International Lighter Project Research Manual

Ver.1.0

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1. Introduction

The cause of marine litter depends on highly complicated factors and some kinds of litter occur repeatedly. To solve the problem, we must pick up the litter widely and continually. However, it is not a method of fundamental or final solution.

First of all, we must clarify the outflow factors and sources of marine litter to solve this problem. Therefore it is necessary to develop a method to monitor discharge areas, flow and extent of the effect of marine litter. We have made a trial to monitor marine litter, using disposable lighters as an indicator item on the coast of the East Asia (Japan, Korea, China and Russia).

We try to monitor the marine litter by this method in the North Pacific during a 2 year period starting from this year (2010 to 2011).

We would like to request you to assist us by collecting lighters at your nearby beaches and sending them to us. This paper demonstrates the objectives of the research project, a procedure to collect and send lighters and the past result of International Lighter Project, as well as the expected result from this research.

2. Disposable lighters

Certain features of disposable lighters (Fig.1) make them the ideal marker for this method of monitoring marine litter:

They are

- widely available
- durable
- small with vivid colors
- have raised markings and printed characters

→

- **Large number**
- **Drifting of a long time**
- **Easy discovery, collection and transportation.**
- **Easy to differentiate the outflow area, country and location.**

Fig.1 Disposable lighters (from left; Japan, Korea, Taiwan, China, Hong Kong)

3. Subject

1. Flow estimation of drifters
2. Source estimation of Drifters
3. Estimate of effective source areas
4. Estimate of density distribution
5. Monitoring
6. Estimate of dynamic state of marine litter

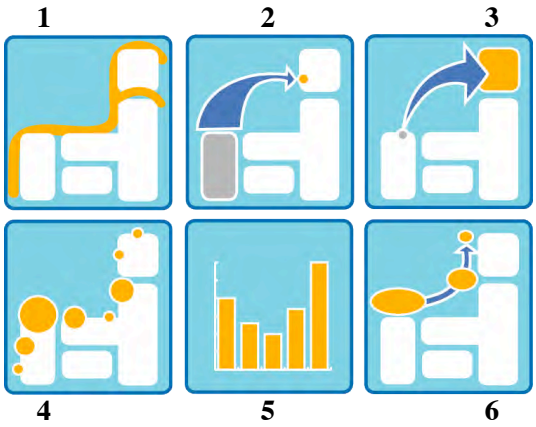


Fig.2 Subjects of this study

4. Collection of disposable lighters

- Please collect all lighters regardless of gas filled, broken, or with or without printed characters/letters.
- Collection timing: Preferably once a month, but if that is difficult, once every three months, or even once a year is fine (e.g. separate only disposable lighters which you collected during ICC).
- Do not mix with lighters with those from other sites, nor with those that have been ingested by animals, i.e. lighters found with animal carcasses.
- Please record the following information on a bag:
  - Site name with town, city and state name
  - Position on the map (Use a map that can show the beach location, marking it on the printed out map. Put the map in a plastic bag and put in the bag with lighters)
  - Date (day/month/year)
  - Estimated distance of which you collected lighters; 200 meters, 500 meters, 1000 meters…
  - Mark "Drifted", if the lighters were on the beach lying, or "Ingested", if it was in the carcasses, and put them in the separate bags.
- Please fill in the necessary information on the form attached, and put that form in each bag of lighters if lighters were picked from different sites or found in animal carcasses.

Information from

Your name and contacts		
Site	Country: States: City or Town or Island:	Site (beach) name:
Date	(day/month/year)	
Distance collected	Length (meters)	Width (meters)
Specimens	□ Drifted on the beach	□ Ingested by animals

5. Tools for removing the gas from lighters and for sending them

Tools and materials:

- Handy power drill with 1.5 or 2.0 mm bit
- Wooden board
- A glove (made of thick leather) for the hand you hold a lighter
- Information form(s)
- Bag(s)
- A cardboard box

Fig.3 Tools for removing the gas from lighters

6. How to remove the gas from a tank

(1) Position of a hole

Please select a part of the tank where there is no printing (letter/numbers/characters "Photo. B") when you drill a hole.

Photo. A printing side "No good"

Photo. B no printing side "Good"

(2) Drilling a hole

Put down a board on the floor. Put a lighter on the board. Hold one hand with a glove against the lighter. Drill a hole of 1.5 mm in diameters with a handy power drill (Photo. C). If there is liquid in the tank, when it gets a hole, gas will escape. Stop drilling, and allow the gas to escape.

Photo. C

(3) Removing the gas

Do not bag the lighters right away after drilling because there may be still a little gas left in the tank. Put the lighters in a bag only after letting stand them for a day.

7. Posting Address & Payment

(1) Please send lighters to the following address:

Dr. Shigeru Fujieda
Fac.of Fisheries, Kagoshima University
4-20-50 Shimoarata, Kagoshima City,
Kagoshima, Japan

(2) Payment

I will pay shipping costs and costs to purchase tools.
Please contact me for details.

E-mail : fujieda@fish.kagoshima-u.ac.jp

8. Results from past study

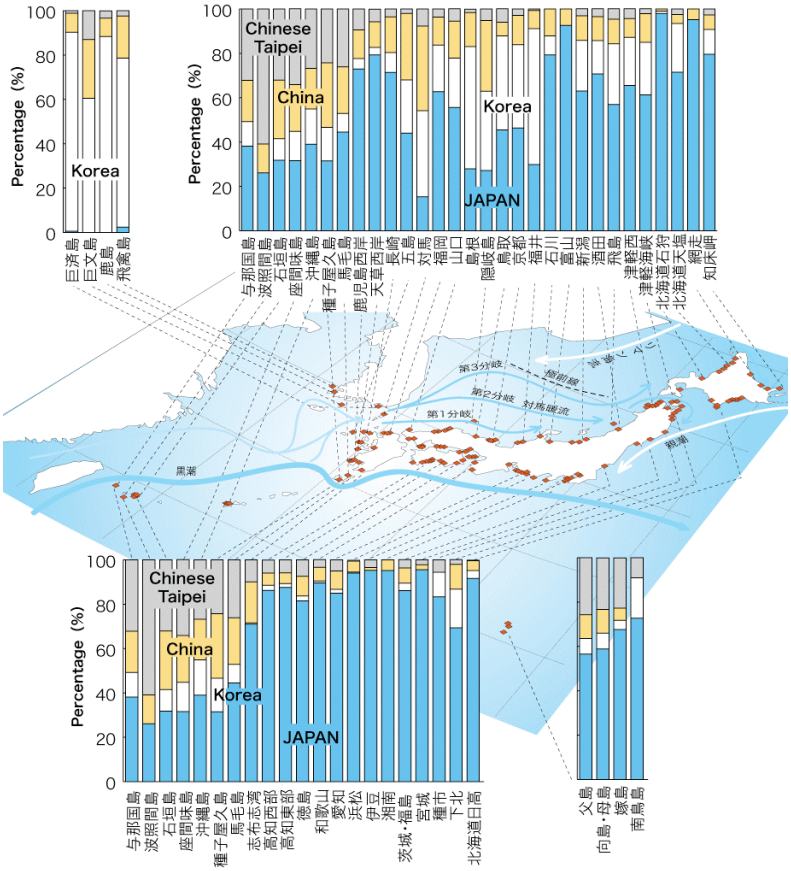
LATEST DATA (1.Apr.2010)

Collecting period： Aug. 2003～Dec. 2009

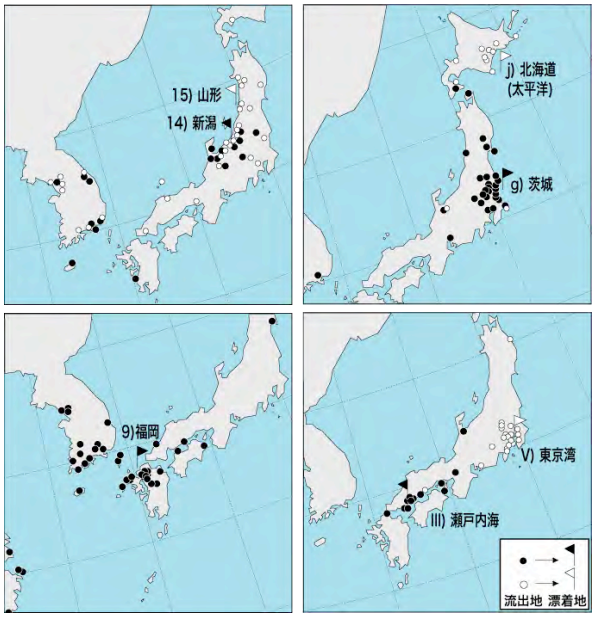
Collected sites： 1,066 sites (include Korea 8 sites, China 1 site, Russia 3 sites)

Total collected number： 47,624

(1) Percentage of production and consumption countries of lighters on the Japanese and Korean coasts

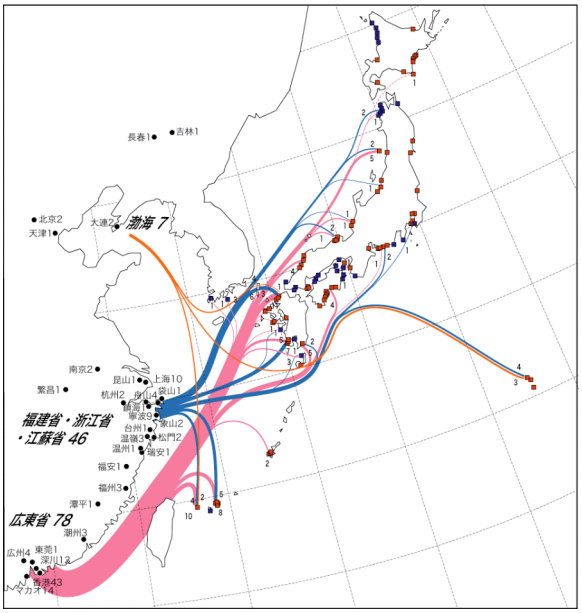


(2) Relationship between outflow locations of Japan lighters and the Japan coast (Fujieda, 2006)



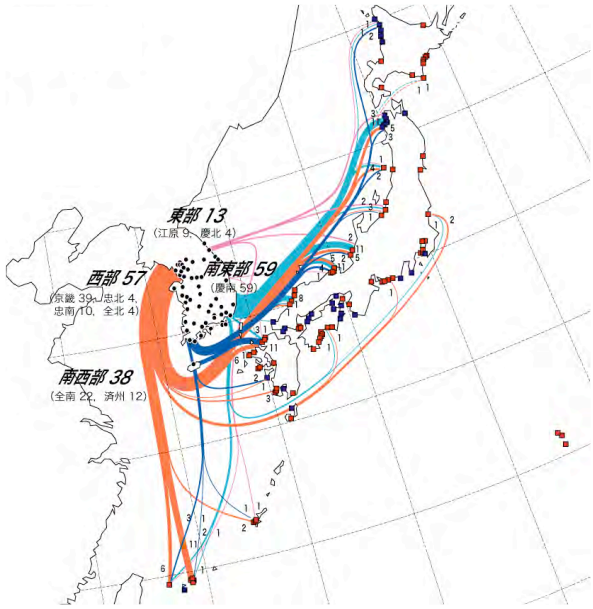
- Outflow locations of Japan lighters were city along the coast and river near the collected sites.

(3) Relationship between outflow locations of China lighters and the Japan coast (Fujieda, 2006)



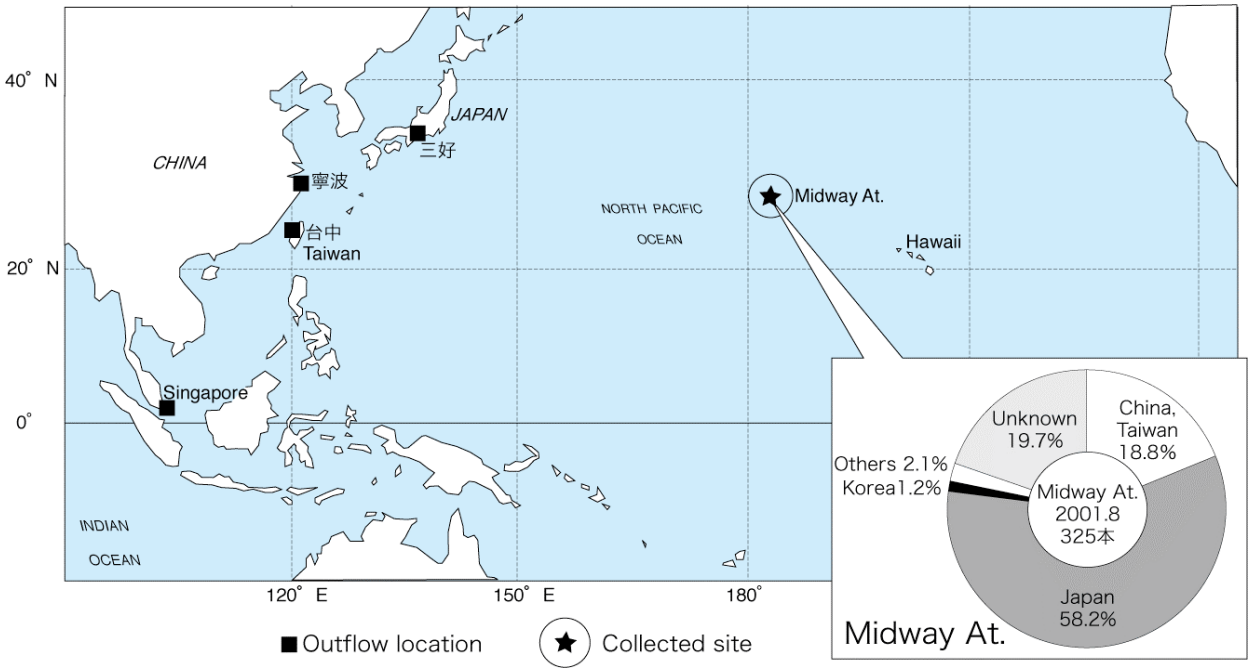
- Outflow locations of China lighters were mainly the two coastal areas of East China and South China.
- Additionally they came to Ogasawara Islands.

(4) Relationship between outflow locations of Korea lighters and the Japan coast (Fujieda 2006)



- Korea lighters flow out of the whole area of Korea.
- A percentage of the total number of lighters that flowed out of the west coast of Korean peninsula drifted on the coast of Ryukyu archipelago, but they mainly drifted on the Japan coast of Sea of Japan.
- A percentage of the total number of Korea lighters came to the north Hokkaido.

(5) Link between the outflows of marine litter from the East Asia region and Northern Pacific region (Fujieda, 2003)



- We picked up lighters from corpses of young bird of Laysan Albatross on the Midway Atoll, USA at Aug. 2001.

9. Expected Result

- Japan coast was affected by marine litter from both countries Korea and China. And the Korea coast was also affected by marine litter from China. But all countries discharge a large quantity of litter to the East Asia Sea, Japan Sea and Pacific Ocean.
- Parent albatrosses eat many plastics mistakenly in the North Pacific. As a result when they are fed by their parents, many young birds choke and are found dead in their nests in the Midway atoll. In 2001, we obtained this finding in 2001 after examining the stomachs of the birds and classifying the 325 lighters that were found. Japanese lighters consisted of about 60 % of all the lighters found and the lighters were mainly from East Asia. (Fujieda, 2003).
- Therefore we think that marine litter flowed out of East Asia countries affect the North Pacific Ocean.
- We hope this study in which one of real items of marine litter is used will demonstrate the discharge areas, routes of marine litter drifting in the ocean and its widespread effects on far away beaches.

10. Reference

S.Fujieda. Souce estimation of beach litter by drifted ashore indicator, Disposable Lighter, Journal of Japan Driftological Society, 1, 13-20, 2003. (in Japanese)

S.Fujieda and A.Kojima. Estimation of the source of marine litter drifted on the coast of East Asia, Journal of Coastal Zone Studies 18(4), 15-22, 2006. (in Japanese)

S.Fujieda, A.Kojima and H.Kanehiro. Monitoring marine debris using Disposable Lighter as an indicator, Joural of the Japan society of waste management experts, 17(2), 117-124, 2006. (in Japanese)

11. Contact us

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