



EAS XIAMEN, CHINA
6-8 NOVEMBER
CONGRESS2024

WOW¹⁹
2024厦门国际海洋周
World Ocean Week in Xiamen

Blue Synergy for a Shared Future: One Sustainable and Resilient Ocean

6-8 NOVEMBER 2024 • XIAMEN CITY, CHINA



SUBTHEME 2.3
GLOBAL CHALLENGES, LOCAL SOLUTIONS

Capacity Building Workshop on the Global Estuaries Monitoring (GEM) Programme

PROCEEDINGS

CONVENER:



中华人民共和国自然资源部
Ministry of Natural Resources of the People's Republic of China

厦门市人民政府
Xiamen Municipal People's Government



Capacity Building Workshop on the Global Estuaries Monitoring (GEM) Programme

14:30-17:30, 7 November 2024

2C Meeting Room, Xiamen International Conference Centre

1.0 Session Information

Session Title: Capacity Building Workshop on the Global Estuaries Monitoring (GEM) Programme

Date and Time: 14:30-17:30, 7 November 2024

Venue/Platform: 2C Meeting Room, Xiamen International Conference Centre

Convening Organization: State Key Laboratory of Marine Pollution, City University of Hong Kong

Session Coordinator Contact Details: Professor Kenneth Mei Yee Leung (kmyleung@cityu.edu.hk)

2.0 Introduction

The Global Estuaries Monitoring (GEM) Programme extended a formal invitation to all existing and potential partners to participate in an exclusive workshop meticulously crafted to provide a comprehensive update on the latest advancements and achievements within the GEM initiative. This workshop serves as a pivotal platform for attendees to acquaint themselves with ongoing projects within GEM, delve into the innovative development of passive samplers, and collaboratively design the forthcoming phase of the GEM Programme.

Throughout this workshop, participants can expect:

- Detailed updates on the progress and notable achievements of the GEM Programme.
- Insightful sessions focusing on the groundbreaking development of novel passive samplers.
- Engaging discussions aimed at collectively shaping the future trajectory of the GEM Programme.

Prospective attendees were warmly encouraged to join this significant event, where knowledge-sharing, exploration, and collaborative planning converge to steer the Global Estuaries Monitoring Programme towards heightened success and impact.

3.0 Session Highlights

3.1 Opening Messages

At the commencement of the workshop, Dr. Chong Chen, serving as the moderator, presented the esteemed members of the GEM Programme's steering committee. This notable group includes Prof. Alistair Boxall from the University of York, Prof. Bryan W. Brooks from Baylor University, Prof. Martina Doblin from the Sydney Institute of Marine Science, Prof. Xinhong Wang from Xiamen University, and Prof. Juying Wang from the National Marine Environment Monitoring Center of China. Prof. Martina Doblin and Prof. Xinhong Wang, representing the steering committee, introduced themselves and shared their perspectives and anticipations for the workshop. They delved into discussions on the cutting-edge advancements in monitoring technologies and how these innovations could be harnessed for robust data collection. Moreover, they underscored the critical need for collaborative efforts among researchers, institutions, and nations to broaden the reach and effectiveness of monitoring endeavors. Furthermore, they shared their forward-looking vision for the programme, envisioning potential expansions, new research trajectories, and sustainable strategies. In parallel, Prof. Leung, the Principal Investigator of the GEM Programme, offered a comprehensive overview of the workshop's agenda, setting the stage for the productive discussions and collaborations ahead.

3.2 Technical Presentations

Prof. Kenneth Mei Yee Leung, City University of Hong Kong

Title: Welcoming and Introduction of the GEM Programme

Key Messages:

- The global river pharmaceutical pollution project has sparked innovative concepts for the Global Estuaries Monitoring Programme.
- Passive samplers and biomonitoring offer novel approaches for the Global Estuaries Monitoring campaign.
- The innovative use of artificial mussels in monitoring radionuclides has emerged as a cutting-edge research focus.

Significant findings or innovations: According to the research results of the global river pharmaceutical pollution project, pharmaceutical pollution was widespread. Rivers in South America, Africa and Asia had higher medicinal pollution, and 10 most

polluted rivers located in: Bolivia, Pakistan, Tunisia, Ethiopia, India, Congo, Kenya, Armenia, Israel and Costa Rica.

Recommendations: GEM Workshop is a platform for existing and new partners of GEM to learn about its latest progress and achievements, learn about the projects under GEM, and co-design the next phase of GEM.

Links to SDGs or regional targets: The implementation of GEM Programme can support SDG 14.1: To prevent and significantly reduce marine pollution of all kinds by 2050.

Prof. Xinhong Wang, Xiamen University

Title: Pollution and Land-sea Transport of Plastic Debris and Microplastics in the River Estuary

Key Messages:

- Land-sea transport of microplastics was moderated with tidal fluctuation. The abundance of tiny microplastics increased while coarse microplastic decreased in the rising tide.
- The dynamics of microplastics in the maximum-turbidity zone is complex.
- River plumes and coastal currents modulate the transport of microplastics to the ocean.

Significant findings or innovations: The characteristics and land-sea transport of microplastics from Jiulong river estuary and Pearl river estuary were systemically studied.

Recommendations: Marine Microplastics become one of the global environmental problems after Global Climate Change, Ozone Depletion and Ocean Acidification.

Links to SDGs or regional targets: This research can support SDG 14.1: To prevent and significantly reduce marine pollution of all kinds by 2050.

Ms. Demilade T. Adedipe, City University of Hong Kong

Title: Development of novel passive samplers for in-situ monitoring of Chemicals of emerging concern (CECs)

Key Messages:

- Preliminarily, no notable differences were observed in the number of chemicals absorbed across diverse environmental conditions.

- The relative standard deviation underscores the commendable reproducibility of the results.
- Sampling rates decrease with prolonged deployment durations, showcasing a swifter initial uptake.
- Consistent sampling rates were noted on the 6th day of exposure.

Significant findings or innovations: S-PVC is the most viable material for novel passive samplers in terms of cost, no of chemicals, stability, and sampling/uptake rate.

Recommendations: Passive samplers offer a substitute method that facilitates the determination of time-weighted average concentrations. Passive approaches allow for the concurrent sampling and concentration of targeted contaminants. These methods can deliver results at a relatively modest cost.

Links to SDGs or regional targets: This research can support SDG 14.1: To prevent and significantly reduce marine pollution of all kinds by 2050.

Dr. Chong Chen, City University of Hong Kong

Title: Progress and Prospects of the GEM Programme

Key Messages:

- Meta-analysis captured 3229 occurrence data for 239 pharmaceuticals in 91 global estuaries over the past 20 years.
- The first phase of the GEM Programme has received water samples from over 150 estuaries for pollutant analysis.
- In the second phase of GEM, we will make use of our invented passive samplers like artificial mussels and smart sponges for studying CEC in global estuaries.

Significant findings or innovations: So far, we have over 120 researchers from around the world to participate in the GEM. We target to complete the first phase of the sampling campaign by the end of this year, and launch the second phase of the GEM in early 2025.

Recommendations: The implementation of the GEM Programme addresses key limitation and knowledge gaps and promises to provide a more comprehensive understanding of contaminants of emerging concern (CECs) pollution in the near future.

Links to SDGs or regional targets: The implementation of GEM Programme can support SDG 14.1: To prevent and significantly reduce marine pollution of all kinds by 2050.

3.3 Panel Discussions/Interactive Sessions

The discussion section of the GEM Workshop was led by Professors Kenneth Leung and Xinhong Wang. All attendees, both in-person and online, actively engaged in a vibrant discussion primarily focusing on shaping the second phase of the GEM Programme. The dialogue centered around three key topics:

- **Prioritizing Emerging Contaminants for Monitoring:** Participants deliberated on which chemicals of emerging contaminants (CECs) should take precedence in the upcoming phase of GEM.
- **Feasibility of Passive Samplers in Proposed Estuaries:** There was a debate on the viability of utilizing passive samplers in the suggested estuaries.
- **Collection of Estuarine Sediments:** Discussions revolved around the ability and practicality of collecting sediments from the proposed estuaries.

Participants highlighted pharmaceuticals and personal care products (PPCPs), microplastics, and per- and polyfluoroalkyl substances (PFAS) as pollutants demanding significant attention. Additionally, legacy pollutants like polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and polybrominated diphenyl ethers (PBDEs), as well as pesticides, heavy metals, liquid crystal monomers (LCMs), and radionuclides, were identified for consideration in the monitoring process.

Regarding passive sampling, nearly half of the participants deemed it feasible. However, concerns were raised during the discussion regarding technical and logistical specifications, the necessity of permissions from relevant authorities for sampler placement, and ensuring security against theft or removal.

Furthermore, an overwhelming majority, around 80% of participants, expressed strong interest and confidence in the feasibility and importance of collecting estuarine sediments for research purposes.

This discourse has laid the groundwork for a preliminary implementation plan for the second phase of the GEM Programme, setting a robust foundation for the forthcoming year's work.

4.0 Key Outcomes

The Global Estuaries Monitoring Programme has benefitted from innovative concepts originating from the global river pharmaceutical pollution project, incorporating novel monitoring approaches such as passive samplers and biomonitoring. Additionally, the utilization of artificial mussels for radionuclide monitoring has emerged as a leading-edge research focus. Prof. Wang's talk gave us further inspiration. Microplastic transport dynamics, influenced by tidal fluctuations and coastal currents, have been elucidated, highlighting the complex interplay of microplastic abundance in estuarine environments. Furthermore, a study on passive samplers has identified S-PVC as a cost-effective material with commendable stability and sampling rates, paving the way for efficient determination of time-weighted average concentrations and contaminant concentration. The progress and prospects of the GEM Programme showcase extensive meta-analysis on pharmaceutical occurrence, successful water sample analyses from over 150 estuaries, and plans for utilizing passive samplers in the upcoming phase, underscoring global collaboration and a targeted timeline for future initiatives.

5.0 Recommendations and Ways Forward

Moving forward, it is essential to continue exploring and implementing innovative monitoring techniques, such as passive samplers and biomonitoring, to enhance the efficacy of the Global Estuaries Monitoring Programme. Further research into the dynamics of microplastic transport within estuaries, focusing on the impact of tidal fluctuations and coastal currents, is recommended. The expansion of passive samplers' use, emphasizing cost-effectiveness and result reproducibility, should be prioritized. Additionally, the ongoing development of the GEM Programme should involve continuous data analysis to address emerging contaminant concerns and leverage global research collaborations to ensure program success and impact.

6.0 Annexes

ANNEX 1. Session Agenda

Capacity Building Workshop on the Global Estuaries Monitoring (GEM) Programme

Time Slot: 14:30-17:30 (GMT+8), 7 November 2024

Venue: 2C Meeting Room

Time	Topic	Lecturer
13:30-14:30	Registration and check-in (Please find staff to check-in)	
14:30-14:35	Introduction: GEM Steering Committee	Prof. Martina Doblin Prof. Xinhong Wang
14:35-15:10	Welcoming and Introduction of the GEM Programme	Prof. Kenneth Mei Yee Leung
15:10-15:45	Pollution and Land-sea Transport of Plastic Debris and Microplastics in the River Estuary	Prof. Xinhong Wang
15:45-15:55	Group Photo Coffee Break	
15:55-16:25	Development of novel passive samplers for in-situ monitoring of Chemicals of emerging concern (CECs)	Ms. Demilade T. Adedipe
16:25-16:55	Progress and Prospects of the GEM Programme	Dr. Chong Chen
16:55-17:30	Free Discussion and Closing Remarks	Prof. Kenneth Mei Yee Leung Prof. Xinhong Wang All Members

Zoom Details for Participation:

Time: 14:30-17:30, November 7, 2024 (GMT+8)

Zoom Link:

<https://cityu.zoom.us/j/84802486029?pwd=2eq4PBAdonxHLJmWjpajlecDgUaRBW.1>

Meeting ID: 848 0248 6029

Passcode: 144805

ANNEX 2. Participant Information

Participant Information

Total number of participants: 28

No	First Name	Last Name	Country/Region	Organization
1	Jordan Jun Chul	Park	Canada	Universite Sainte-Anne
8	Qiufeng	Zhang	China	Chinese Academy of Sciences
2	Ruolan	Jia	China	City University of Hong Kong
3	Suyu	Fan	China	Tongji University
5	Hongying	Gao	China	Xiamen University
6	Wangqing	Shen	China	Xiamen University
4	Xinhong	Wang	China	Xiamen University
7	Weiwei	Zhang	China	Xiamen University
17	Demilade	Adedipe	Hong Kong, China	City University of Hong Kong
9	Chong	Chen	Hong Kong, China	City University of Hong Kong
22	Yali	Huang	Hong Kong, China	City University of Hong Kong
21	Jiayong	Lao	Hong Kong, China	City University of Hong Kong
13	Kenneth	Leung	Hong Kong, China	City University of Hong Kong
18	Huiju	Lin	Hong Kong, China	City University of Hong Kong
11	Mengyang	Liu	Hong Kong, China	City University of Hong Kong
16	Ming	Liu	Hong Kong, China	City University of Hong Kong
12	Xuemei	Mao	Hong Kong, China	City University of Hong Kong
15	Qiang	Ou	Hong Kong, China	City University of Hong Kong
20	Yuefei	Ruan	Hong Kong, China	City University of Hong Kong
19	Shaopeng	Xu	Hong Kong, China	City University of Hong Kong
10	Meng	Yan	Hong Kong, China	City University of Hong Kong
14	Qihui	Zhao	Hong Kong, China	City University of Hong Kong
23	Prabhakar	Sharma	India	Nagaland University
24	Ade	Supriatin	Indonesia	Institut Teknologi Bandung
25	Hernando	Bacosa	Philippines	Mindanao State University -Iligan Institute of Technology
26	Matthew	Tabilog	Philippines	PEMSEA
27	Vesna	Cerkvenik Flajs	Slovenia	University of Ljubljana
28	Rachael	Wyse-Mason	Trinidad & Tobago	The University of the West Indies

ANNEX 3. Presentation Materials

- Links to the presentation can be found [here](#)

ANNEX 4. Documentation



Group Photo



Discussion Section



Ms. Demilade Adedipe's Talk



Prof. Kenneth Leung's Talk



Dr. Chong Chen's Talk



Prof. Xinhong Wang's Talk