SECOND WESTPAC WORKSHOP ON DISTRIBUTION, SOURCE, FATE AND IMPACTS
OF MARINE MICROPLASTICS IN ASIA AND THE PACIFIC

Program Book

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About the event

Plastic is the most prevalent type of marine debris found in our coasts and ocean. Microplastics (MPs) are small pieces of plastic, commonly defined as less than 5 millimeters in diameter/length. Because of their very tiny size and ubiquity in marine environment, MPs could be ingested and accumulated in the bodies of many marine organisms such as mammals, sea birds, sea turtles, fishes and invertebrates. As MPs absorb and efficiently concentrate toxic persistent organic pollutants (POPs) present in sea water, these may also become bioavailable to the ingesting organisms. Transfer of microplastics along the trophic chain can potentially reach human consumers of seafood. In recent years, the world has seen mounting concerns over microplastics in ocean environment and its potential effects on biodiversity, food security, and human health.

Considering the limited scientific knowledge on the generation, movement and fate of microplastics in marine environment and their ecological impacts, the IOC Sub-Commission for the Western Pacific (WESTPAC) established, at its 11th Session (21-23 April 2017, Qingdao, China), a programme that aims to establish a marine microplastics monitoring and research network; and develop joint-monitoring and research efforts to study and mitigate MPs in the region, in order to understand the sources, distribution, fate and effects of marine MPs in the Western Pacific and its adjacent regions.

The inception workshop was held on 20-22 September 2018, in Phuket, Thailand with the participation of more than 50 experts from 10 countries in the region. Participants reviewed the current status of plastics and microplastics pollution at global, regional and local level, and examined existing methods and protocols for sampling and laboratory analysis of MPs. Following the presentations on MPs research and monitoring efforts in respective institutions and countries, all participants agreed that harmonizing standard operating procedures in the region for sampling and analysis for MPs in beach, surface water and marine biota would be an important first step.

As an initial step, more than 50 sites (beach) were proposed by participants to join this programme, with samples to be taken in accordance with the draft SOPs in beach sediment that has been elaborated at the workshop. Meanwhile two working groups were established with one on development of SOPs for microplastics in surface water, and the other on marine organism to keep
strengthening the established network of scientists who are interested in studying the effects of microplastics in marine organisms. All participants also decided to conduct the 2\textsuperscript{nd} workshop in late 2018.

The East China Normal University (ECNU), founded in Shanghai in 1951, is one of the most prestigious public research universities in China. The Plastic Marine Debris Research Center of the East China Normal University serves as China’s first research and the most advanced center dedicated to monitoring technologies, ecological impact assessment, management and control of marine plastic and microplastic pollution. With advanced equipments and technology for marine plastic and microplastic research, the Center carries out comprehensive scientific research on oceanography, chemistry and biology related to the life processes of marine plastic and micro plastics.

**What we aim to achieve?**

The first day will be dedicated to a microplastics science symposium, with invited presentations on the latest research findings on microplastics, its research or assessment approaches, methods, and techniques, and its impacts at global, regional and local scales. This symposium will also be an opportunity for participants to share their latest research results and to explore new opportunities of collaborative research in the region.

The 2\textsuperscript{nd} and 3\textsuperscript{rd} day will be a follow up to the inception workshop (20-22 September 2017, Phuket, Thailand), with objectives to finalize, with feedbacks to be received from the pilot sites, the draft standard method for microplastic sampling and analysis in beach sediment; to develop a harmonized microplastic sampling and analysis protocol in surface water; to review the progress made since last year in the pilot sites and by two working groups (microplastics in surface water and marine organisms); to examine strengths, challenges and lessons learned from the programme implementation in the past; and to explore partnership building opportunities and future research directions, while taking into account the results generated from the science symposium on the first day.
## Program

### Microplastic Science Symposium

**Venue:** Meeting Room Chopin, 2nd floor of the Vienna International Hotel. (Shanghai Jinhaijiang Road), Shanghai, China

### Monday 15 October 2018

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<td>Opening</td>
<td>Daoji Li</td>
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<td>· Opening and welcome remarks</td>
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<td>· Conduct of the symposium and workshop</td>
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<td>09:30-10:20</td>
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<td>Somkiat Khokiattiwong</td>
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<td></td>
<td>· Preliminary study on microplastic distribution in the Western Pacific</td>
<td>Chengjun Sun</td>
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<td>· Horizontal and vertical distribution of microplastics in coastal areas of South Korea</td>
<td>Won Joon Shim</td>
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<td>10:20-10:50</td>
<td>Group photo and coffee break</td>
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<tr>
<td>10:50-11:40</td>
<td>· Abundance and distribution of microplastics in the offshore waters of China</td>
<td>Juying Wang &amp; Weiwei Zhang</td>
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<td>· Removal of microplastics from sea surface</td>
<td>Daoji Li</td>
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<td>11:40-12:30</td>
<td>Plenary Session 2: Impacts on biota and marine ecosystems</td>
<td>Won Joon Shim</td>
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<td>· Ingestion of microplastics by marine organisms and transfer of the associated chemicals from ingested plastics to the internal system of the organism</td>
<td>Hideshige Takada</td>
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<td>· New ways for aquatic organisms to take microplastics from the environment</td>
<td>Huahong Shi</td>
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<td>Time</td>
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<td>12:30-14:00</td>
<td><strong>Lunch break</strong></td>
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| 14:00-14:50| · Microplastics ingestion by marine organisms in the South China Sea  
  Yusof Shuaib Ibrahim  
  · Microplastic exposure of Acropora Formosa-evidence of ingestion and toxicity  
  Agung Dhamar |
| 14:50-15:40| **Plenary Session 3: Research and monitoring methods, model development, risk assessment**  
  Juying Wang  
  · Ecological Risk Assessment of Microplastics in Marine Environment  
  Won Joon Shim  
  · Japan’s efforts in standardization/harmonization of microplastic surveys, monitoring and modeling  
  Atsuhiko Isobe |
| 15:40-16:00| **Coffee break**                                                                  |
| 16:00-16:25| · Transport processes of marine microplastics in the East China Sea and adjacent water based on numerical simulation  
  Hui Wu |
| 16:25-16:40| **Information presentation:**  
  · UN Decade of Ocean Science for Sustainable Development (2021-2030): what this group can benefit from and contribute to?  
  Wenxi Zhu |
| 16:40-17:30| **Plenary discussions “Recommendations for future MP research, monitoring, risk assessment”**  
  Daoji, Wenxi, Wonjoon, Somkiat, Isobe & all |
| 17:30      | **Closure**                                                                      |
2\textsuperscript{nd} WESTPAC Workshop on Microplastic Research and Monitoring

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<td>Introduction · Participants brief</td>
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<td>09:30-10:00</td>
<td>Setting the scene · Brief on the 1\textsuperscript{st} workshop (20-22 September 2017, Phuket, Thailand), and progress made since 1\textsuperscript{st} workshop · 2\textsuperscript{nd} workshop's objectives, and expected outputs and outcomes</td>
<td>Wenxi Zhu</td>
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<td>10:00-10:30</td>
<td>Introductory presentation-I · Abundance, composition, and distribution of microplastics in sand beaches: Case study in South Korea</td>
<td>Wonjoon Shim</td>
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<td>Introductory presentation-II · Methodological limitations for microplastic quantification in the ocean: recommendations for overcoming the defects</td>
<td>Daoji Li</td>
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<td>11:20-12:20</td>
<td>Progress report on MP research and monitoring · Bangladesh · Marine microplastics research in Bangladesh: progress, prospects, problems and challenges</td>
<td>Sayedur Chowdhurry &amp; Shahadat Hossain</td>
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<td>· China · Microplastics in sandy beach in China: knowledge and challenge</td>
<td>Juying Wang</td>
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<td>12:20-14:00</td>
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<td>14:00-15:30</td>
<td>Progress report on MP research and monitoring</td>
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<td>- Indonesia</td>
<td>• Current Status and Strategic Research Plan of Marine Plastics Debris in Indonesia; ii. Microplastics in sandy beach in Indonesia</td>
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<td>- Japan</td>
<td>• Harmonization of floating marine microplastics monitoring methodologies</td>
<td>Takashi Ohmura &amp; Atsuhiko Isobe</td>
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<td>- Singapore</td>
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<td>Lynette Ying</td>
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<td>• The current status of microplastic analysis in Malaysia; ii. A comparative study on microplastics occurrence in pristine, moderate and polluted area of Malaysian Waters</td>
<td>T N Sabiqah Tuan, Anuar, Yusof Suaiib, Irahim &amp; Zulfigar, Yasin</td>
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<td>- Sri Lanka</td>
<td>• Micro-plastics in sandy beach in Sri Lanka</td>
<td>Deeptha Amaratunga</td>
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<td>- Thailand</td>
<td>• Microplastic study in sediment from sandy beaches in Thailand; ii. Recent progress and results on Microplastics Identification around Thai Coasts</td>
<td>Phaothep Cherdsukjai, Suchana Chavanich, Supakij, Suttiruengwong</td>
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<td>- Vietnam</td>
<td>•</td>
<td>Tuan Linh Tran Vo &amp; Duong Thah Nhi</td>
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<td>17:30</td>
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<tr>
<td>08:15</td>
<td>Leaving hotel for the Minhang Campus of the East China Normal University (ECNU), <strong>participants are requested to gather at the Vienna International hotel’s lobby by 08:10 hours.</strong></td>
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<td>09:30-10:30</td>
<td><strong>Progress report by two WGs</strong>&lt;br&gt;• WG on MPs in surface water  Chengjun Sun &amp; Juying Wang&lt;br&gt;• WG on MPs in marine organisms  Huahong Shi</td>
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<td>10:30-11:00</td>
<td><strong>Coffee break</strong></td>
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<td>11:00-12:00</td>
<td><strong>Finalization of the guidelines for microplastic sampling and analysis in beach sediment</strong>&lt;br&gt;(Draft circulated in early September)  Won Joon Shim, Daoji Li, Wenxi Zhu &amp; all</td>
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<td>12:00-13:30</td>
<td><strong>Lunch break</strong></td>
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<td>13:30-15:00</td>
<td><strong>Discussion</strong>  &lt;br&gt;Brainstorming and discussion on the way forward and formulation of an action plan  Daoji, Somkiat &amp; all</td>
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<td>15:00-15:20</td>
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<td>15:20-16:00</td>
<td><strong>Conclusion, next steps and closing</strong>  Daoji Li, Wenxi Zhu &amp; All</td>
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<tr>
<td>16:00-17:30</td>
<td>Visit the State Key Laboratory of Estuarine and Coastal Studies and the Plastics Marine Debris Research Center at new campus of ECNU  Daoji Li</td>
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Guidelines for Sampling and Analysis of Microplastics in Beach Sediment

WESTPAC Microplastic Research Programme: Distribution, Source, Fate and Impacts of Marine Microplastics in Asia and the Pacific

IOC Sub-Commission for the Western Pacific (WESTPAC)
Intergovernmental Oceanographic Commission of UNESCO
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1. INTRODUCTION

Marine microplastics (plastic particles smaller than 5 mm in size) are a growing concern worldwide, due to their ubiquitous presence in the environment and potential serious threats to marine organisms and human health. Scientific knowledge on spatio-temporal distribution and concentration of microplastics in the environment is critical for developing effective management plans and mitigation measures at the national, regional and global level.

As the microplastic pollution has just emerged over the past decade, there are several methods for MP sampling and analysis with a considerable amount of methodological variability. Methodological variation currently limits comparisons as there is no a standard method for microplastic sampling and laboratory analysis in the region.

In this regard, the UNESCO/IOC Sub-Commission for the Western Pacific (WESTPAC) endeavors to harmonize the methods for microplastic sampling and analysis in order to understand and compare spatiotemporal microplastic abundance, composition and distribution across marine environment in the region and beyond. This harmonization constitutes one key element of the WESTPAC programme entitled “Distribution, Source, Fate and Impacts of Microplastics in the Asia and Pacific Region” (referred to as “WESTPAC Microplastic Research and Monitoring Programme) which was initiated at its 11th Intergovernmental Session (21-23 April 2017, Qingdao) with a view to assisting the Member States in developing the knowledge base on the entire cycle and impacts of marine microplastics, and providing scientific evidence for mitigation and remediation measures.

As per the expert discussions at the WESTPAC microplastics inception workshop (20-22 September 2017, Phuket, Thailand), the initial focus is to monitor microplastic abundance and distribution in sandy beach, given the tendency of microplastics to accumulate in the beach sediment and a relatively low sampling cost.

This document, intended to be used as a practical technical manual, provides step-by-step guidance for sampling, analyzing and quantifying microplastics in beach sediment. The Sub-Commission wishes to thank Wonjoon Shim, Daoji Li, Wenxi Zhu and Chengjun Sun for the preparation of this document, and
Nachapa Saransuth and Orathai Pongruktham for the support provided to this output.

2. SITE SELECTION AND FREQUENCY OF SAMPLING

To allow the comparison of microplastic abundance and distribution among the participating countries across the vast region, it is recommended that three types of beaches be selected in each country:

I) highly populated or urbanized site with extensive human activities, such as harbor and estuary;

II) moderately impacted site by human activities, such as small fishing village, beach outside the city or small-scale aquaculture area; and

III) pristine site with limited human activities, such as remote island or protected area.

It is strongly suggested that a minimum of two beaches under each type be studied in each country with samples collected during the dry season prior to monsoon, in order to better reflect the impacts of human activities on the coasts.

3. MICROPLASTIC SAMPLING IN BEACH SEDIMENT

3.1 Materials

- Quadrats: 0.5 m × 0.5 m
- Stainless sieves: 1 mm and 5 mm mesh size
- A stainless tray: to contain 1mm sieve filtrates
- A stainless scoop: to collect sand samples
- A scrapper:
- Sample bottles: >1 L glass or metal bottles to store the 1 mm sieve filtrates
- Ziplock bags: to store solid particles of 1-5 mm size range (*materials retained on a 1 mm sieve)
3.2 Sample collection

1) At each studied beach, select three 100 m referent stretches (Figure 1 and Figure 2);

- Backshore line (B-line): the last point before vegetation or artificial structure where a quadrat can be placed
- High strandline (S-line): the high-water mark line in between B-line and W-line
- Water-edge (W-line): line closest to the sea side where dry sands can be taken from surface

2) Divide each referent line into four sections at intervals of 25 meters, and place a 0.5 m x 0.5 m quadrat randomly in each section to avoid bias sampling (Figure 3 and Figure 4);

3) Make uneven beach surface flat using a stainless scrapper to keep sampling depth equal for each quadrat;
4) Take sand samples from the top 2.5 cm of the surface within the quadrat using a scoop and a scrapper (Figure 5);

5) Sequentially sieve the samples through a stack of 5 mm and 1 mm sieves on top of a stainless tray (Figure 6);

6) Store in a ziplock bag the retained materials on the 1 mm sieve, and label the ziplock bag properly; This is a sample for large microplastic analysis (L-MP; 1-5 mm);

7) Mix thoroughly the filtrates passing through the 1 mm sieve in the stainless tray, transfer about 80 ml of the sand to a sampling bottle, and label the bottle properly; This is a sample for small microplastic analysis (S-MP; < 1 mm).

8) Repeat steps 3) through 7) in a total of 12 quadrats on a studied beach;

9) make a large microplastic (L-MP; 1-5 mm in size) and a small microplastic (S-MP; < 1 mm) composite sample, respectively on a studied beach;

9) Bring the samples to the laboratory for further analysis.

**Note 1:**

In the case of wet sand, two of the following options are recommended:

a) use distilled water or filtered sea water (through < 1 mm pore size filter) to facilitate sieving; or

b) bring the sand that could not be sieved to the laboratory, and dry them in an oven at 60°C (avoid air contamination). After drying the sample, proceed to the step 5) through 7) above in the laboratory.
4. LABORATORY ANALYSIS OF LARGE MICROPLASTICS (L-MP; 1-5 MM)

4.1 Visual Quantification of L-MP

1) Pour the sediment samples from a ziplock bag into a stainless tray in the laboratory;

2) Visually select plastic like particles using forceps;

3) Sort the plastic like particles into the following categories: pellet, fragment, fiber/filament, sphere, sheet/film, foamed plastic, and others. Store the particles in each category in a glass petri dish (Figure 7);

4) Confirm if the plastic like particles are plastics by:
   a) If a bench-top Fourier Transform Infrared Spectroscope (FT-IR) is available, check each plastic like particle with the FT-IR using Attenuated Total Reflectance (ATR) mode;
   b) If a FT-IR is not available, cross check each plastic like particle with another expert;

5) Count the plastic particles by category and weight them separately.

4.2 Determination of L-MP abundance/density/concentration

Sampling area, sampling depth, number and weight of L-MP are used for calculation of abundance/density/concentration of L-MP in beach sediment. The abundance of L-MP on a beach can be reported in the following units: number/m² (n/m²), n/m³, gram/m²(g/m²), and g/m³.

1) Determination of L-MP abundance per unit area (n/m² and g/m²)
2) Determination of L-MP abundance per volume (n/m³ or g/m³)

\[
\text{Sample volume} = \text{sampling area} \times \text{sampling depth} \times \text{number of quadrats} \\
= 0.25 \text{ m}^2 \times 0.025 \text{ m} \times 12 \\
= 0.075 \text{ m}^3 \\
\text{Abundance of L-MP per volume} = \frac{\text{number or weight of L-MP}}{0.075 \text{ m}^3} \quad \text{(n/m³ or g/m³)}
\]

5. LABORATORY ANALYSIS OF SMALL MICROPLASTICS (S-MP; <1 MM)

5.1 Materials and reagents for pre-treatment

- 600 ml wide-mouth glass bottles with caps
- Glass beakers (1 L and 250 ml)
- Aluminum foil
- A spatula
- Sieves: 20 or 300 μm mesh size (depending on the lowest cut-off size)
- A drying oven (60°C)
- An analytical balance
- Magnetic stirrer with hot plates
• Magnetic stirring bars

• 250 ml glass funnels

• Forceps

• A vacuum filtration apparatus

• Membrane filters for FT-IR analysis: <10 μm pore size

• Glass-fiber filters for microplastic analysis only: <10 μm pore size

• Glass petri dishes with lids

• Lithium metatungstate (LMT) solution: mix 1 L of 2.95g/ml LMT solution in 2,250 ml of distilled water to make 1.6g/ml of LMT solution

• 35% Hydrogen peroxide (H₂O₂) solution (to remove natural organic matter)

• 0.05M Fe(II) solution: dissolve 7.5 g of FeSO₄ · 7H₂O in a mixture of 500 ml distilled water and 3 ml of sulfuric acid solution

5.2 Methods for sample pre-treatment

5.2.1 The first density separation

1) Take 200 ml of sand subsample from a sampling bottle, weigh the sample and record the weight;

2) Transfer the sand sample with known volume and weight to a 600 ml glass bottle with a cap;

3) Add 250 ml of LMT solution (d=1.6 g/ml) in the bottle, seal tightly the lid, and shake vigorously for 1 min;

4) Set the bottle for 10 minutes to allow sedimentation of heavy particles (Figure 8a), gently transfer the supernatant to a 1 L glass beaker;
Note 2:

If there are many suspended fine particle in the solution, the sedimentation can take longer than 10 min, wait until the supernatant looks clean.

5) Wash off the plastic particles attached to the bottle wall with a squeeze bottle containing LMT solution;

6) Repeat two more times the steps 3), through 5) to extract more plastic particles from the sand sample;

7) Cover the 1 L beaker with aluminum foil and keep the combined supernatant overnight for additional settlement of the suspended fine particles (Figure 8b);

8) Gently pour only the supernatant from the 1 L beaker onto a 20 μm or 300 μm sieve (Figure 8c), and wash off the particles attached to the beaker wall;

9) Rinse the sample on the sieve with enough amount of distilled water to remove LMT solution (Figure 8d).

Note 3:

To avoid cross contamination among the samples from S-MP residuals on the sieves, the used 20 μm sieve must be back-flushed with plenty of distilled water and cleaned with high pressure air gun.

10) Transfer particles on the 20 μm or 300 μm sieve into a 250 ml glass beaker with distilled water, and the glass beaker should be weighed before sample transfer;

Figure 8: Sample pre-treatment steps for S-MP analysis: first density separation; a) sedimentation of heavy particles; b) sedimentation of fine particles; c) collecting supernatant; d) removing LMT solution; and e) Drying the sieved particles in a dry oven at 60°C.
11) Dry sample in the beaker at 60°C in a dry oven;

**Note 4:**

To avoid air contamination, cover the beaker with aluminum foil, but slightly open one edge. Generally, it takes 1-3 days for dryness.

12) After dryness, weigh the cooled beaker to determine the mass of S-MP with the density separated residue.

### 5.2.2 Removal of organic matter/ wet peroxide oxidation

**Caution**

Highly reactive reagents are used in these steps. Please review the laboratory safety practice before proceeding to this analysis.

1) Put magnetic stirring bar in the 250 ml beaker with the sieved particles, add 20 ml of 0.05 M Fe (II) solution and 20 ml of 35% H₂O₂ solution to the beaker, respectively, and cover the beaker with aluminum foil;

2) Place the beaker on a magnetic stirrer with 180 rpm at 75°C in a fume hood (Figure 9);

**Caution**

This solution can boil violently if heated >75°C.

3) When the solution boils, remove the beaker from the hot plate. Open the aluminum foil cover to let the steam escape (handle the hot beaker with care);

4) Place the beaker on the stirrer for another 30 min;

5) If the solution still has brown color (remaining organic matter), add another 20 ml of 35% H₂O₂ solution to the beaker;

6) Repeat 2), 3), 4) and 5) until the brown color disappears.

### 5.2.3 The second density separation

1) Pour the solution in the 250 ml beaker to the 20 μm or 300 μm sieve, rinse
the beaker several times with distilled water, and transfer all the remaining particles in the beaker to the sieve;

2) Transfer the particles on the sieve to a 250 ml glass funnel using LMT solution;

3) Fill the glass funnel with additional LMT solution up to about 100 ml;

4) Cover the funnel with aluminum foil, and set the funnel overnight for density separation (Figure 10);

5) Very gently drain and discard only bottom part of the solution.

5.2.4 Filtration and weighing

Prior to S-MP identification and quantification, the pre-treated and isolated S-MP samples are filtered and weighed.

1) Weigh a polycarbonate filter paper (D);

2) Drain and collect the remaining supernatant in the funnel directly to a vacuum filtration apparatus (Figure 11);

3) Rinse the funnel with distilled water to collect all residue;

4) Rinse the filtration apparatus cup with distilled water and collect all residue;

5) Put the filter paper with S-MP particles in a petri dish and cover with a lid;

6) dry the filter paper in petri dishes, either in air or in a dry oven;

7) Weigh the dried filter paper (C) and calculate the weight of the particles (E) on the filter paper.

Weight of the particles (E) = C - D (gram)
5.2.5 Identification and quantification of S-MP

Discrimination and identification of S-MP from other non-plastic particles requires a microscope and/or a spectroscope. Spectroscope confirmation using micro-FTIR or Raman for S-MP is strongly recommended for the identification of S-MP particles in 0.001-1 mm size range (class II and III). However, a microscope can be used for the identification of S-MP in 0.3-1 mm size range (class II) if the micro-FTIR or Raman are not available.

Microscope identification

1) Identify the particles on a filter under a dissecting microscope

2) Measure the longest dimension of the particle and record the shape, maximum length and color

3) Classify and count the plastic particles by category (fragment, fiber/filament, sphere, and others);

4) If micro-FTIR or Raman is available, it is recommended that a subset of the plastic particle samples (10-20\% of the total S-MP counts or very typical and major types of plastics) be confirmed with the spectroscopy.

Spectroscope identification (micro-FTIR)

**Note 6:**
To identify the particles on a filter using a micro-FTIR, Attenuated Total Reflectance (ATR) mode, rather than transmission and reflection mode, is recommended for a clear spectrum.

1) Place the filter under a micro-FTIR.

2) Measure the longest dimension of the particle and record its shape, maximum length and color (Figure 12: examples of MP types and measurement);

3) Identify the particle, and switch the objective lens to ATR tip;

4) Gently contact the particle to get the spectrum.
5) Search and match the obtained spectrum against the FTIR spectrum library;

5.2.6 Determination of S-MP abundance/density/concentration

Based on sampling area, sampling depth, weight and volume of sand sample, and number of S-MP, abundance of S-MP on a studied beach could be reported in the following units: \( n/m^2 \), \( n/m^3 \) and \( n/kilogram \ (n/kg) \)

1) Determination of S-MP abundance per unit area \( (n/m^2) \)

Calculation of sampling area from sand volume used for the analysis

Sand’s volume for the analysis = 200 ml = 0.0002 m\(^3\), sampling depth = 0.025 m

Therefore, sampling area = \( \frac{0.0002 \, m^3}{0.025 \, m} = 0.008 \, m^2 \)

\[
\text{Abundance of S-MP per area} = \frac{\text{number of S-MP}}{0.008 \, m^2}
\]

2) Determination of S-MP abundance per volume \( (n/m^3) \)

Figure 12: MP images and measurement labels from micro-FTIR: (a) Fragment, (b) fiber, and (c) sphere.
Sample volume = 200 mL = 0.0002 m³

Abundance of S-MP per volume = \( \frac{\text{number of S-MP}}{0.0002 \text{ m}^3} \) (n/m³)

3) Determination of S-MP abundance per weight (n/kg)

| Abundance of S-MP per weight = \( \frac{\text{number of S-MP}}{\text{weight of the 200 mL sand sample}} \) (n/m³) |

6. PREVENTION OF CONTAMINATION

1) Cotton clothes must be worn during the sampling.

2) A cotton lab gown and latex glove must be worn during the laboratory work.

3) All liquid reagents and media must be filtered before use.

4) Samples must be covered with a lid or aluminum foil.

5) Every apparatus must be cleaned with tap water, and rinsed with distilled water prior to use.

7. QUALITY CONTROL

For quality control, systematic blanks should be taken.

1) Run field and/or procedural blank sample with LMT solution in the identical method to S-MP analysis.

2) Expose dampened filter paper in a petri dish near the microscope or micro-FTIR to check air contamination during analysis.

Note 7:

Number of S-MP in the blank samples must be significantly lower than the actual samples.
8. REFERENCE


Logistic Information Note for Participants

Welcome to Shanghai! To facilitate your travel preparations, please find below the information on logistic arrangements.

1. Meeting Venue

**Date: 15-16 October 2018**

The meeting will be held at the Vienna International Hotel (维也纳国际酒店, 原“金沙江大酒店”)

257 Nujiang Road, Putuo District, Shanghai, China

Tel: +86 21-62578888; Fax: +86 21-62578066

Email: shjsjrs@wyn88.com

Website: https://wyn88.com/

**Meeting room:** Chopin which is located on the 2nd floor of the Vienna International Hotel.

**Date: 17 October 2018**

The meeting will be held at the State Key Laboratory of Estuarine and Coastal Research (SKLEC) Building, Minhang Campus of the East China Normal University (ECNU)

**Meeting room:** A204 which is located on the 2nd floor of the SKLEC Building.

On Wednesday 17 October 2018, **participants are requested to gather at the hotel lobby by 08:10 hours** and leave for the Minhang Campus of the East China Normal University (ECNU) at 08:15 hours.
2. Accommodation

We have made a block booking for a number of rooms at the Vienna International Hotel. Preferential room rates will be provided at **428 RMB for single occupancy and 458 RMB for double occupancy**, approximately US$ 62 and US$ 67 respectively per room per night.

To guarantee the special room rate, please inform Ms Lixin Zhu at lixinzhu0305@hotmail.com with a copy to Ms Lu Wang (lwang@sklec.ecnu.edu.cn) as early as possible about your check-in date and check-out date.

Self-funded participants are personally responsible for clearing their hotel bills directly with the hotel before your departure. The hotel requires cash payment in local currency (RMB). Participants are advised to exchange the local currency prior to your departure, or at the airport upon your arrival for the hotel room cost.

**Room rate inclusions:**

- Daily buffet breakfast for 1-2 persons at the Wudaoxiang restaurant (五稻香餐厅), located on the first floor of the Vienna International Hotel
- Wi-Fi internet access in room
- Government Tax and service charges

**Check in/out time:**

- Check in time is before 06:00 am or after 14:00 pm and check out time is before 14:00 pm.

3. Transportation to and from the airport

Shanghai Pudong Airport (IATA: PVG, ICAO: ZSPD) is the main international airport serving the city of Shanghai, China. The airport is located 30 km (19 miles) east of Shanghai city centre.

The Vienna International Hotel (meeting venue and accommodation) is located in the northwest of Shanghai City, 54 kilometers from Shanghai Pudong Airport. The local host will provide assistance on local transportation arrangement
between Shanghai Pudong Airport and the Vienna International Hotel.

4. Registration

The registration desk will be open on 15 October 2018 at 08:30 a.m. in front of the meeting room. Please provide your name card to the Secretariat upon registration.

5. Wi-Fi

Free Wi-Fi will be available in the meeting room. Password will be announced accordingly.

6. Reception

Welcome reception and farewell dinner will be hosted by the State Key Laboratory of Estuarine and Coastal Research, East China Normal University on Monday 15 October 2018 and Wednesday 17 October 2018 respectively. Please confirm your attendance and indicate your food restrictions if any (e.g. vegetarian, no beef/pork), with the local contact points in advance.

7. Visa Requirements

It is the responsibility of participants to establish visa requirements for China and any transit countries as may be necessary, including the securing of such visas.

Each participant should ensure that his/her passport is valid for at least 6 months from his/her travel dates. If a visa to China is needed, the application process should begin immediately. Please contact Chinese embassies, consulates, Chinese diplomatic missions, or a Chinese Visa Application Center (CVASC) in your country or check: http://cs.mfa.gov.cn/wgrlh/lhqz/ for more information on visa requirements and applications.

8. Time Zone

China Standard Time (CST) is 8 hours ahead to the Universal Time Coordinated (UTC).
9. Electricity

The mains supply in China is 220 volts, 50Hz and the plug shape is type I. If you wish to use an electric appliance, you may need an international adaptor plug.

10. Currency

The currency in China is RenMinBi (RMB). The exchange rate as of October 2018 is USD 1 = RMB 6.88 (from U.N. Operational Rates of Exchange)

All major credit cards and traveller's cheques are widely accepted at banks, restaurants and shopping centres.

Participants are advised to exchange some local currency prior to your departure, or at the airport upon your arrival for the taxi fares and hotel rooms at the Vienna Internataional Hotel.

11. Weather

It tends to be a sunny, cool and dry weather and rarely rains in October in Shanghai.

Since the meeting room is air-conditioned, it can be rather cold inside. The dress code for the meeting is smart casual, and a light jacket or shawl would be appropriate.

12. Health

All participants are required to obtain medical insurance for the duration of the meetings prior to your departure.

In case you have an urgent need for medical treatment, please contact the hotel’s information desk (available for 24 hours). The hotel has a first-aid kit available for basic medical care. The nearest hospitals to the hotel are:

1) Shanghai Putuo District Central Hospital

Address: No.164 Lanxi Road, Putuo District, Shanghai, China

Call Center: +86 21 2223 3222
2) Huashan Hospital

Address: No. 12, Wulumuqi Middle Road, Jing’an District, Shanghai, China

Website: https://huashan.org.cn/

Call Center: +86 21 5288 9999

13. Local Contact Point

Should you have any questions or require any assistance on the logistic arrangements, please feel free to contact:

Mr Lixin Zhu
Meeting Secretary
State Key Laboratory of Estuarine and Coastal Research, ECNU
Mobile: +86 175 2121 4296
E-mail: lixinzhu0305@hotmail.com

Ms Lu Wang
Meeting Secretary
State Key Laboratory of Estuarine and Coastal Research, ECNU
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E-mail: lwang@sklec.ecnu.edu.cn

The meeting organizer disclaims all responsibilities for medical, accident and travel insurances, for compensation for death or disability compensation, for loss of or damage to personal property and for any other losses that may be incurred during travel time or the period of participation. In this context, it is strongly recommended that participants will secure international medical, accident and travel insurances for the period of participation prior to departure.

Finally, we wish you a pleasant stay in Shanghai!