th Apr 2011

Are the marine whelks recovering in Iceland and Hong Kong after the global ban of organotin antifouling paints?

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Organotins (OTs), in particular tributyltin and triphenyltin (TPT), have been widely used as effective biocides in antifouling paints on ship hulls and fish farm net cages since 1960s. However, they are highly toxic leading to widespread adverse effects on marine organisms such as induction of imposex (growth of penis and vas deferens on females) in over 200 species of neogastropods. A mandatory global ban of the use of OT-based antifoulants has been enacted since September 2009. It is, therefore, anticipated to observe a reduction of OT pollution in the marine waters worldwide. We have recently examined imposex status and measured tissue concentrations of various OTs in the dogwhelk *Nucella lapillus* collected along the Icelandic coast and revealed some degree of recovery. Since 1994, the imposex status and tissue organotin levels of the whelk *Thais clavigera* have been systematically monitored at a number of coastal sites in Hong Kong. In the recent survey, we not only measured both imposex indices and quantified the tissue concentrations of various OTs in the whelk, but also studied their population dynamics (e.g. succession and population growth) in several locations in order to address whether or not OT pollution actually declined with measurable recovery following the global ban. Unfortunately, our preliminary results showed a very high TPT concentration in *T. clavigera* with high incidence of imposex, indicating a continuous threat of OT contamination in Hong Kong waters. Currently we are trying to identify the sources of TPT pollution and reveal its environmental fate for more accurate ecological risk assessment.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

10:20-10:40
Wed, 13th Apr 2011

Imposex and masculinization

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TBT is a kind of known endocrine disruptor, especially for resulting in the imposex in gastropods, but it is reported in some literature that it would result in masculinize. So we take the developing female *Haliotis diversicolor* in the period of early sexual development of gastropoda Prosobranchia as subjects, respectively pollute them, and determine the imposex level. Under the normal physiological conditions, the gonadal hormone level of *Haliotis diversicolor* changes as the reproductive periods, in control group, two of the gonad T and E2 levels are increased firstly and then decreased, the E2 level in hemolymph liquid is decreased firstly and then increased, but the ratio of T/E2 in sex gland keeps the same basically. The effect of TBT exposure on the level of sex gland T in *Haliotis diversicolor* is mainly embodied in late inducement by medium and high concentration pollution; for the low concentration group, the level of sex gland E2 is inhabited at the end of pollution period, for the medium concentration group, it is induced at the middle of pollution period, and for the high concentration group, it is inhibited all of the periods. From the view of histology, by electron microscope observation, large of the residuals are the residuals of brain yellow protein and the masculinize phenomena does not occur.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:20-11:40
Wed, 13th Apr 2011

Larval growth and development of the commercial oyster *Crassostrea hongkongenesis* in high-CO_2

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Oysters are one of the commercially exploited shellfishes around the world for seafood. Due to rising CO_2 and subsequent decrease in seawater pH, their survival and shell forming processes are threatened globally. Among various life stages, the survival of the early-larval stages of oysters, amidst changes in fluctuating estuary conditions along with ocean acidification effects, gains more attention to its sustainability in aquaculture. In this study, the effects of chronic exposure levels to CO_2 concentrations of current atmospheric levels, pH8.2 and predicted future levels from pH 7.9 to pH 7.6 was examined to predict the potential impact of climate change on oyster aquaculture in South China. Larval responses such as survival, and larval shell growth, were monitored in response to the exposure conditions. Our results suggest that oyster larvae succumb to chronic exposure level by showing delayed growth. This slow growth or prolonged pelagic phase would expose them to predation in the open ocean waters and reduced settlement, yielding less spats will have a huge impact on oyster population and their aquaculture. Our future studies will look at mechanisms responsible for such slow growth response associated with ocean acidification stress with the use of proteomics.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:40-12:00
Wed, 13th Apr 2011

Biomineralization response to rising CO_2 by the calcareous tube worm, *Hydroides elegans*

***Vera B. S. CHAN[1], Y.C. WANG[2], Y.Q. CHAU[2], K. SHIH[2], T. ZHANG[2] and V. THIYAGARAJAN[1]**

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Marine invertebrates actively incorporate calcium and carbonate ions from seawater to build their calcium carbonate ($CaCO_3$) skeletons through highly regulated biomineralization processes. The process has been shown to be exogenously influenced by seawater carbonate chemistry. Recently, rising anthropogenic CO_2 have resulted in a directional shift in seawater carbonate chemistry regime, reducing the availability of carbonate ions and pH. This anticipated climate change scenario of undersaturated and acidified environment may ultimately hinder calcification of many calcareous species.

The biofouling polycheate worm, *Hydroides elegans*, builds a bimineralic calcareous tube with ~70% calcite and ~30% aragonite in the adult shell. This study investigates the effect of elevated CO_2 partial pressure (pCO_2) on the calcareous tube of *Hydroides elegans* after metamorphosis: different levels of CO_2 enriched seawater were maintained to resemble different projected levels of pCO_2. Since aragonite is observed to be 35% more soluble in normal seawater than calcite, we predict the presence of more CO_2 in seawater could severely impact aragonite microstructures.

In this study, one day old trochophore larvae were obtained by artificial spawning of 19 males and 20 females, and were subjected to the four levels of pH for six-day-culture until competency. Competent larvae were chemically induced to settle and were further grown for seven days. The effects of increased pCO_2 on the rate of shell deposition, composition of calcite and aragonite, ultrastructure and mechanical properties will be discussed during the presentation.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:00-12:20
Wed, 13th Apr 2011

Application of the DNA marker technology for genetic analysis in crustacean

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This report introduces the definition and history of the development of DNA molecular markers technology. Several DNA molecular markers' technology such as restriction fragment length polymorphism (RFLP), random amplified polymorphic DNA (RAPD), simple sequence repeats (SSR), amplified fragment length polymorphisms (AFLP), single nucleotide polymorphisms (SNPs) etc. were described in detail. Then its application in crustacean, including the basic principle, advantages and disadvantages of the techniques especially their application for the identification of genetic diversity were briefly reviewed. Finally, the problem existing in the application of DNA molecular markers in crustacean were briefly discussed.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:20-12:40
Wed, 13th Apr 2011

Continuous measurements of CO_2 and CH_4 with a wavelength-scanned cavity ring-down spectroscopy instrument

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In this presentation, we report the results of performance testing on a wavelength-scanned cavity ring-down spectroscopy (WS-CRDS) instrument (Picarro Inc., CA, USA, model G1301) for continuous CO_2 and CH_4 measurements both in the laboratory and the fields. The performance testing in labs have shown the capability of this analyzer on simultaneous measurements of CO_2 and CH_4 with reliable accurate measurements and ppbv sensitivity. Combining with a continuous flow and cylinder-type equilibrator system, the analyzer provides a reliable measurements result on dissolved CO_2 and CH_4 of the water. Routine analytical precisions for atmosphere and seawater in the range of 0-2000 ppm for CO_2 and 0-20 ppm for CH_4, are better than ±1‰ ($1000\sigma / \overline{x}$) for CO_2 and ±3‰ ($1000\sigma / \overline{x}$) for CH_4. Furthermore, combining with the equilibrator, the analyzer shows the average dissolved CO_2 in the surface water of Minjiang wetland during high tide was 848 ppm. Combining with a transparent Plexiglas chamber (25 cm i.d. and 25 cm long), the analyzer shows the flux of CH_4 from the wetland mud to the atmosphere was 0.82 mmol/(m^2 d) Comparing to the traditional instruments for greenhouse gases measurements, such as Li-Cor non-dispersive infrared (NDIR) spectrometer for CO_2 measurement and Gas Chromatography for CH_4 measurement, the WS-CRDS instrument is a simply operated, easily field-deployable, real-time, ambient gas monitor that maintains high linearity, precision, and accuracy over changing environmental conditions without frequent calibration. These advantages make this new analyzer ideal for future studies on the water systems.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:40-13:00
Wed, 13th Apr 2011

An approach to the study of copepod egg banks based on efficient DNA extraction from individual copepod eggs

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A method of extracting DNA from individual copepod eggs was introduced for this study which included a modified proteinase K procedure and an efficient DNA sedimentation process. DNA was extracted from egg samples including freshly spawned eggs from the three copepod species *Apocyclops borneoensis*, *Centropages tenuiremis* and *Calanus sinicus*, together with eighteen resting eggs separated from different sediment layers. A short fragment of the 28S rDNA (~300bp) sequence that varied between copepod species was amplified and sequenced. These sequences were used to construct a UPGMA tree which helped to assess species composition and the distribution of copepods buried in the sediments. The results showed that *C. tenuiremis* and *Acartia pacifica* were closely clustered in the tree with egg samples from deeper sediment layers, whereas *A. borneoensis* and *C. sinicus* were grouped with surface egg samples. Species composition in the sediments varied between sediment layers and sampling locations. The DNA extraction method was valid for analyzing individual copepod eggs with different egg-spawning types and sizes and the results helped us to reconstruct the copepod egg composition and distribution in the sediments. We believe that the technique has a wide usage in analyzing the copepod egg bank in sediments, and possibly even for other zooplankton.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:00-9:20
Thu, 14th Apr 2011

The social behaviour dynamics of Indo-Pacific humpback dolphin (*Sousa chinensis*) in Taiwan

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Indo-Pacific humpback dolphins (*Sousa chinensis*) inhabit the shallow coastal waters from eastern Africa to southeastern Asia and north Australia. Their social structures have been rarely been studied; though limited research was done in Algoa Bay, South Africa and Queensland, Australia. For this current study in western Taiwan, 71 non-calf dolphins were identified from over 60,000 photos collected from 333 surveys between 2007-2010. Dolphins tended to gather in small groups, with an average of 5.66 (s.d. 4.14) individuals. The relationships between animals were measured by a half-weight index (mean=0.14± s.d. 0.03). To analyze community structure, 55 individuals who were observed more than 10 times were used. Hierarchical cluster analysis and non-metric multidimensional scaling analysis were applied and revealed two communities in the Taiwan *Sousa* population. Each community contained some residents as well as transients, fewer transients in the northern one. The acquaintances among individuals were not random. The whole population had two levels of associations: casual and relatively permanent, and varied between two communities. In the southern community, some individuals kept constant companions; but in the north community, individuals only exhibited casual acquaintances, which decayed over time. The "emigration and reimmigration" model described in the lagged identification rate indicated that the previous statement/previously held belief of a closed *Sousa* population in Taiwan may need to be re-evaluated.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:20-9:40
Thu, 14th Apr 2011

Dolphin watching in Hong Kong

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Dolphin watching is a popular leisure activity worldwide. It does not only provide joy and excitement to the participating tourists, but also contributes considerable financial benefits to the society. While societies are focusing on the direct and indirect revenues generated by the activity, more attention have also been given to the effects of such activities exerting on the animals involved. This research aims as providing various information of the dolphin watching industry within Hong Kong territory, as well as providing ground for future management actions. The first part of this research involves a social survey to obtain information of the commercial dolphin watching tours and operators, as well as their modus operandi within Hong Kong. It is found that operators differ in quality and standard, hence implying the differences in their capabilities. The second part examines the dolphin-boat interactions, assessing potential (short-term) impacts by dolphin watching operations on the well-being of the animals involved. The third part of the research aims at finding out the effectiveness of the dolphin watching activities as a mean to provide joy and excitement to the participating tourists. The difference of participants' satisfaction between dolphin watching operators imply the importance of an effective modus operandi and clear targets. It is suggested further studies with more sophisticated quantitative methods are needed before the government establishes new monitoring and management plans in Hong Kong in the future.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

9:40-10:00
Thu, 14th Apr 2011

Assessing ecological impacts of human activity in coastal area: using Chinese white dolphin (*Sousa chinensis*) as indicator species

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Coastal areas support important ecological functions, but are disturbed by human beings intensively. Subsequently ecological impacts in population, community and ecosystem level occur in such areas. In the context of population impacts, structure changes take priority over habitats shift which usually causes other effects, since methods for 'priority habitats' assessment taking species' prey and their various biophysical behaviors (preference of salinity, sea depth, distance to costal line etc.) into account and presenting results simply are rare. In the case of Chinese white dolphin (*Sousa chinensis*) in Xiamen Tongan Bay, I adopt Geographic Information System (GIS) tools, and sea depth (10-20m) and distance to coastal line (inner 500m) serve as basis for the delineation of its 'priority habitat' boundaries. Results show that the priority habitat for Chinese white dolphin in Tongan bay is 7.5865 km^2 in the year of 2002, 1.7979 km^2 smaller than that in 1996. The main reason for the priority habitat loss is the increasing sedimentation caused by reclamation in Tongan Bay made some suitable areas shallow than 10m. This methods could help to assess habitat impacts and its relation to human activity and define scientific MPA boundaries.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

10:00-10:20
Thu, 14th Apr 2011

Comprehensive evaluation on special marine protected resources of Fujian Province

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Fujian Province has abundant marine biological resources, marine oil-gas resources, ports and costal tourism resources. With the rapid development of urbanization, marine resources are confronted with contamination, biodiversity loss and ecosystem damage. In this project, we firstly define "marine protected resources" based on the rareness and locality of resources, as well as the importance in social-economic development and marine ecosystem. Secondly, by tabulation, we select *Larimichthys crocea*, *Cultelles scalprum*, *Coelomactra antiquata*, *Tachypleus tridentatus*, *Branchiostoma balcher*, *Sousa chinensis* and hermatypic corals as special protected marine biological resources. As for natural heritage resources, we choose Shenhu Bay ancient forest protected areas, Shenhu Bay national geological park and Niutoushan volcanic park. By using Pressure-State-Response (PSR) Model to evaluate resources above, we consider that for biological resources, *Larimichthys crocea* and *Tachypleus tridentatus* are destroyed mainly due to over-fishing. *Sousa chinensis* is threatened by habitat destruction and shipping. *Coelomactra antiquata*, *Branchiostoma balcheri*, *Cultelles scalprum* and other benthic organisms are extremely sensitive to habitat change, and human over-fishing has also had serious impact on them. Threats to hermatypic corals, like irrational development activities, global climate change, and alien species invasion are also comprehensively analyzed. For natural heritage resources, they are also subject to environmental pollution and human activities. Furthermore, natural disasters destroy the natural heritage at the same time. Currently, the protection of marine resources in Fujian Province is more concerned about the protection of species and the establishment of protected areas. Laws, regulations enforcement and the strengthening of public participation are important means to protection of marine resources.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

10:20-10:40
Thu, 14th Apr 2011

An integrated environmental risk assessment and management framework for safeguarding marine protected areas

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Over the past two decades, establishment of Marine Protected Areas (MPAs) such as marine parks and marine reserves has become a mainstream management tool for long-term conservation of marine biodiversity and fisheries resources. MPAs not only provide "refuges" and nursery grounds for marine organisms but also they can potentially serve as spawning grounds and thereby enhance the overall fisheries stock. Both ecological and economical values of a MPA often increase over time. For example, marine biodiversity in the Cape d'Aguilar Marine Reserve, Shek O, Hong Kong has been improving significantly, with obvious signs of ecological recovery since its designation in 1996. As anticipated, this marine reserve will gradually become one of the most 'sensitive marine receivers' in Hong Kong. Unfortunately, this reserve situated in highly populated Hong Kong is unavoidably surrounded by various pollution sources including sewage outfalls, storm water drainages and marine traffics. It is indeed being continuously exposed to both natural and anthropogenic threats. To safeguard a MPA like the Cape d'Aguilar one, it is important to develop a cost-effective framework to monitor these threats, assess their ecological risks and forecast the potential ecological impacts at different scenarios (e.g., with and without proper pollution control at sources). In this presentation, we will first detail each of the potential ecological threats, and then introduce an integrated risk assessment and management framework for protecting MPAs using Cape d'Aguilar Marine Reserve as an example. Such a proposed framework will be applicable to other MPAs located within or adjacent to a metropolitan city like Hong Kong.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:20-11:40
Thu, 14th Apr 2011

Environmental rehabilitation in a rapidly developing urban area of Xiamen, China — A review within the DPSIR model

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Coastal regions are among the most rapidly urbanizing places on earth. Urbanization and its consequences present many deleterious ecological effects to marine environment. As one of the most developing coastal cities in China, Xiamen suffered many ecological problems under the economic and social development. However, rapid urban growth has increased the importance of restoring degraded habitats. Based on an analysis using the DPSIR framework, it discusses some of the important socio-economic driving forces of urbanization, with a focus on population and economic development. It also analyses the pressure they exert on environment, the observed changes of marine environment, the resulting impacts on ecosystem, and the actions taken to response. The major cause and effect relationship of environmental rehabilitation was highly explored. Suggestions are made for further improvement in dealing with the changing conditions and requirements.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

11:40-12:00
Thu, 14th Apr 2011

Impacts assessment of marine reclamations on water quality in Fujian, China

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Marine reclamation is one of major coastal projects, it can cause negative effect on water quality as other human activities. A comprehensive assessment can understand the environmental impacts and give advices for implementing the reclamation planning. Water quality assessment, including retrospective, status and impacts assessment, is an important step in the argument which can obtain the status and changing trend of water quality. Considering the cumulative effect, we also focus on the adjoining reclamation areas. The methods of single factor and integrative indicator are applied to assess the past and current status, while we design an assessing matrix to have a half-quantitative analysis of impacts on water quality. In the assessing matrix, the main impact factors are pollutant diffusing condition and water quality pressure, and the value of different impact factors is mainly obtained from expert judgement. The adjoining reclamation areas are integrated into a united one to have an assessment, and several cross-section related to cumulative effect are also selected to be discussed. The result reveals that the impact level of 1 reclamation area is extremely high. More importantly, the cumulative effect of the adjoining reclamation areas such as Weitou Bay is obvious, even though assessing result of single one is acceptable.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:00-12:20
Thu, 14th Apr 2011

Marine environment quality assessment in the regional seas

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Reclamation projects can cause negative effects on coastal environment as other human activities. To prove the feasibility of reclamation projects along the coastline of Fujian Province, it is significant and necessary to review and predict the marine environmental quality before it goes further. In this project, three proposed representative reclamation areas were picked up for case studies. By considering the accumulative effect of reclamation projects, adjoining areas for reclamation were studied as well. To create an approach applied to the case, based on the collection of monitoring data in last 10 years as possible and site survey, we chose the Single Factor Index Method, together with Water Quality Indexes, to assess the quality of sea water, sediment and biology in these three reclamation areas. The results showed that, firstly, the water was slightly polluted in Jinjing reclamation area and it was clean in Shijing and Dadeng reclamation areas. The Water Quality Index was 0.8509 in Jinjing and 0.295 in Shijing and Dadeng. And the main pollutants in water were DIN and DIP in the whole areas, while the exceeding were high to 47.73% and 15.91%. Secondly, for the quality of sediment, the monitoring data mainly met the standards. Third, to varying degrees, the biological quality got polluted by heavy metal in these areas. In a word, the reclamation here can exacerbate the marine environmental quality while the current situation was poor. All those results mentioned above should be taken into account when implementing the reclamation program. The case result also proved the Framework and Approach proposed in this paper is practicable and subservience for the research of reclamation planning.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:20-12:40
Thu, 14th Apr 2011

Economic analysis of the main function selection — A case study on coastal main functional zoning of Xiamen Bay

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Coastal zone is the concentration area of offshore resources exploitation with intensive human activities. With population growth and economic development, the increasing intensity and span of human explosive activities have made coastal ecosystem under heavier pressure, use conflicts and rarity of resources have become increasingly prominent. Coastal main functional zoning is an effective tool to solve use conflicts of coastal resources, optimize resources allocation and support sustainable development. However it is still at the exploratory stage. Thus, the studies on theory and method are of considerable importance, and the confirmation of main function is the key point of coastal main functional zoning. In this article, a case study on the coastal main functional zoning of Xiamen Bay is introduced. Based on the allocation and exploit potential of coastal resources, two probable scenarios of development and the main function for each scenario are analyzed by using the scenario analysis method. Then social benefits of scenario I (tourism dominant) and scenario II (port dominant) are estimated by economic analysis, which are 295.8 and 137 billion RMB per year respectively. So tourism should be determined as the main function of Xiamen Bay. The results show that economic analysis can provide the support to determine the main function and complete coastal functional zoning.

Critique guide
Content: _____ Delivery: _____ Slides: _____ Organization: _____

12:40-13:00
Thu, 14th Apr 2011

Land-based pollution control measures in Xiamen, in perspective of marine environmental carrying capacity of Xiamen Bay

***Samuel G. H. WANG[1], Luoping ZHANG[2], Enhui LIAO[2], Qinhua FANG[2], Yiwu JIANG[2]**

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Rapid socio-economic development in Xiamen has been deteriorating the marine environmental quality for years. Thus, it's internal requirement to control the land -based pollution so as to improve the marine environmental carrying capacity. The approach for this study was "Strategic Planning-Scenario Analysis-Numerical Modeling". With the result of numerical modeling, sharing portions of point source pollution (PSP), non-point source pollution (NPSP) and Jiulong River input were identified. Then four scenarios were set up for further analysis. The results manifested that: 1) In terms of total nitrogen (TN) and total phosphorus (TP), land-based NPSP contributes more than PSP; 2) According to the urban planning, NPSP could be cut down by ~50%; but the seawater is still substandard; 3) Engineering measures for PSP spatial optimization should be taken into consideration, i.e. outlets of the inner bay should be reallocated; 4) Further measures to regionalize NPSP should be carried out to ensure the environmental standards are met; 5) Despite all the aforementioned measures have been implemented in Xiamen, Jiulong River input should be still further cut down by 16.8% of TP contribution so as to achieve the management goal. This calls for the integrated coastal management by expanding the management boundary to watershed upstream across the municipal jurisdiction. Additionally, detailed land-based pollution management proposal could be put forward based on the outcomes of this.

Critique guide

Content: _____ Delivery: _____ Slides: _____ Organization: _____

Notes

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Notes

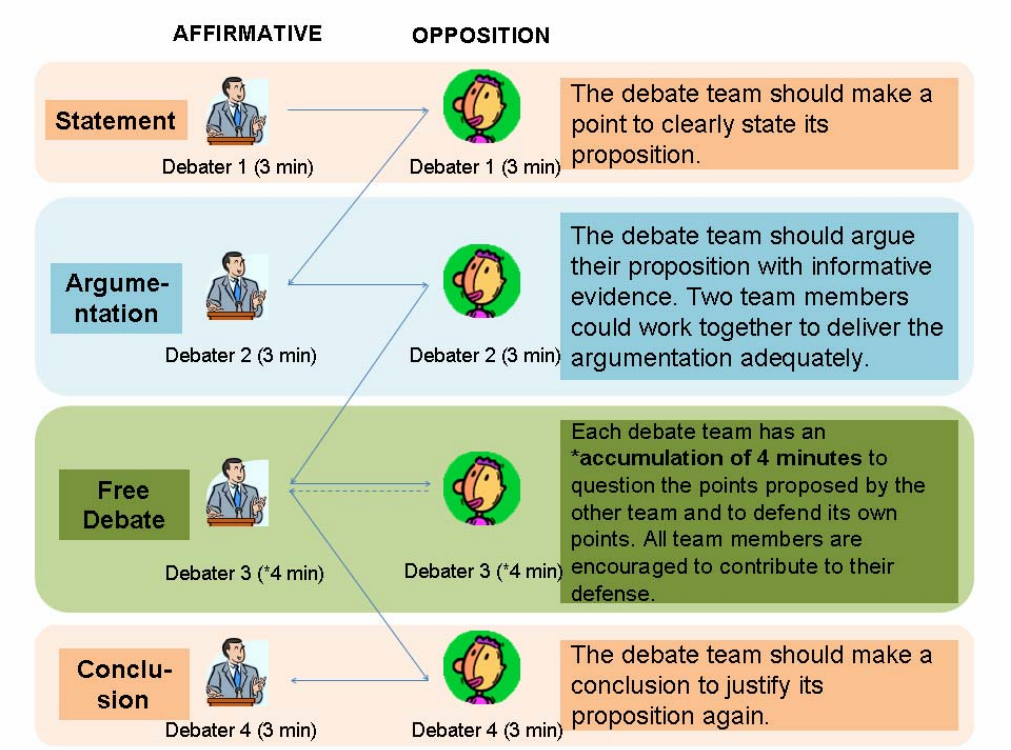
Rules of Debate

1. **General Arrangements**
   All participants will be informed of four debate topics prior to the symposium. The debate position of each team (Affirmative and Opposition) will be assigned in the morning of Day One. The debate event will be held in the afternoon of Day Three, from 2:00pm to 6:00pm.

2. **Team Member**
   There will be 5-6 people from different universities with different background in each debate team. Team members are encouraged to discuss with each other with enthusiasm to prepare for the debate. Please note that some team may have 6 people in the team. But only 4 people will be allowed to argue and rebuttal on the stage.

3. **Debate Procedure**
   The procedures of debate are designed in the way to ensure equal involvement and active participation of every team member during the argumentation and rebuttal sessions within the debate. Each debate will take about 26 minutes and then will be followed with an 8-10 minute Q&A session. All the six other audience teams are encouraged to ask questions or to comment on the topic. The performance of all debate teams in the Q&A sessions will also be assessed and taken into consideration of the selection of The BEST Debate Team.

Rules of Debate



4. Assessment

The debate results will be assessed and discussed by the staff Mentor Committee and will be announced by the Moderator.

Debate Topics

Topic 1

Background: Shark fin soup is a popular Chinese cuisine served at special occasions such as weddings and banquets, these traditions result in China being the leading importer of shark fins. Finning is a popular fin harvesting method and has lead to drastic declines in populations of many shark species.

Affirmative: Complete banning of shark fin import in China **WILL** ease shark population declines.

Opposition: Complete banning of shark fin import in China **WILL NOT** ease shark populations declines.

Topic 2

Background: Mariculture involves the cultivation of marine organisms such as finfish and shellfish e.g. prawns, oysters and seaweed for food and also non-food products such as pearls and cosmetics. Many people believe that mariculture promises economic benefits as it can produce fish at lower cost than industrial fishing and it is environmental friendly as it eases fishing pressure. However, certain mariculture practices can severely damage environments such as mangroves or pollute surrounding areas.

Affirmative: China **SHOULD** encourage the mariculture industry to reduce fishing pressure in the South China Sea.

Opposition: China **SHOULD NOT** encourage the mariculture industry to reduce fishing pressure in the South China Sea.

Topic 3

Background: Turtle jelly is a popular jelly-like Chinese medicine sold as a dessert, which is claimed to be good for skin. It was traditionally made with the shell from the golden coin turtle *Cuora trifasciata*, which is now critically endangered. Many turtle jelly producers claim that their products are now made with turtles that can be commercially farmed so it won't cause decline in natural turtle populations.

Affirmative: Turtle jelly industry **WILL** cause turtle decline in China.

Opposition: Turtle jelly industry **WILL NOT** cause turtle decline in China.

Topic 4

Background: Antarctic was designated as a "natural reserve, devoted to peace and science" by Protocol on Environmental Protection to the Antarctic Treaty which was proposed in 1991 and entered into full operation by 1998. It has banned the all exploitative activities in the Antarctic. Future action however, in light of limited resources like fossil fuel and mineral resources worldwide, many countries (especially developing nations) would benefit from the exploitation of this untapped resource.

Affirmative: The present ban on exploiting resources from the Antarctic **SHOULD** be maintained.

Opposition: The present ban on exploiting resources from the Antarctic **SHOULD NOT** be maintained.

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OUC — Ocean University of China
NTU — National Taiwan University
BU — Hong Kong Baptist University
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