

# Marine Plastic Debris Science In Countries of East Asian Seas

An update and extension of NUS May 2019 Report

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**SEA of Solutions**

**11 November 2019, Bangkok**

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*NUS Research Project on combating pollution from marine plastics through international law, governance and science – Youna Lyons, Kanin Laopirun, Amanda Lim, Neo Mei Lin, Yuke Ling Tay and Vu Hai Dang*

# The Next Step Forward



- Updating SEA nations with newly published research
- Re-analyzing research with new categories
- Expanding geographical scope to China, South Korea, and Japan

<b>Category</b>	<b>Explanations</b>
Country	Location of the main research institution
Research Group(s)	Institution affiliations of all researchers
Source of Funding	Source(s) of funding supporting the research
Aim of Research	Briefly define purpose of study
Methodologies Used	Key terms describing methodology
Period of Study	Dates/Years of sampling
Scope of Work	Characteristics of plastic
Geographic Location of Work	Locality of research
Scale of Work	The environment of plastic occurrence - Biological and ecological habitat, Non-biological environment, Socioeconomic
Pollution Impact	Specific to the subject of study - physical, ecological, physiological, biochemical impact
Plastic Source	Point of entry into the environment
Research Focus Categories	Key terms following previous report

# Categories



Marine Pollution Bulletin

Volume 142, May 2019, Pages 54-57



Baseline

Impacts of leachates from single-use polyethylene plastic bags on the early development of clam *Meretrix meretrix* (Bivalvia: Veneridae)

Ai-Ying Ke <sup>a</sup>, Jian Chen <sup>b</sup>, Jie Zhu <sup>a</sup>, Yao-Hua Wang <sup>a</sup>, Yuan Hu <sup>a</sup>, Zheng-Li Fan <sup>b</sup>, Man Chen <sup>c</sup>, Peng Peng <sup>c</sup>, Shu-Wen Jiang <sup>c</sup>, Xiang-Rong Xu <sup>d</sup>, Heng-Xiang Li <sup>d</sup> 

 Show more

<https://doi.org/10.1016/j.marpolbul.2019.03.029>

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Ke et al. (2019) *Mar. Poll. Bull.*

## Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment

YUKIE MATO,<sup>1</sup> TOMOHIKO ISOBE,<sup>1</sup>  
HIDESHIGE TAKADA,<sup>\*,1</sup>  
HARUYUKI KANEHIRO,<sup>1</sup>  
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Mato et al. (2001) *Environ. Sci. Technol.*

# Categories



- Scope of Work – Characteristics of plastics
  - Ke et al. (2019): Leachate, Polyethylene, Plastic bags
  - Mato et al. (2001): Polypropylene, resin pellets
- Geographic Location of Work
  - Ke et al. (2019): Laboratory
  - Mato et al. (2001): Four sites in Shimane and Tokyo prefectures
- Plastic Source – Point of entry
  - Ke et al. (2019): N/A
  - Mato et al. (2001): Sea

# Categories



- Scale of Work – Environment of plastic occurrence
  - Ke et al. (2019): Marine bivalve, filtered seawater
  - Mato et al. (2019): Coastal sandy beaches and canals
- Pollution Impact
  - Ke et al. (2019): Early life history of a marine bivalve
  - Mato et al. (2019): Vector and source of harmful chemicals

Mato et al. (2001)  
Ke et al. (2019)

Research Focus	Level of interest by bodies & initiatives	Natural Science Research	Recommended
Surveys and monitoring / pollution status	<i>High</i>	<i>High</i>	Priority
Ecological and environmental impact	<i>High</i>	<i>High</i>	Priority
Accumulation zones & Hotspots	<i>High</i>	<i>Medium</i>	Priority
Macroplastics	<i>High</i>	<i>Medium</i>	Priority
Source differentiation	<i>Medium</i>	<i>Medium</i>	Priority
Contribution of fisheries/Lost and abandoned fishing gear	<i>Medium</i>	<i>Medium</i>	Priority
Microplastics	<i>Medium</i>	<i>High</i>	In Progress
Methodology for the monitoring and assessment of marine litter	<i>Medium</i>	<i>Low</i>	Gap
Fragmentation and degradation	<i>Medium</i>	<i>Low</i>	Gap
Contribution from rivers/river basin management	<i>Low</i>	<i>Low</i>	Gap
Fiber reinforced plastic vessels	<i>Low</i>	<i>Low</i>	More research needed
Hull scraping and marine coating	<i>Low</i>	<i>Low</i>	More research needed
Discharge from offshore infrastructures (including aquaculture)	<i>Low</i>	<i>Low</i>	More research needed
Upstream research / Waste management	<i>High</i>	NA	Potential Gaps
Policy, laws, administrative measures	<i>Medium</i>	NA	Potential Gaps
Action Plan, guidelines and standards	<i>Medium</i>	NA	Potential Gaps
Public outreach / Beach clean-up	<i>Medium</i>	NA	Potential Gaps
Research framework, coordination	<i>Medium</i>	NA	Potential Gaps
Socio-economic impact	<i>Medium</i>	NA	Potential Gaps
Port reception facilities	<i>Low</i>	NA	Potential Gaps
Language and cultural barriers/data accessibility	<i>Low</i>	NA	Potential Gaps

# Marine Debris Research Repository

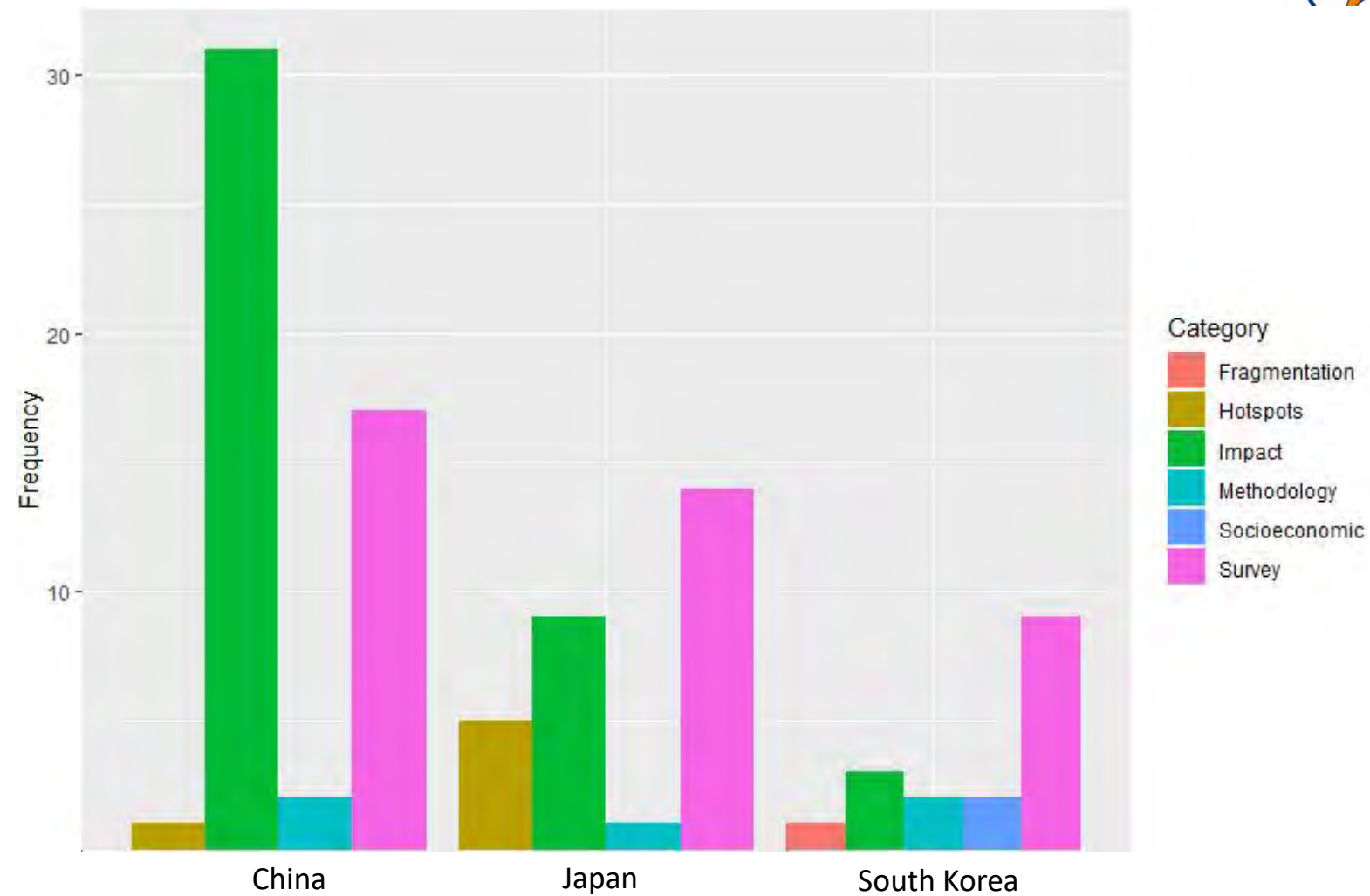


Country	Information Source	Research Group	Period of study	Research Focus	Category	Source of Fund
South Korea	Kang et al. (2015) Marine neustonic microplastics around the southeastern coast of Korea. Marine Pollution Bulletin 96(1-2): 304-312	Korea Institute of Ocean Science & Technology + University of Science and Technology (Dajeon, Korea)	2012 (May, July)	Sampling and quantifying floating microplastics in Geoje Bay, near mouth of Nakdong River	Sampling	Financial support from Ministry of Ocean Fisheries, Korea
South Korea	Lee et al. (2013) Relationships among the abundances of plastic debris in different size classes on beaches in South Korea. Marine Pollution Bulletin 77: 349-354.	Our Sea of East Asia Network + Korea Institute of Ocean Science & Technology + University of Science and Technology (Dajeon, Korea) + Pukyong National University	2012 (May, September)	Quantifying micro-, meso-, and macroplastic debris found on beaches in Geoje Bay, and correlating the abundance of debris in the three size classes	Sampling	Financial support from Korea Institute of Ocean Science & Technology
South Korea	Hidayaturrahman & Lee (2019) A study on characteristics of microplastic in wastewater of South Korea: Identification, quantification, and fate of microplastics during treatment process. Marine Pollution Bulletin 146: 696-702.	Keimyung University + The Agency for Assessment and Application of Technology (BPPT), Indonesia	-	Investigating the removal of microplastics from different treatment stages in three wastewater treatment plants	Sampling	Financial support from Keimyung University Research Grant
	<a href="#">Lee et al. (2019) Rapid assessment of marine debris in coastal areas using a visual scoring</a>	Korea Marine Litter Institute. Our	2017 (April, June)	Conducted rapid assessment of marine debris on the coasts of South Korea using a visual scoring	Data collection methodology:	Financial support from the Ministry of C

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# Research Interest



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Category	China	South Korea	Japan
Surveys and Monitoring	High	High	High
Hotspots	Low	Low	Medium
Ecological Impact	High	Medium	High
Methodology	Low	Medium	Low
Fragmentation	Low	Low	Low
Socio-economic Impact	Low	Medium	Low
Ship hulling	Low	Low	Low

# Further Work



- Repository of marine debris research in Southeast and East Asia including some analytics and summary of what is known and what is not
- Network of cooperation in marine debris research
- Proposal for a knowledge organization system in this field
- Comparison with regional policies, regulations and initiatives

# Acknowledgements



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