Marine litter investigation during the cruise of China’ s Eighth Arctic Expedition

Prof. LU ZHIBO
Tongji University
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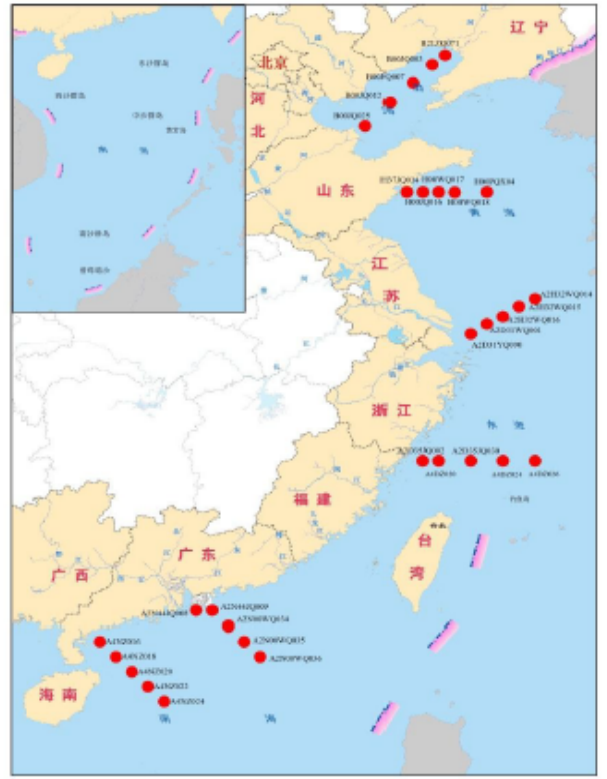
- **2014:** Coasts, river mouth and offshore regions in China
- **2017:** Arctic, Antarctic, and High Seas

SOA's Marine Debris Monitoring Program

2016

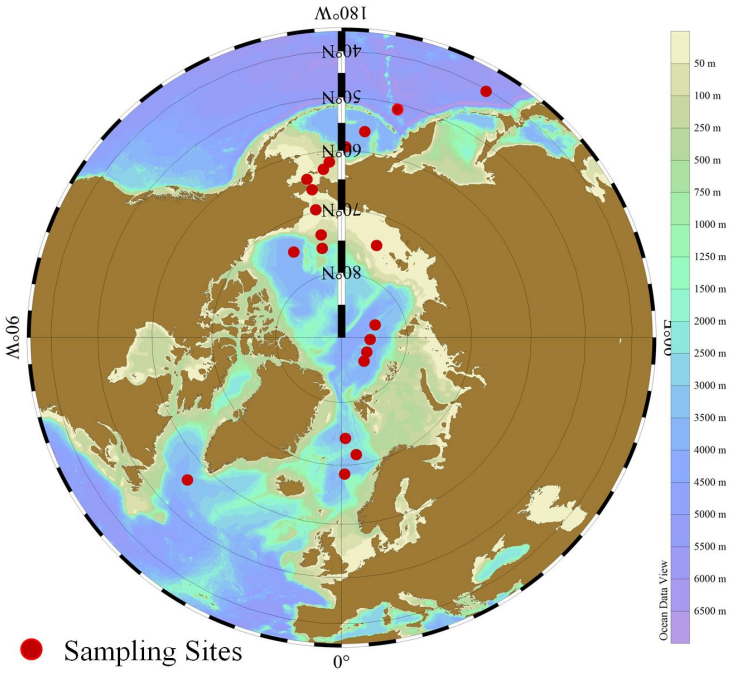


2017

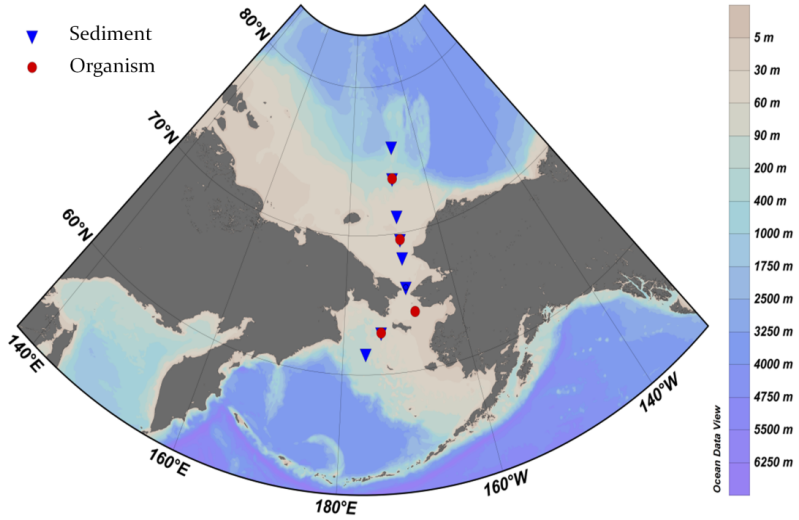
- Micro-debris: being commenced since 2016

In recent years, China has begun to monitor marine microplastics in offshore, ocean and the polar regions. In the polar regions, both China' s eighth Arctic Expedition in 2017 and the 34th Antarctic Expedition in 2017/18 season carried out investigations on floating litter and marine microplastics. In September 2017, the Research Center of Marine Litter and Microplastics was founded at the National Marine Environmental Monitoring Center.

Cruise of China’ s Eighth Arctic Expedition



Surface water: 21 sites

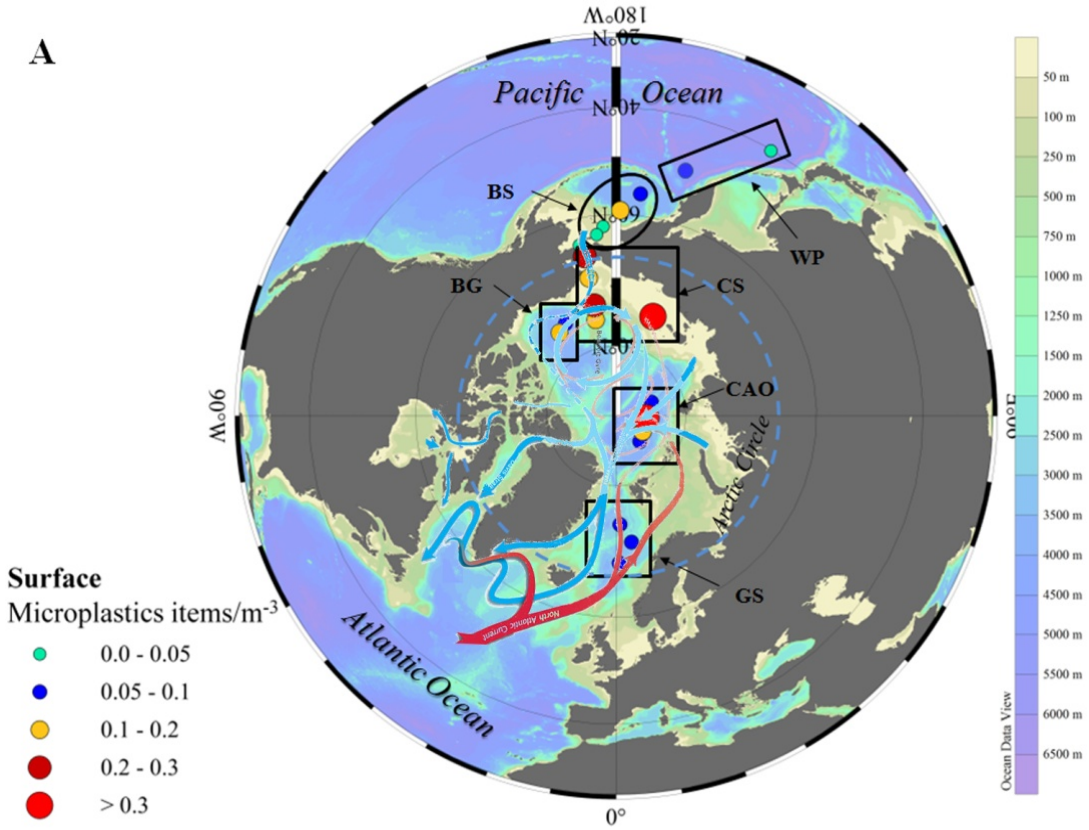


Sediment: 8 sites

Benthic organisms: 4 sites

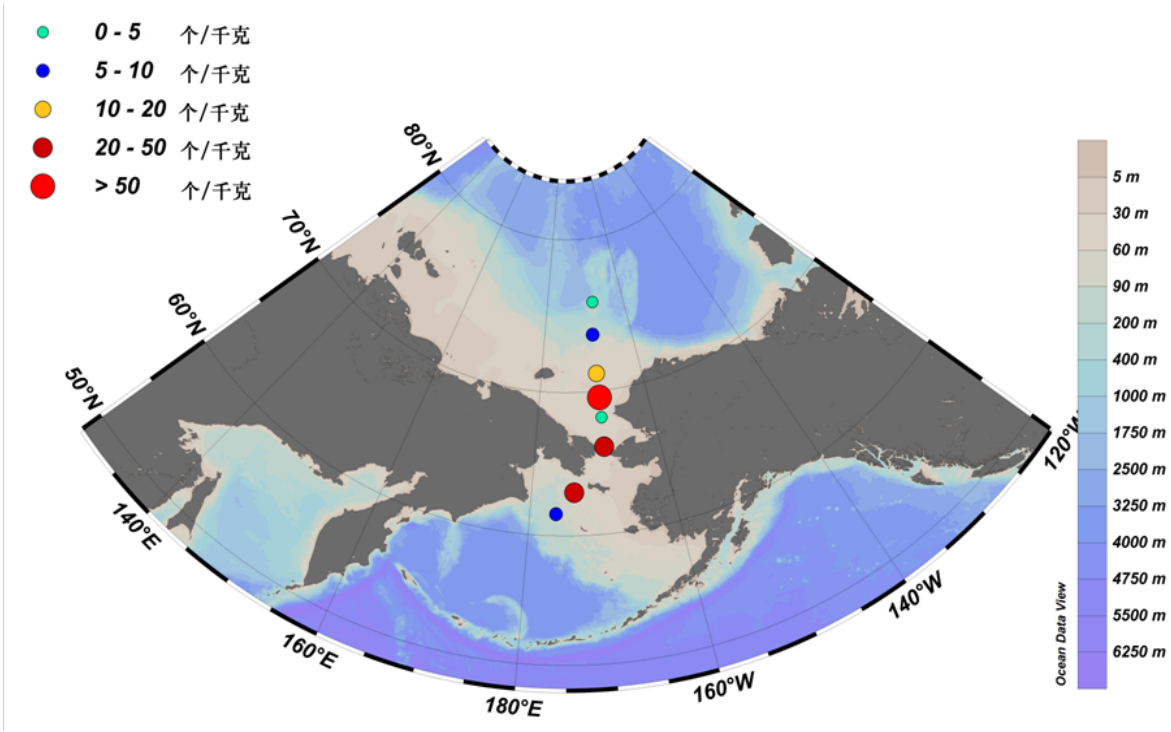
- This is the cruise route of China’ s eighth Arctic Expedition. Floating litter was observed along the whole voyage and was investigated at certain points using trawls. Surface seawater, sediment, and benthos samples were collected for the marine microplastics survey. Due to the limitations of our icebreaker Xuelong, we did not do the fish survey.
- The surface seawater sampling covered the Northwest Pacific, the Bering Sea, the Chukchi Sea, the Beaufort Sea, the ice zone in the Arctic Ocean and the Nordic Seas while sediments and benthos were collected in the Bering Sea-Chukchi Sea Shelf.
- The picture on the left shows the 21 sites for surface water collection using net trawls and filters. The triangles in the picture at the bottom right show 8 sediment sites and the dots indicate the location of 4 benthos sites.

Concentration of microplastics in surface water



- Highest: 0.31 Items/m^3
- Fibers > 87%
- PET (Polyethylene terephthalate)>76%

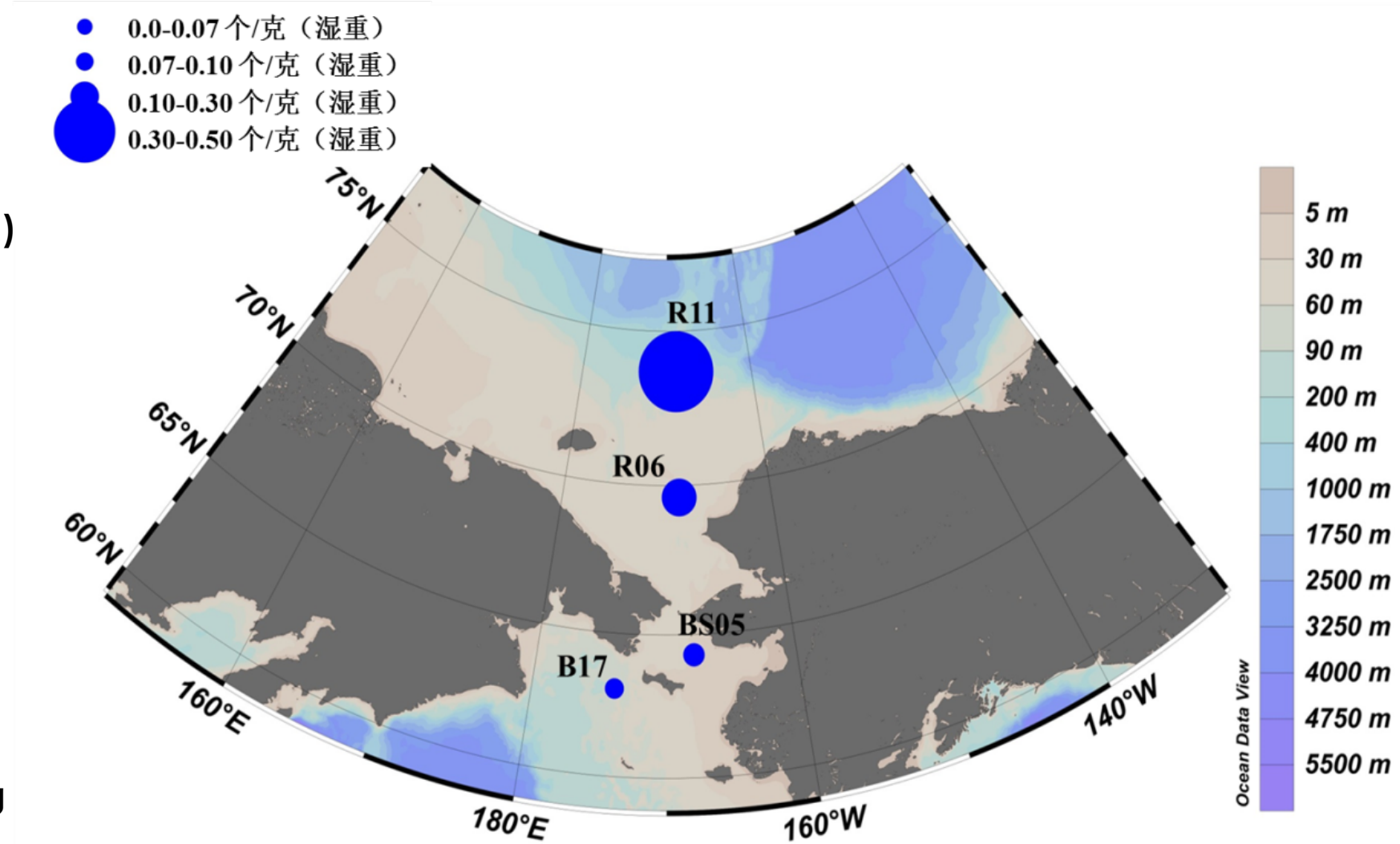
Concentration of microplastics in sediments



- Average: 20.5 items/kg dw
- Highest: 68.8 items/kg dw
- Fibers > 75%
- PP:56%
- PET:22%
- Cellophane:22%

Concentration of microplastics in surface water

- 大西洋海星（Asterias rubens）
- 泥海星（Ctenodiscus crispatus）
- 北极甜虾（Pandalus borealis）
- 雪蟹（Chionoecetes opilio）



- Asterias rubens is the highest
- The range is 0.02-0.46 Items/g
- Nylon: 51%
- PE :33%
- Cellophane:13%

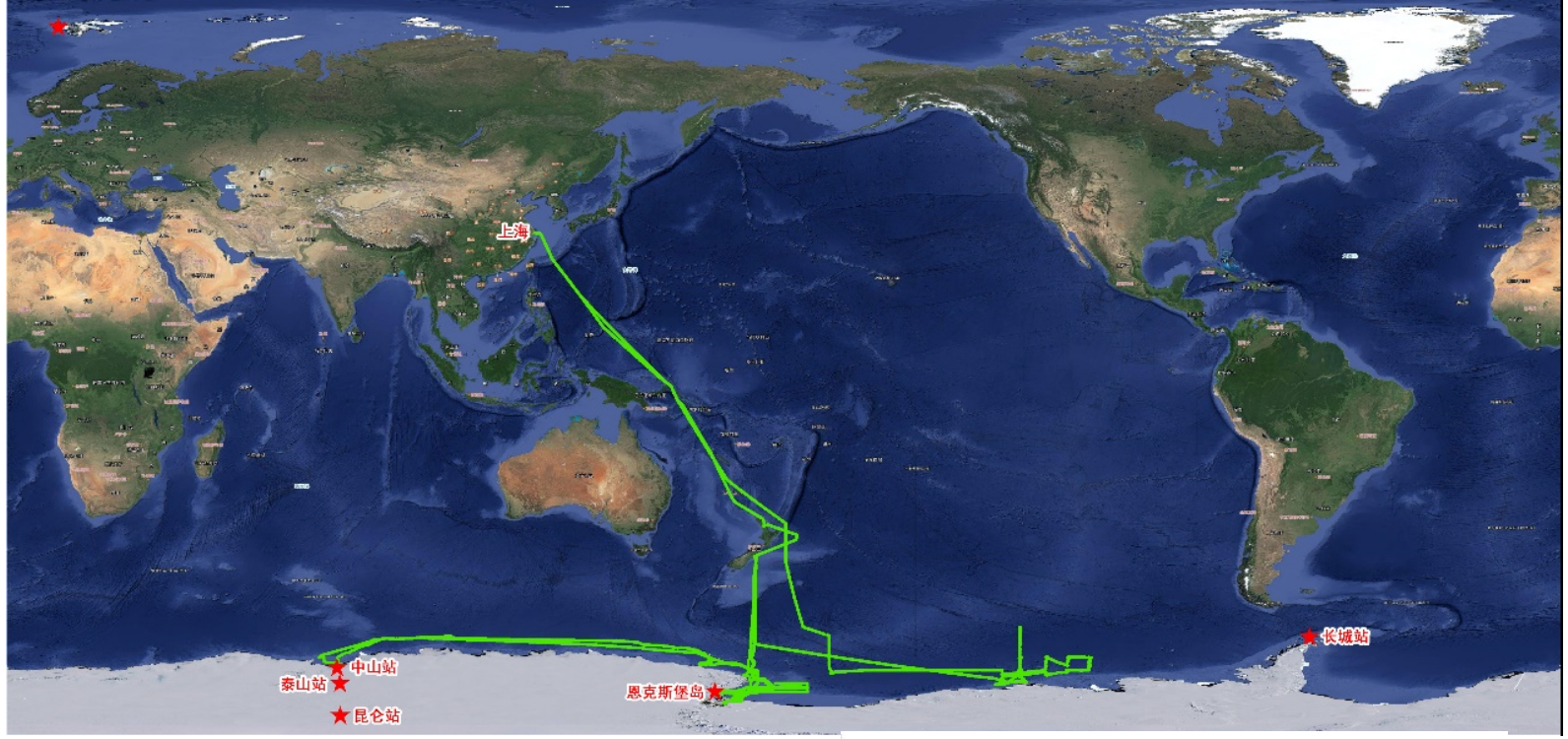
Preliminary Findings in the Arctic

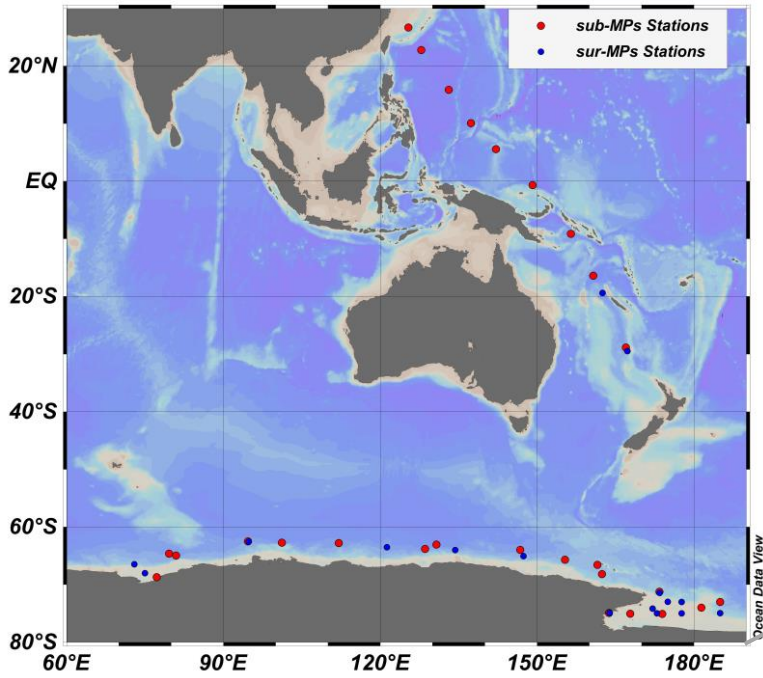
❑1. Large floating debris is mostly found in the coastal and offshore areas where there are intensive human activities.

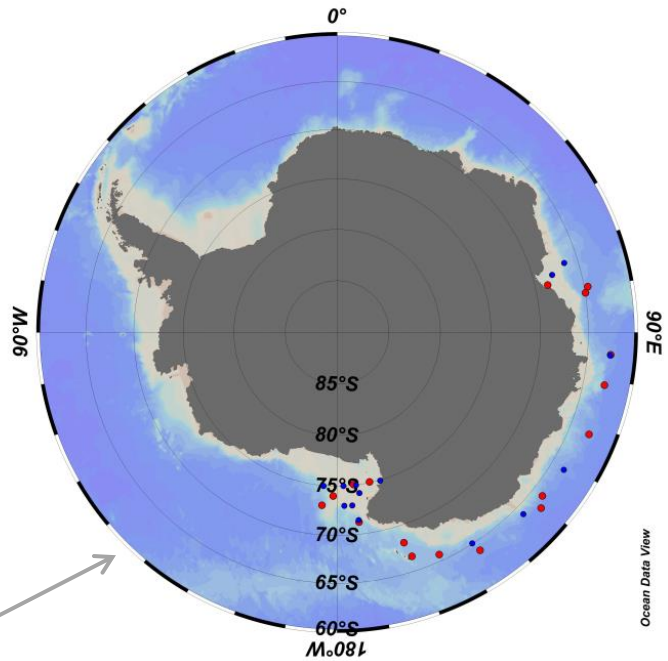
❑2.Within the Arctic Circle, the areas with relatively high microplastics are located in Bering Strait, the northern Beaufort Sea and the ice zone in the Arctic Ocean, the average content is lower than the offshore area of several countries. The main sources may be long-range inputs from the Pacific and Atlantic Oceans and result in accumulation in the Beaufort Sea and the ice zone in the Arctic Ocean.

❑3.Microplastics are widely found in the sediments and benthic organisms in the Bering Sea-Chukchi Sea Shelf, though in low concentrations. However, higher concentrations are detected in the high latitudes near the ice zone within the monitored area.

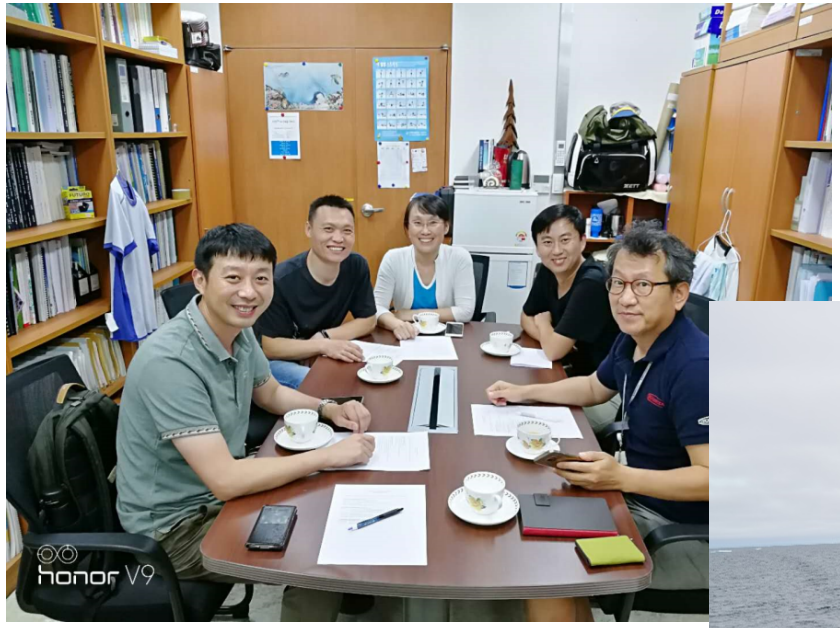
❑4. Most of the microplastics in the Arctic region are PET, PP, and synthetic fibers. PET and PP may come from large degraded debris such as fishing gear and nets, plastic bottles and ropes that are transported along with ocean currents over long distances. Synthetic fibers like acrylic and polyacrylonitrile may migrate over long distances with ocean currents or come from the sewage and waste water from coastal areas.







- This is the route of Xuelong in the Antarctic . Microplastics investigations were mainly conducted in the Ross Sea, the Davis Sea-Prydz Bay and the Amundsen Sea.
- During the voyage, 14 microplastics samples were collected from surface seawater and 20 from the subsurface.
- Since the Antarctic Expedition returned in the late April 2018, the analysis is still underway.
- China has cooperate with Norway, South Korea, Thailand, Germany and Malaysia in recent years.
- China is willing to have more international cooperation focusing on the marine litter and microplastic related scientific research both in Arctic and Antarctica regions.
- As an observer, we are willing to donate our knowledge and sharing the available data in Arctic with PAME and Arctic Council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Phuket
Aquarium
WESTPAC Training Workshop on "Distribution, Source,
Fate and Impacts of Marine Microplastics in Asia and the Pacific"
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