

# Introduction of activity of dataset collection, acceptance, and processing along with overall data handling workflow

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# Atlas of Ocean Microplastics; AOMI 青海 (blue ocean)

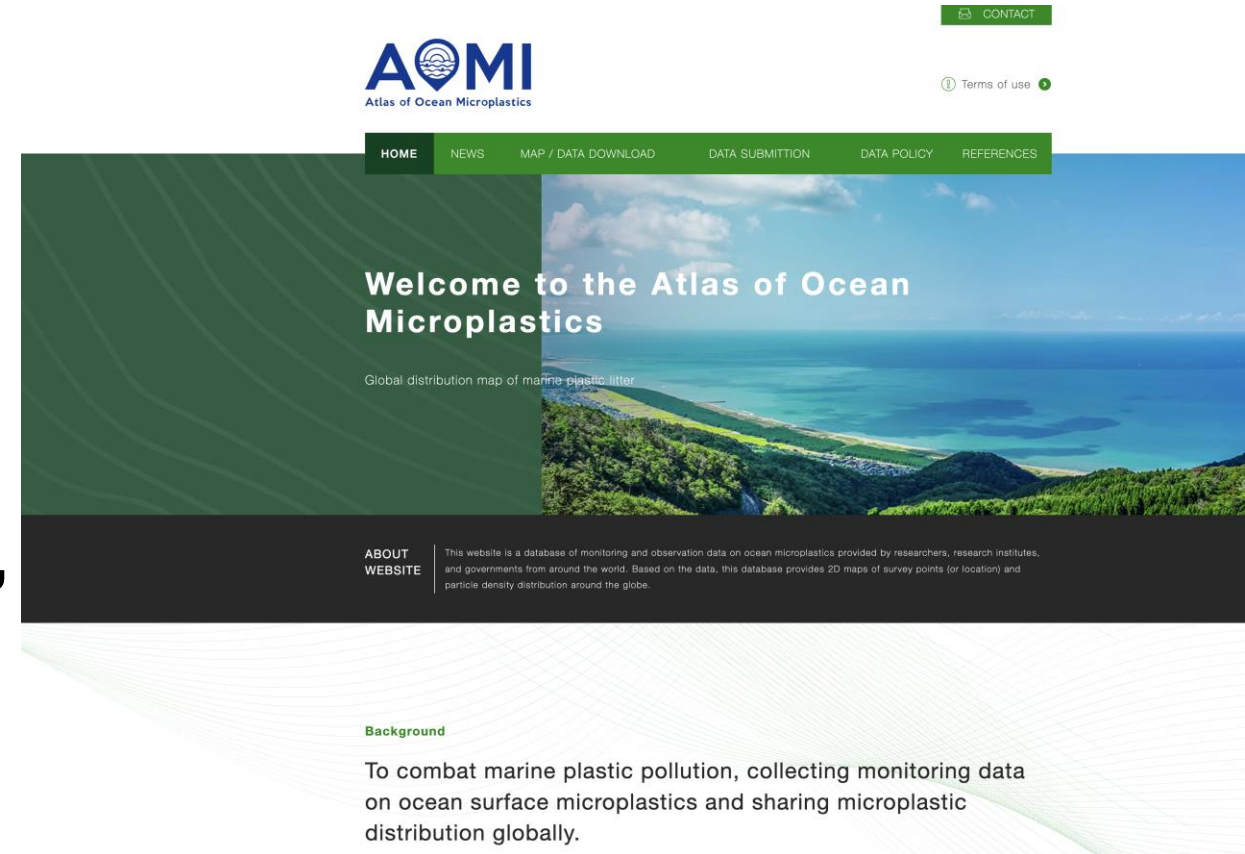
Atsuhiko ISOBE

Center for Ocean Plastic Studies,  
Research Institute for Applied Mechanics,

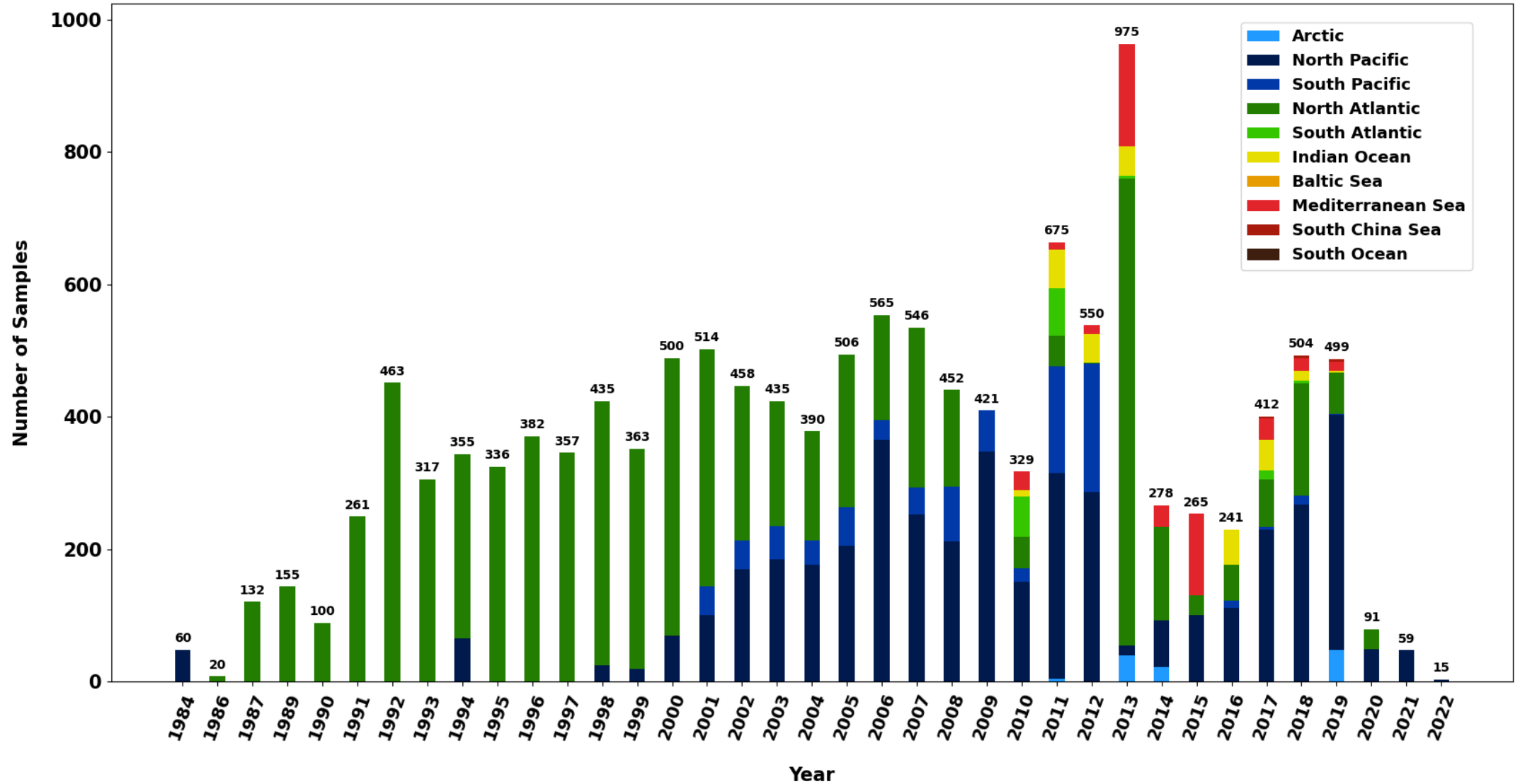
Kyushu University, JAPAN

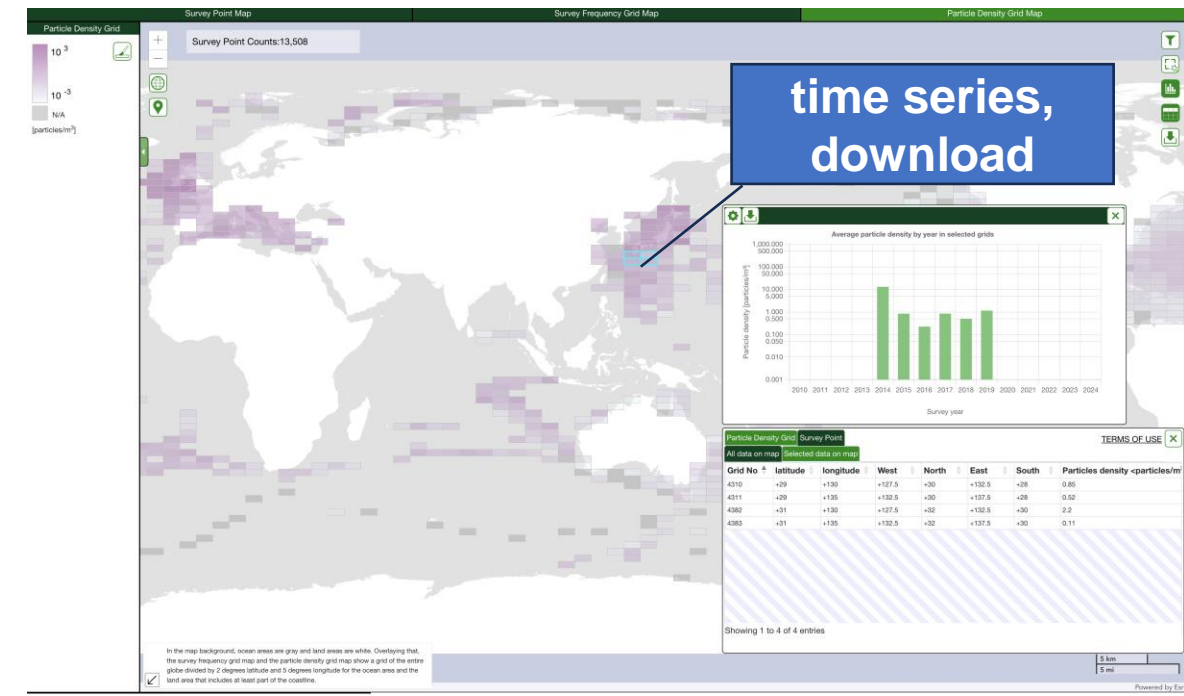
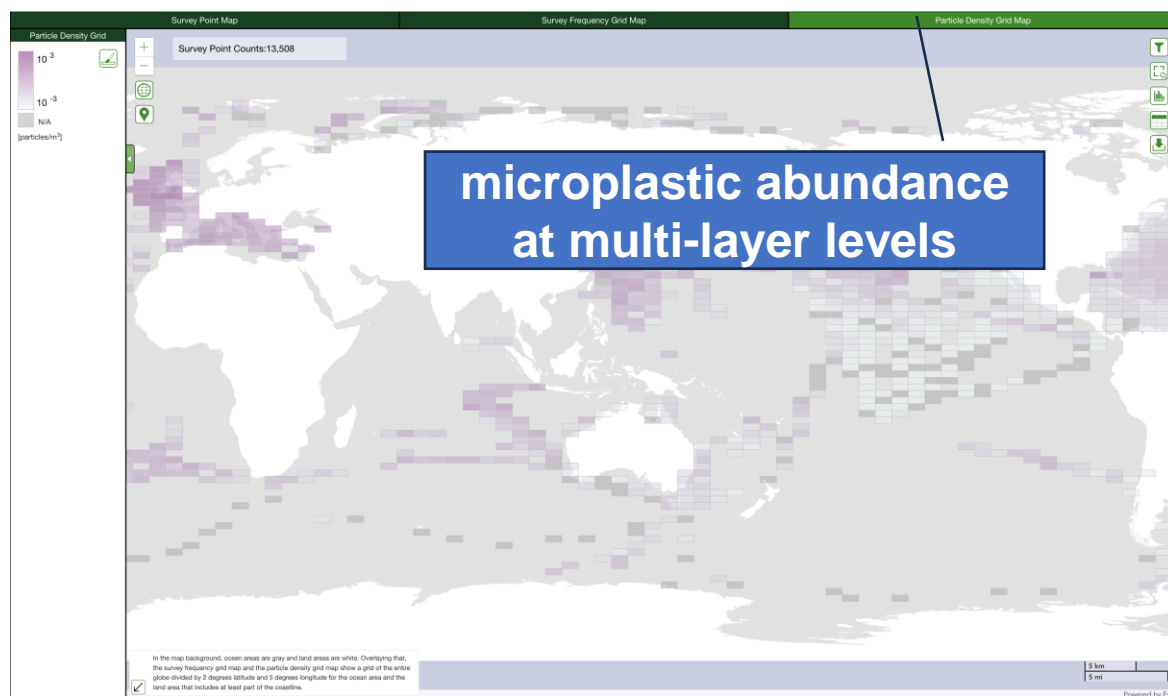
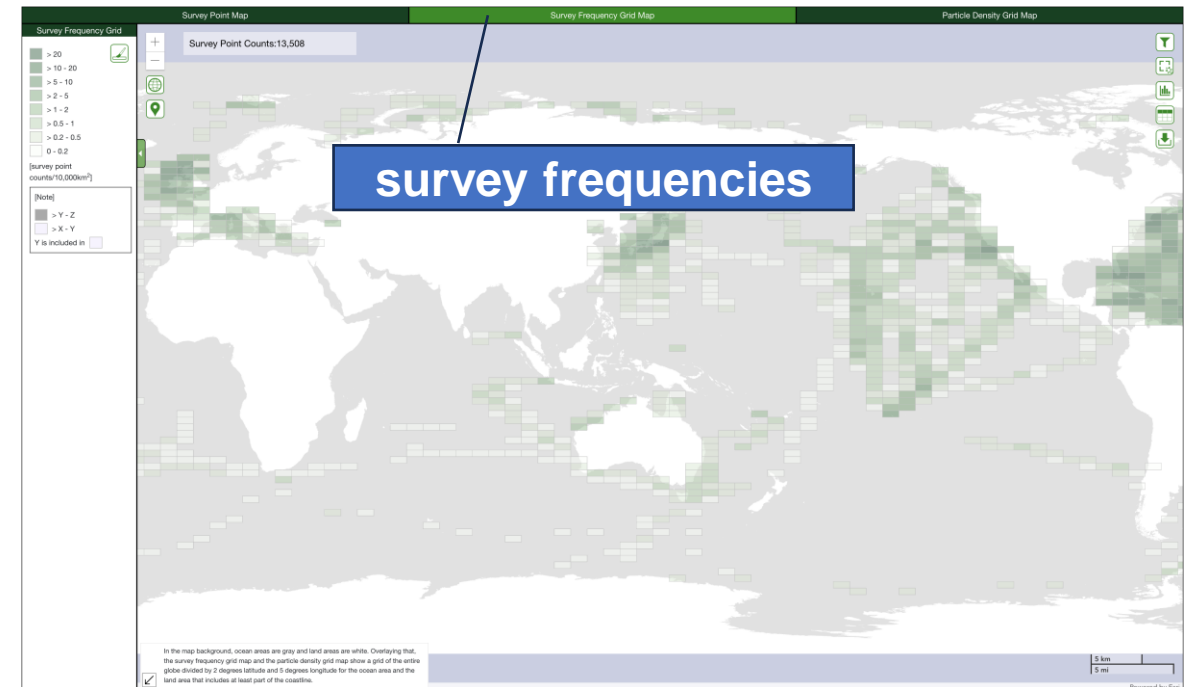
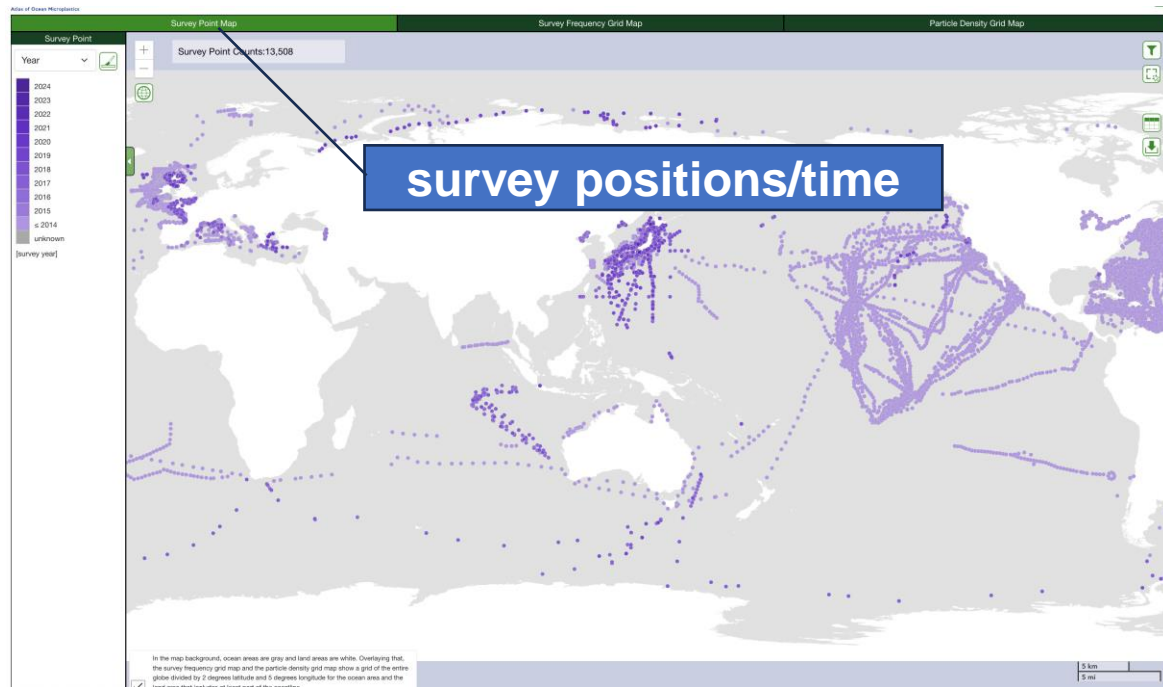


<https://aomi.env.go.jp/>



## Latest update of AOMI database





# Uploading to AOMI database

## How to contribute to AOMI?



You can **download an excel file** to provide your information

### UPLOAD FORM

[Excel file](#)

Form File.xlsx

(Please find "Data Entry Form Sheet & Data List Sheet")

Please create your data files using the templates provided (.xlsx and .xlsm), and submit them using the upload area below.

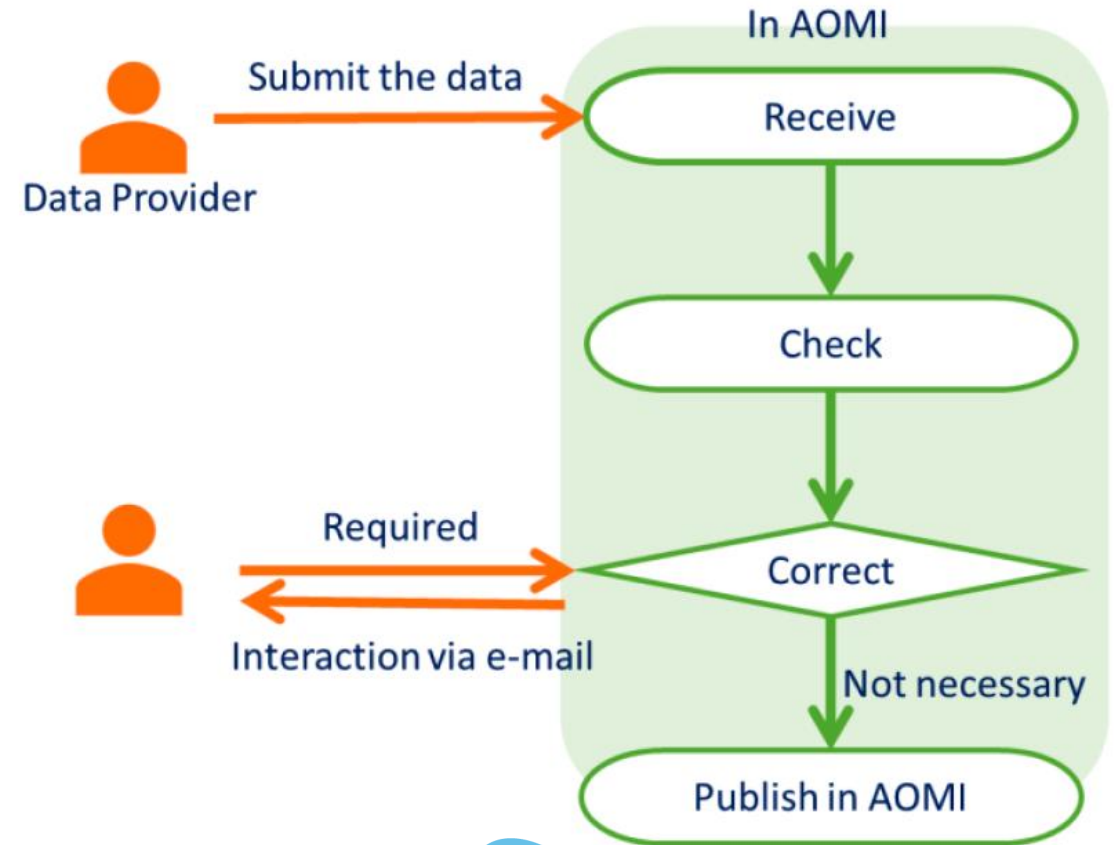
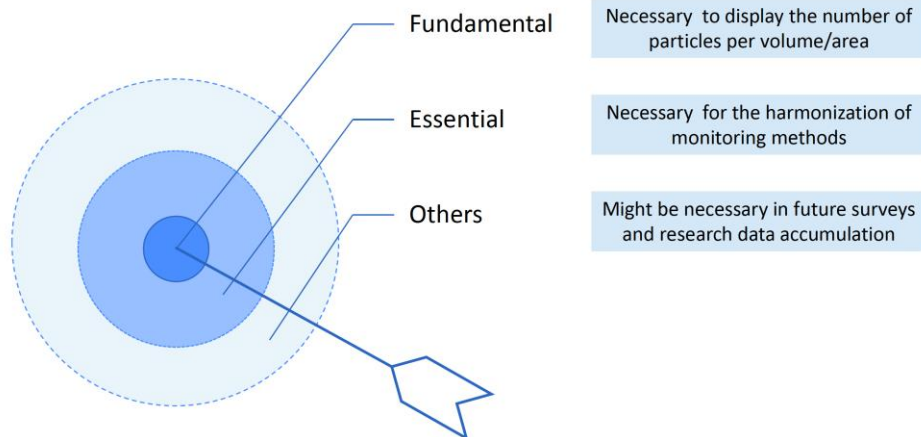
Our administrators will review the data, if there is any question, we may contact you via email to request data revisions and resubmission.

#### • Terms of data submission

Individual data records will be provided to those who have agreed to use them within the scope permitted by their respective Creative Commons licenses.

We will use the data you provide to create charts and graphics in this database. The charts and graphics created will be distributed under a Creative Commons license (CC-BY-SA), with the condition that proper attribution to this database is given.

## Data items categories

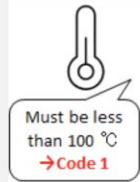


## DATA SUBMISSION

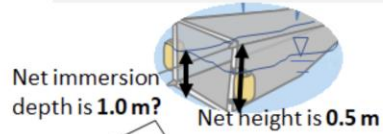
HOME > DATA SUBMISSION

- › Data Format
- › Submission Method
- › Multiple Stages of Data Submission
- › Confirmation After Submitting the Data
- › Upload Form

### Data Entry Form



Sea surface temperature (°C) is **100 °C?**



Net immersion depth must be less than or equal to net height  
→ Code 2

Tow starting point  
Tow distance = 28,242 m?

Database operator:  
Might be too long!? → Code 3

Data provider A:  
No, the data are correct. The tow distance was exactly 28,242 m → Code 4

Database operator:  
"Particle density/km<sup>2</sup>" can be calculated from the provided data ("net immersion depth 0.5 m" and "particle density 1.67/m<sup>3</sup>") by using following formula.  
 $1.67 / 0.5 * 1000 * 1000 \approx 3,340,000 / \text{km}^2$   
→ Code 5

Data provider B:  
Yes, I confirm that and am resubmitting the data.

Database operator:  
"Particles/m<sup>3</sup>" should be calculated from "particle quantity," "net width," "net immersion depth" and "tow distance." You must have "net immersion depth" data. → Code 6

**QC**

## UPLOAD FORM

Form File.xlsx

Please create your data files using the "Data Entry Form Sheet & Data List Sheet" provided (.xlsx and .xlsm), and submit them using the upload area below.

(How to input data is contained in the sheet.)

Our administrators will review the data, if there is any question, we may contact you via email to request data revisions and resubmission.

#### Terms of data submission

Individual data records will be provided to those who have agreed to use them within the scope permitted by

Name\*:

E-mail Address\*:

Organization\*:

Creative Commons License\*:

Dataset Description:

Enter a description of the data and consultation on atypical data.

Drop a file here  
OR

Select a file

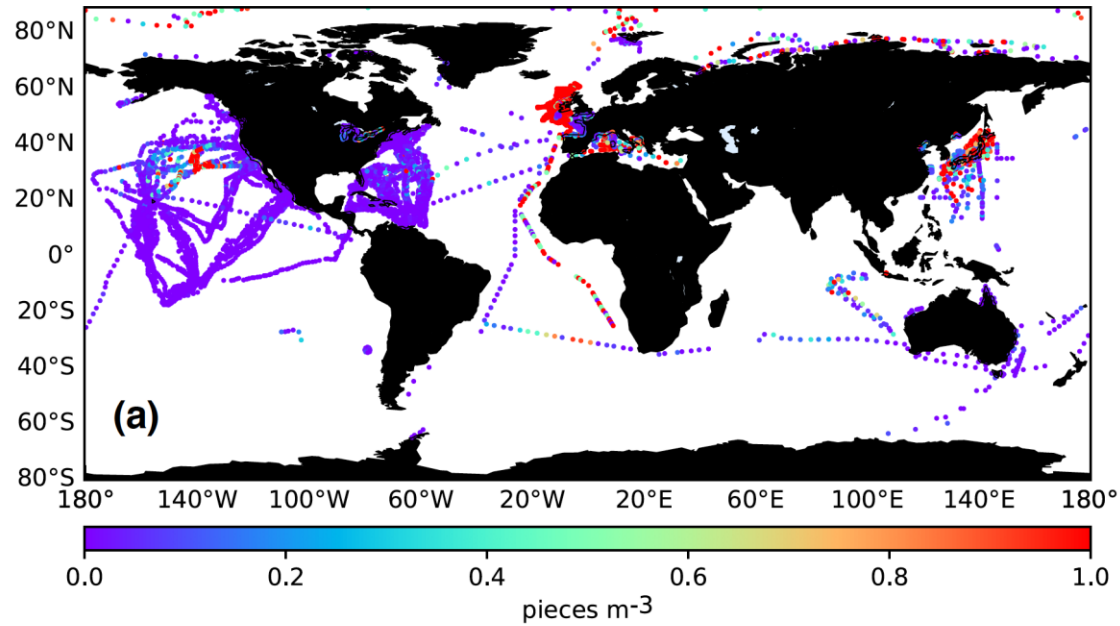
Terms of use

✕ CLEAR

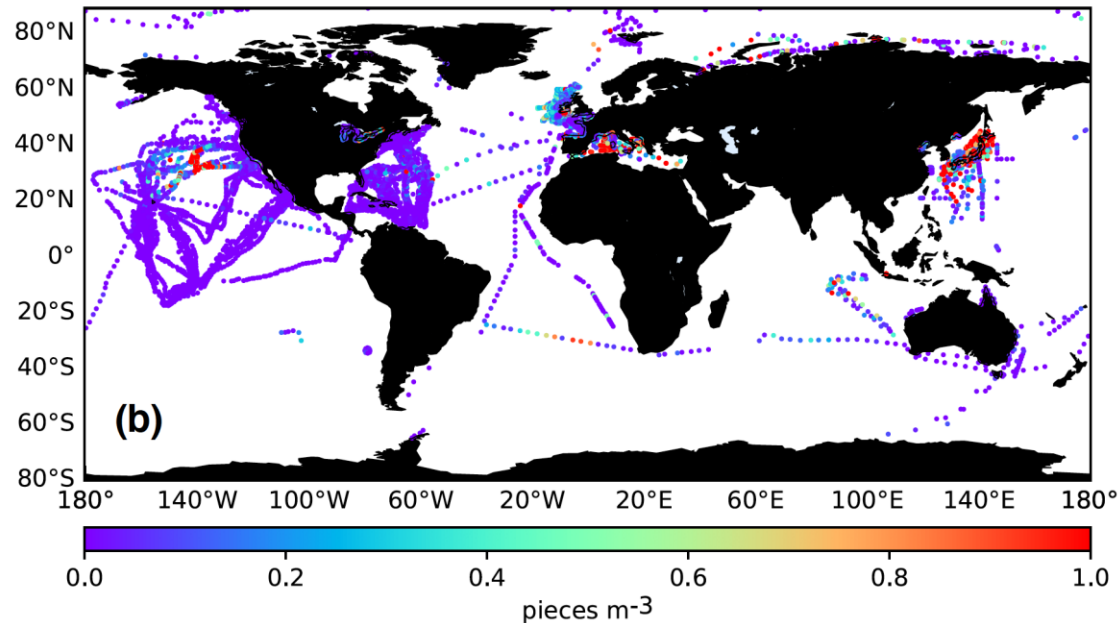
✓ SEND



# What is the multi-level dataset?



particle count per unit volume  
**LEVEL 0**

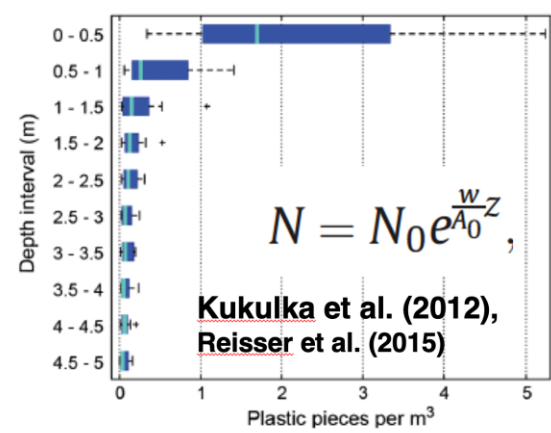
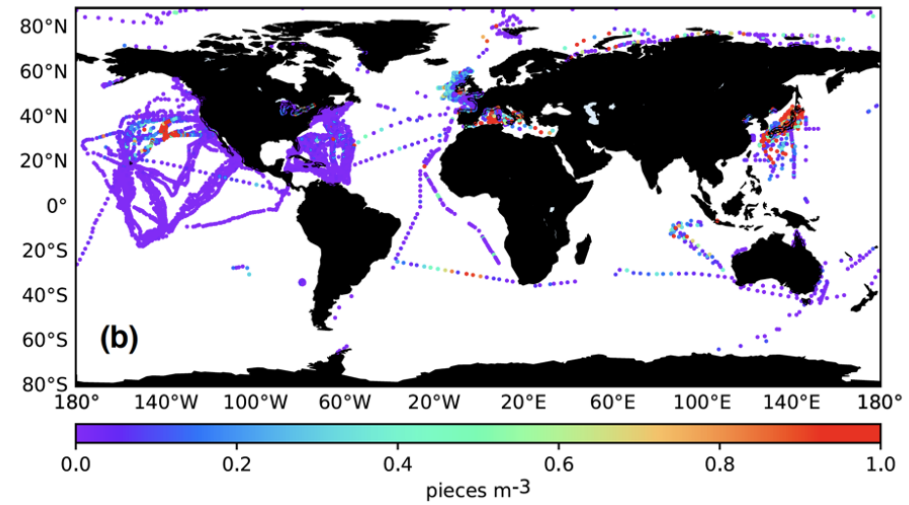


without fibrous microplastics  
**LEVEL 1**



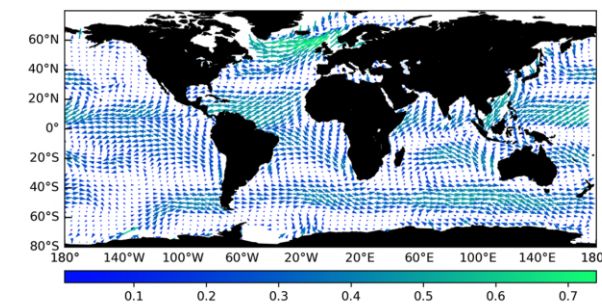
# What is the multi-level dataset?

## Level 1

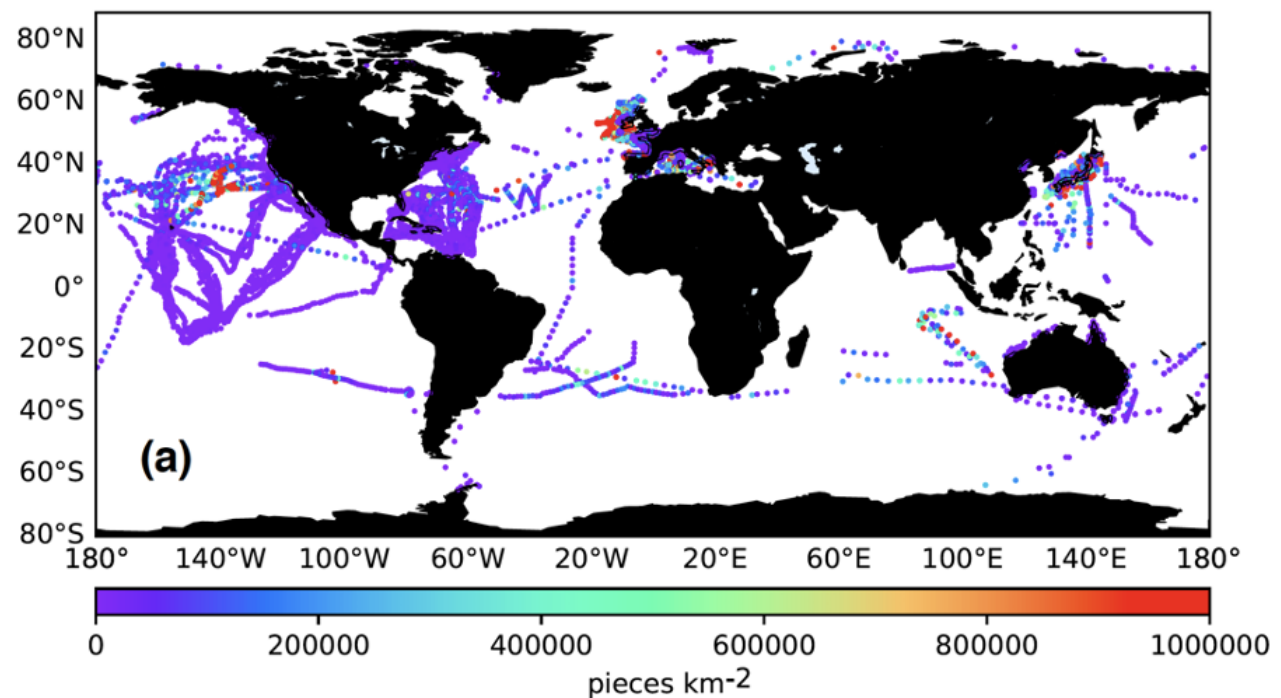


Isobe et al. (2015, MPB), Isobe et al. (2017, MPB),  
Isobe et al. (2019, Nature Comm)

$A_0 = 1.5 u_* k H_s$ , Significant wave height derived in a wave model  
( $u_* = 0.0012$   $W_{10}$ ) Satellite-derived winds



## particle count per unit area LEVEL 2p



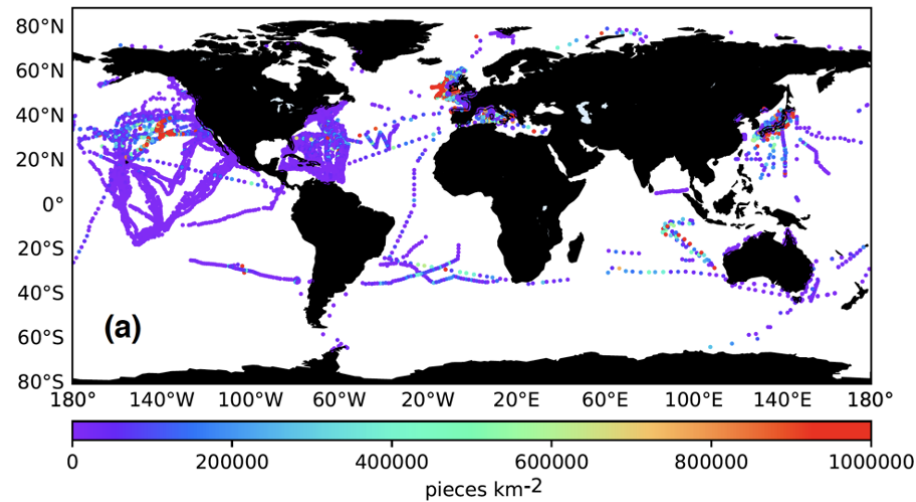
$$M = \frac{N_0 A_0}{w}$$

upward terminal velocity of microplastics (e.g., 5.3 mm/s in Reisser et al., 2015)

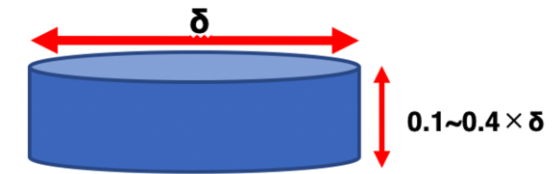
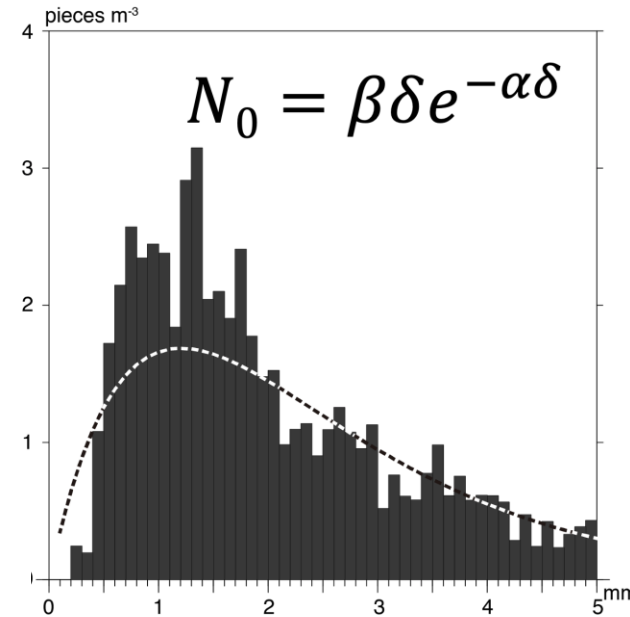
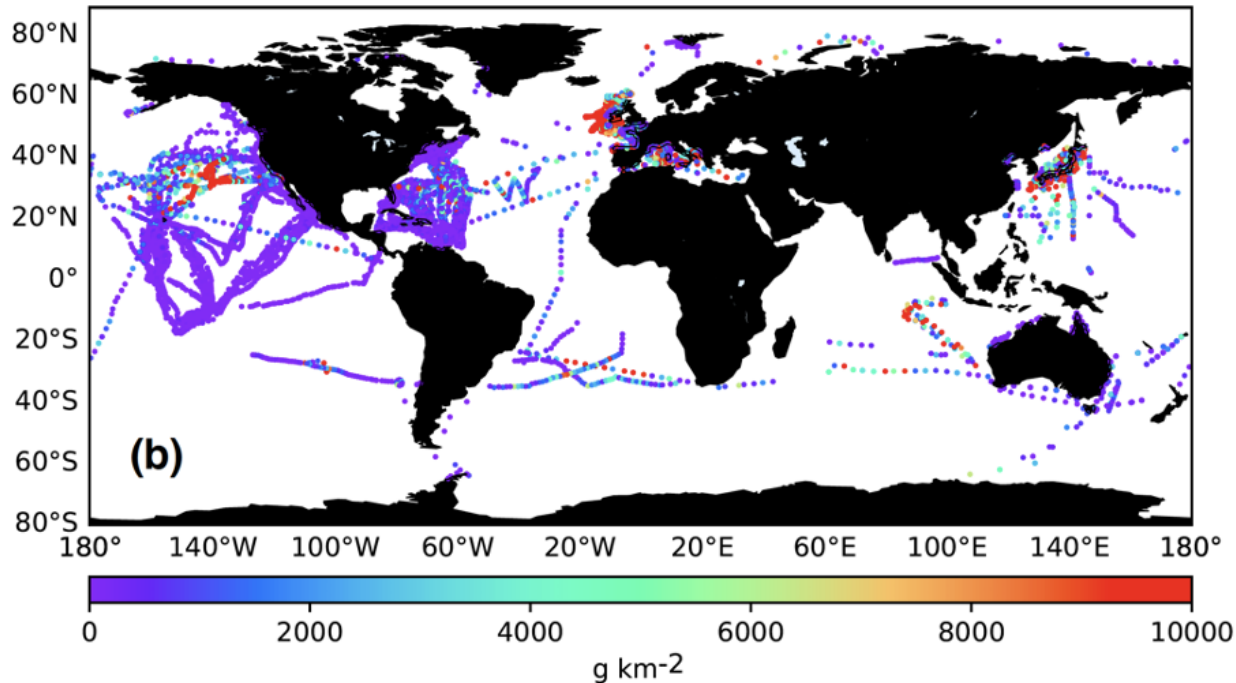
Data processing to reduce influences of oceanic turbulences induced by winds and waves

# What is the multi-level dataset?

## Level 2p



## weight per unit area **LEVEL 2w**

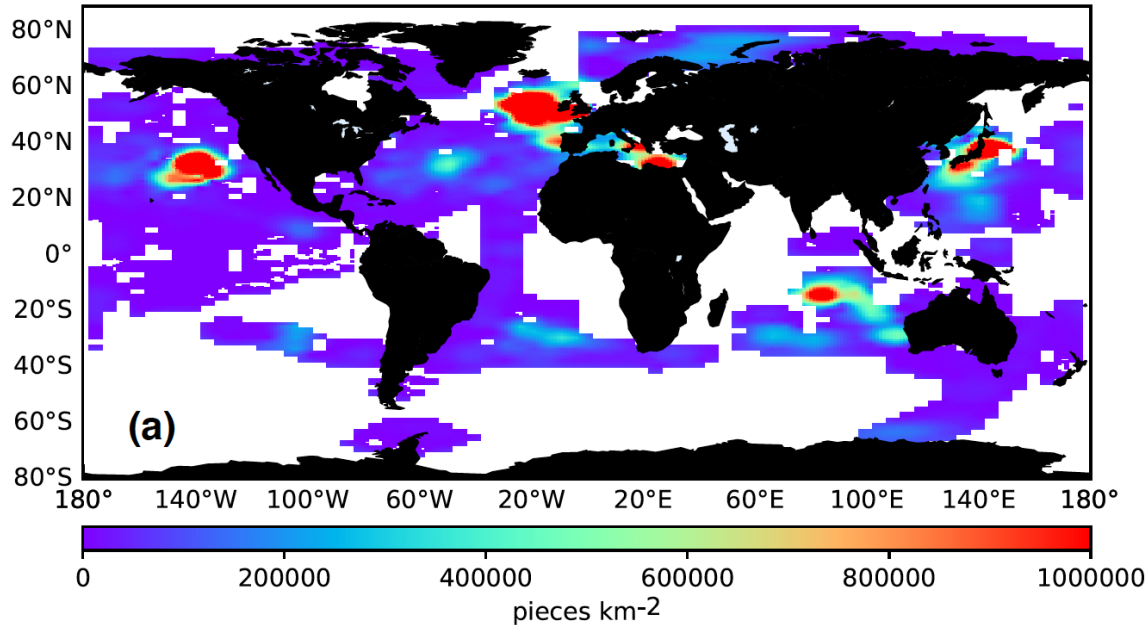


density of PE and PP:  $\sim 1.0 \text{ g/cm}^3$

Isobe et al. (2019, [Nature Comm](#))

Data processing to convert particle counts to weight to bridge the gap between units used in field surveys (hence, numerical models) and laboratory-based studies by ecotoxicologists and environmental chemists.

# What is the multi-level dataset?



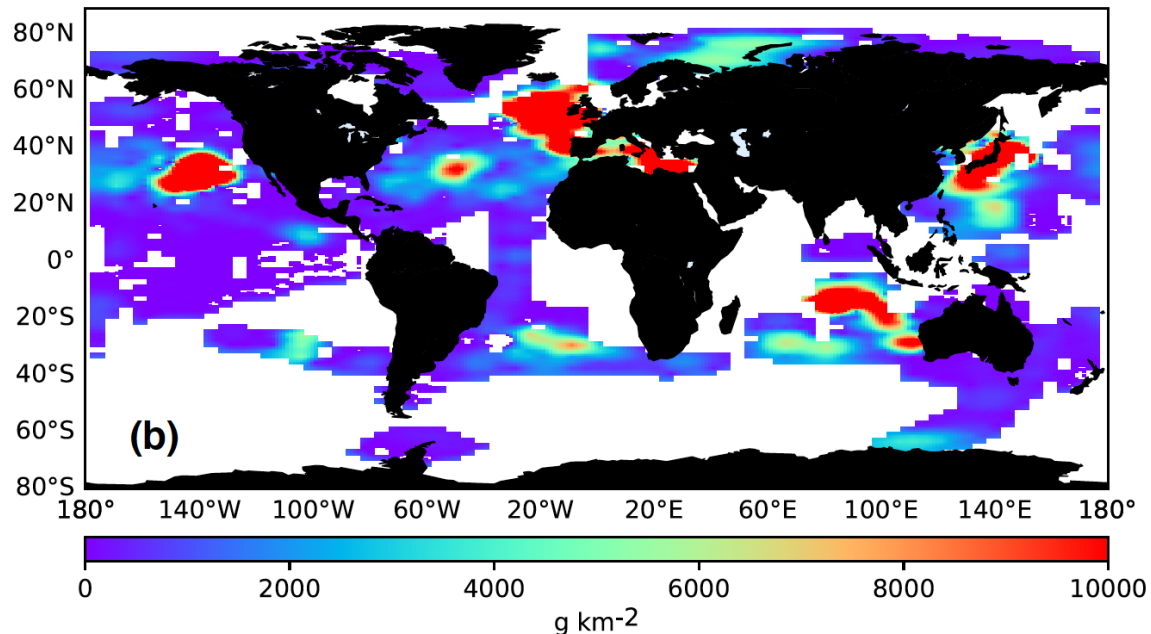
particle count per unit area **LEVEL 3p**

Optimum Interpolation Method (Kako et al., 2011)

$$A_g = B_g + \sum_{i=1}^N (O_i - B_i) W_i,$$

$$\sum_{j=1}^N \sum_{i=1}^N (\mu_{ij}^B + \mu_{ij}^O) W_i = \mu_{ig}^B,$$

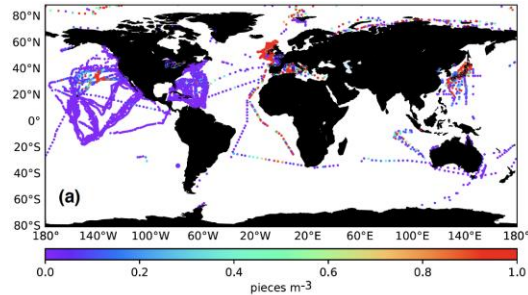
$$\mu^B = e^{\left(-\frac{r_m^2}{L_m^2} - \frac{r_z^2}{L_z^2}\right)},$$



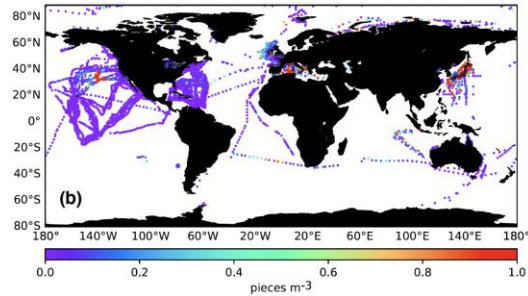
weight per unit area **LEVEL 3w**

1000 km × 500 km

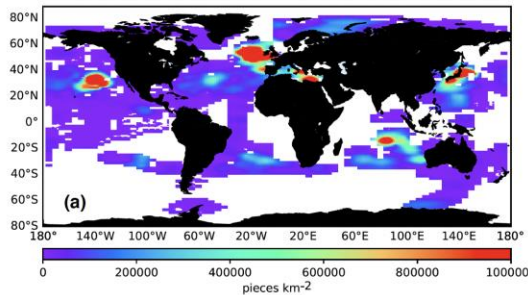
# Data Processing to multi-layer database



particle count per unit volume  
**LEVEL 0**



without fibrous microplastics  
**LEVEL 1**



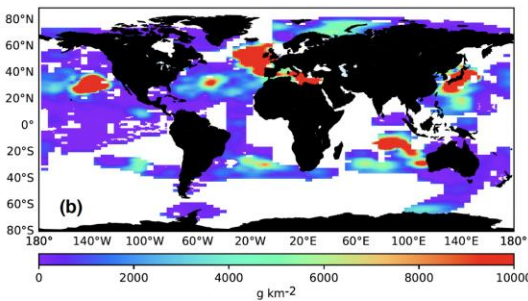
particle count per unit area **LEVEL 3p**

Optimum Interpolation Method (Kako et al., 2011)

$$A_g = B_g + \sum_{i=1}^N (O_i - B_i) W_i$$

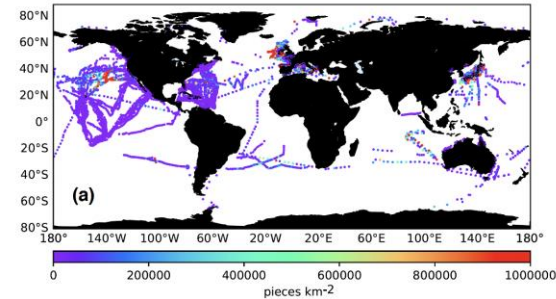
$$\sum_{j=1}^N \sum_{i=1}^N (\mu_{ij}^B + \mu_{ij}^O) W_i = \mu_{ig}^B$$

$$\mu^B = e^{\left( -\frac{r_m^2}{L_m^2} - \frac{r_g^2}{L_g^2} \right)}$$

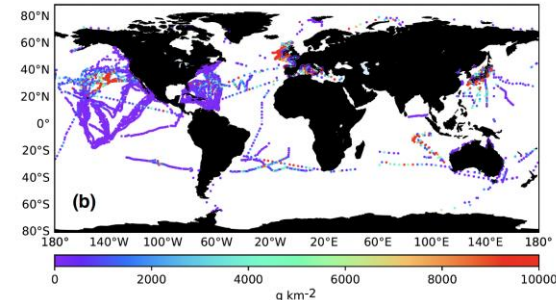
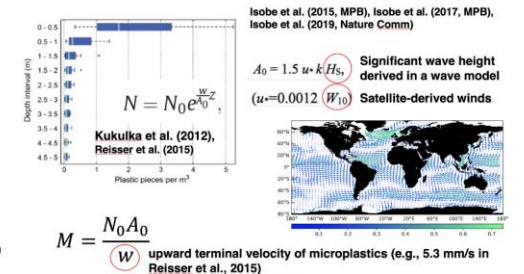


weight per unit area **LEVEL 3w**

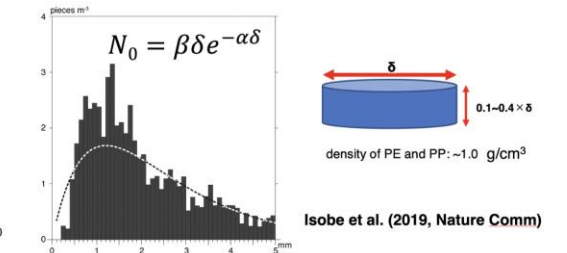
1000 km × 500 km



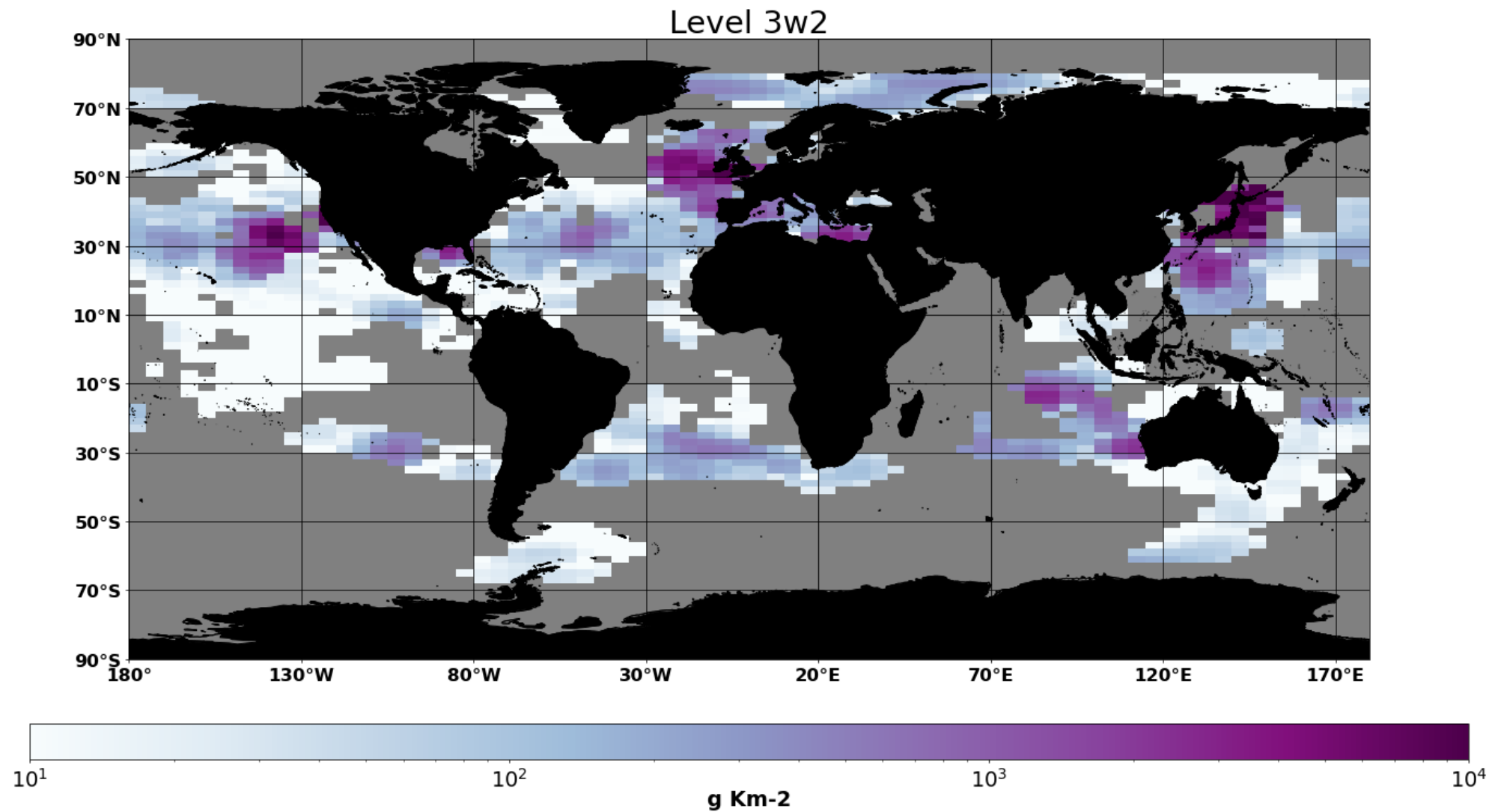
particle count per unit area **LEVEL 2p**



weight per unit area **LEVEL 2w**



- ✓ **Ecotoxicologists and/or environmental chemists** who set up laboratory-based studies regarding "toxicity" of microplastics in realistic situations.
- ✓ **Physical Oceanographers** who set up numerical modeling approaches to reproduce and/or forecast the ocean microplastic abundance
- ✓ **Oceanographers and/or NPOs** who set up field surveys to collect microplastics efficiently
- ✓ .....



**< 10% over the world's oceans**