Rapid Sampling of Suspended and Floating Microplastics in Challenging Riverine and Coastal Water Environments in Japan

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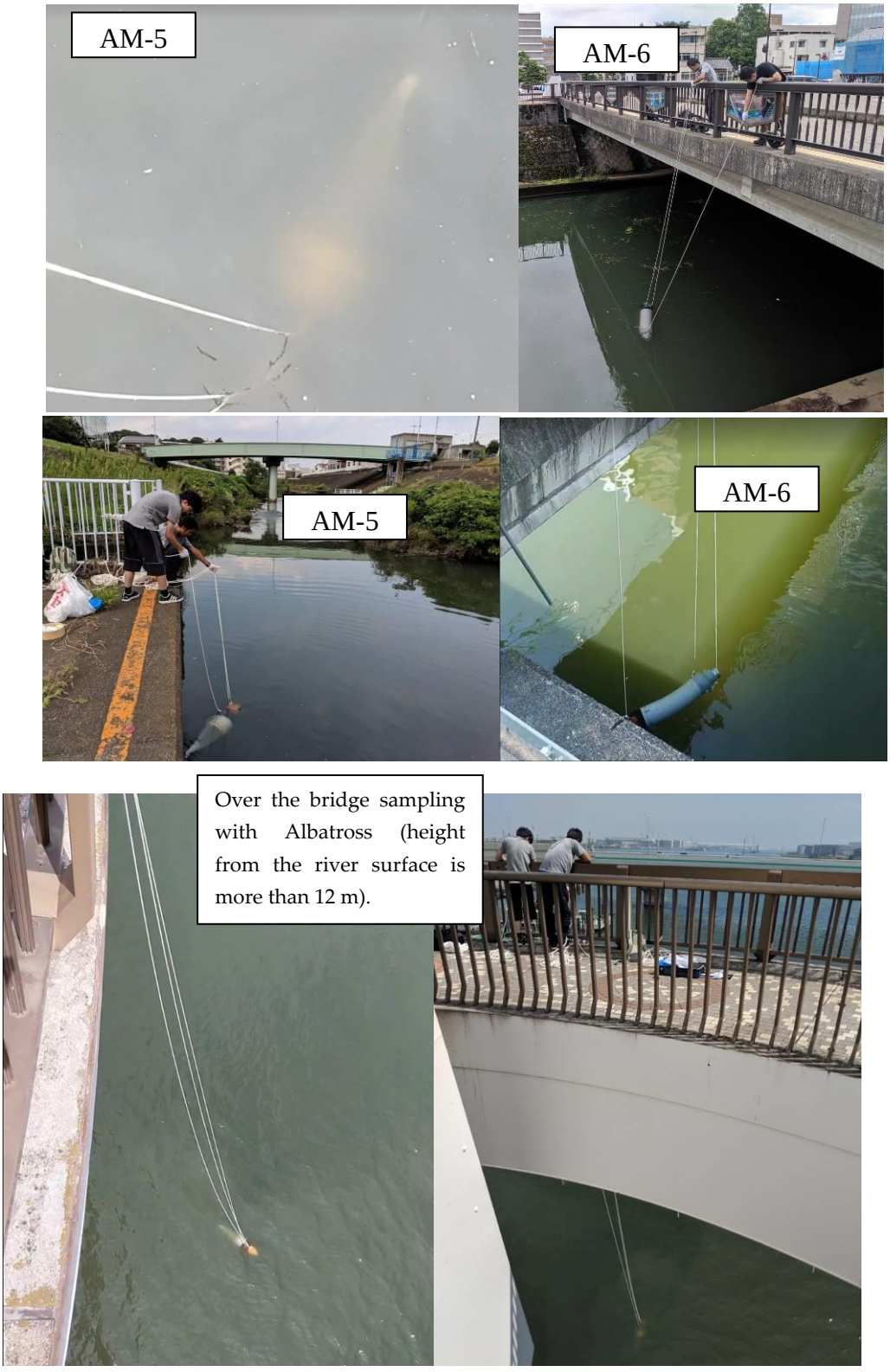


Figure S1: Several sampling locations and "Albatross" sampling devices.

Equations S1 and S2: Riverine and Coastal size distribution.

$$f_{r,x} = \frac{n_{r,x}}{N_r}$$

Equation S1

$f_{r,x}$: relative frequency of riverine microplastic particles in size class x
$n_{r,x}$: number of riverine microplastic particles in size class x
N_r: total number of riverine microplastic particles

$$f_{c,x} = \frac{n_{c,x}}{N_c}$$

Equation S2

$f_{c,x}$: relative frequency of coastal microplastic particles in size class x
$n_{c,x}$: number of coastal microplastic particles in size class x
N_c: total number of coastal microplastic particles

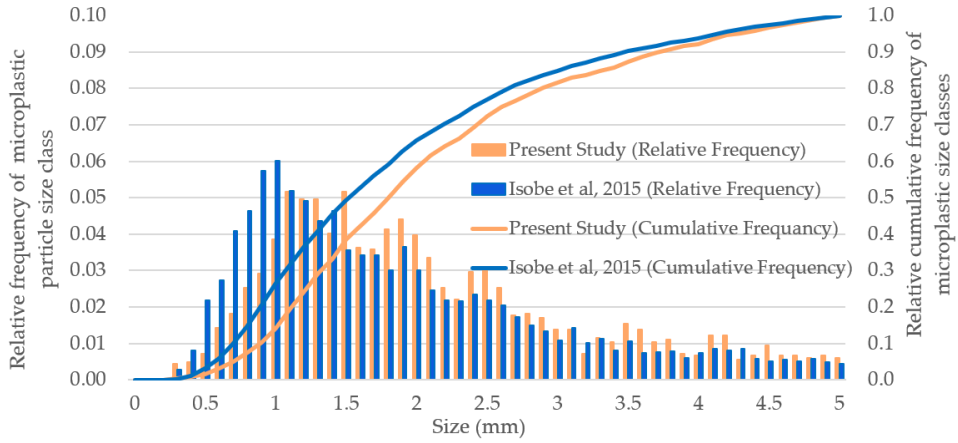


Figure S2: Comparison between this study and Isobe et al, 2015 [1] (East Aisan Seas around Japan). The cocentration values reported by Isobe et al, 2015 [1] were converted to fractions for the comparison with the present study.

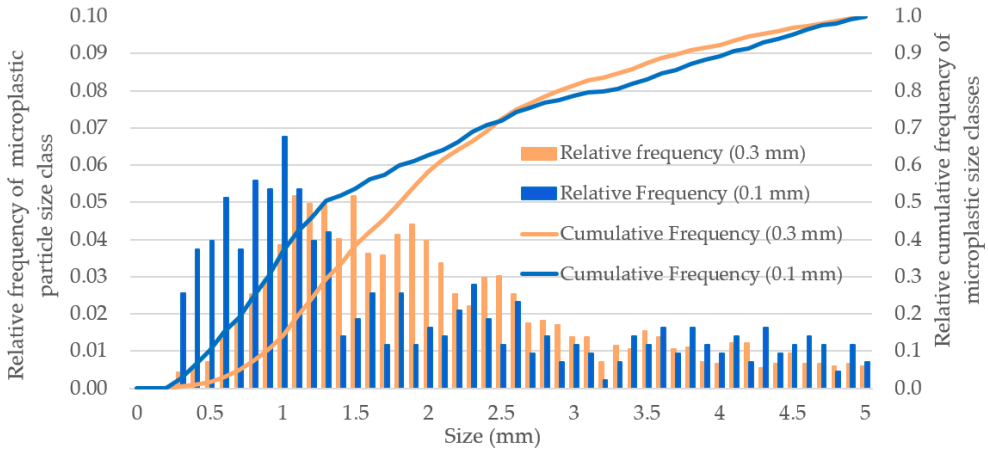


Figure S3: 300 µm Vs 100 µm mesh (particles larger than 300 µm only)

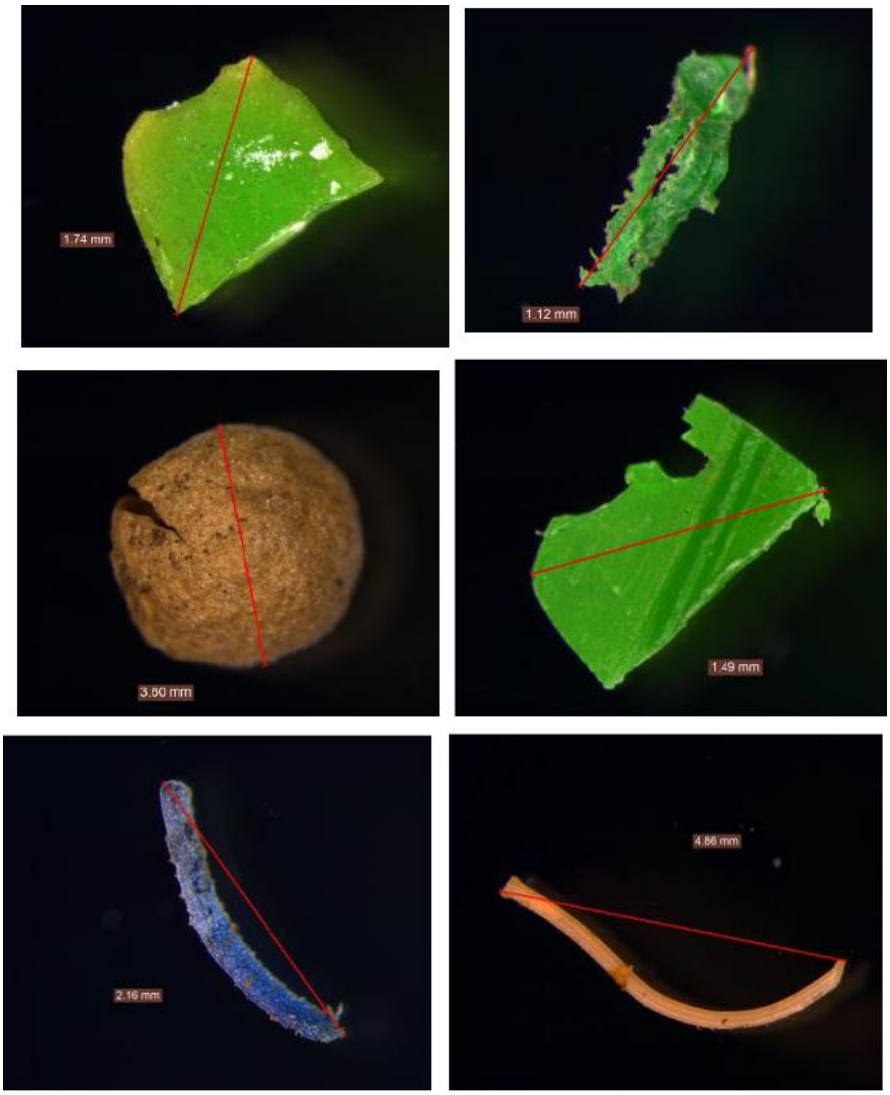
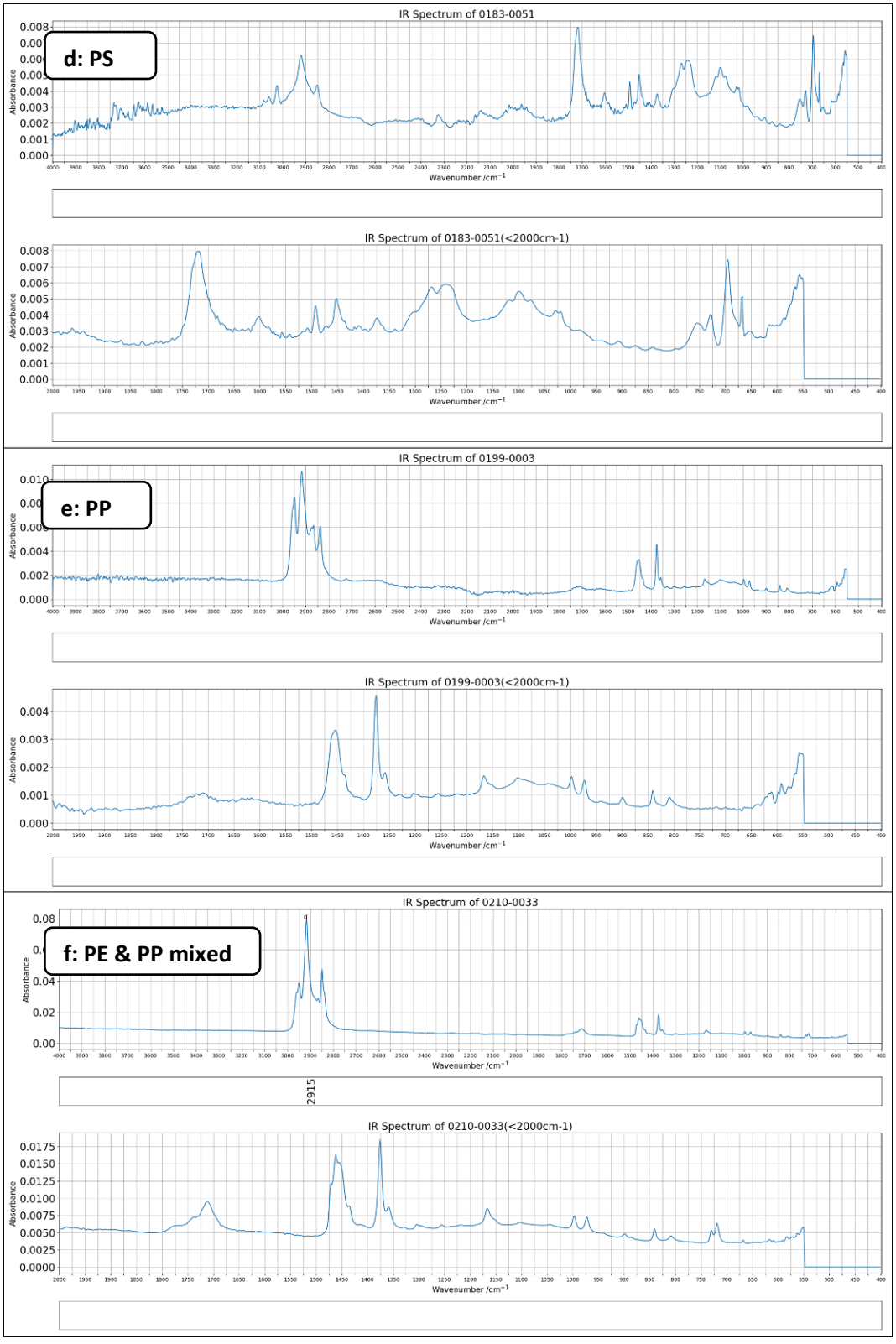


Figure S4: Microscopic images of selected microplastic pieces analysed durign the study. Images of all the microplastic pieces analysed (NP:1818) are given can be accessed at: https://en.opendata.plastic.research.pirika.org/


a: Other plastic
IR Spectrum of 0211-0007
IR Spectrum of 0211-0007(<2000cm-1)
b: PP
IR Spectrum of 0210-0027
IR Spectrum of 0210-0027(<2000cm-1)
c: PE
IR Spectrum of 0181-0023
2915
IR Spectrum of 0181-0023(<2000cm-1)
Absorbance
Wavenumber /cm⁻¹

(**a**)



(**b**)

Figure S5. (**a**): IR spectra of selected microplastic pieces given in figure 5 (Please see Fig. 5 in main manuscript for the images of the microplastics); (**b**): IR spectra of the microplastic pieces given in figure 5.(Please see Fig. 5 in main manuscript for the images of the microplastics). . Details ar egiven at https://en.opendata.plastic.research.pirika.org/

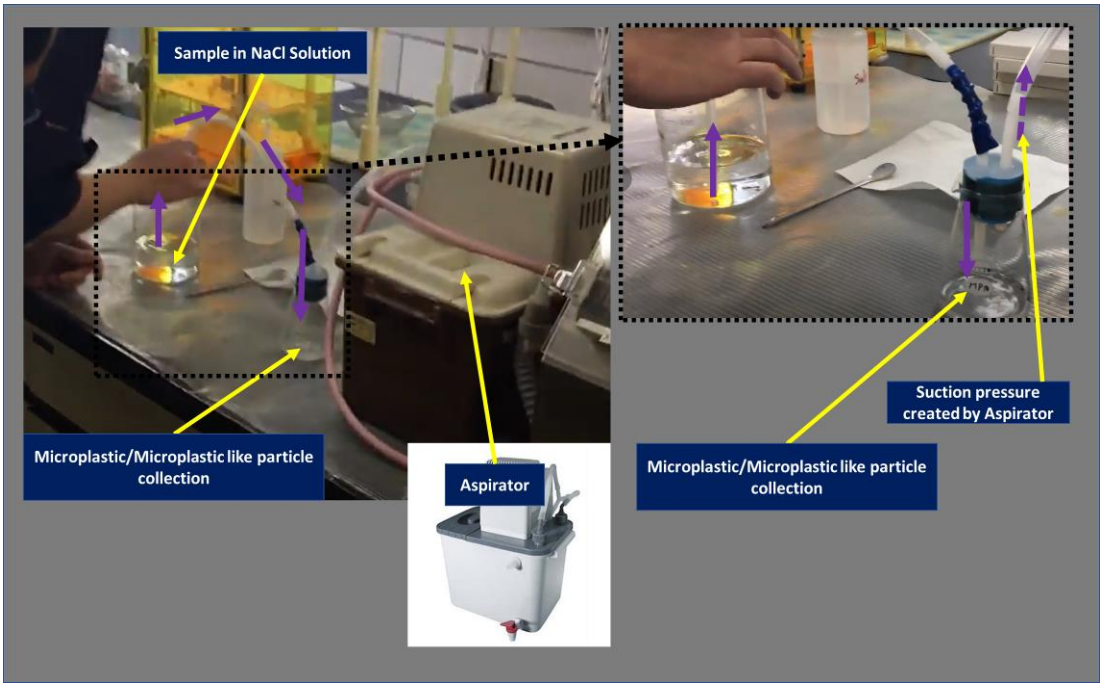


Figure S6: Vacuum suction of microplastics/microplastic like particles in the NaCl solution.

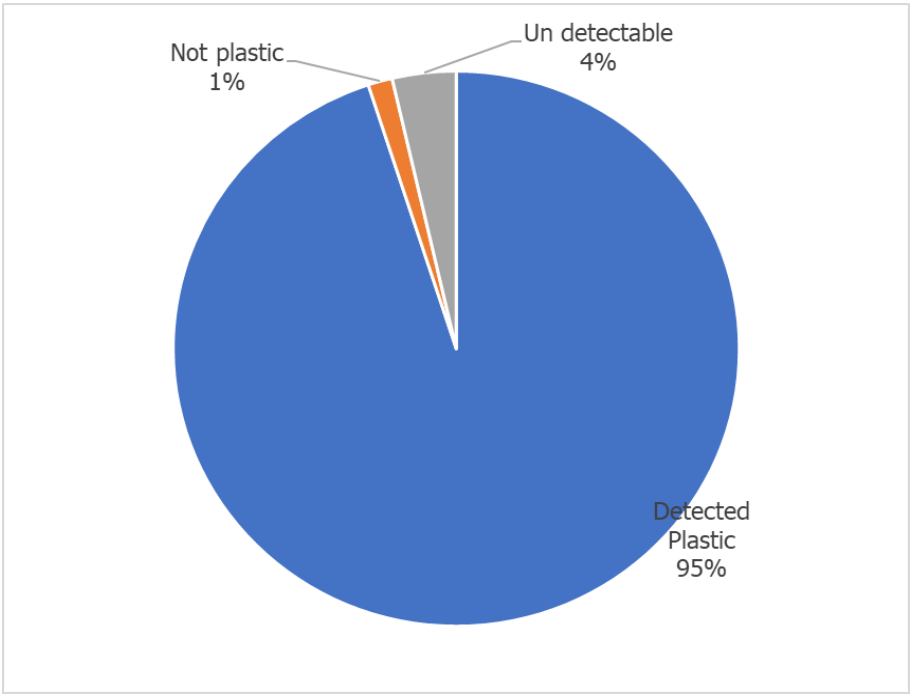


Figure S7: The breakdown of plastic detectability by FR-IR in the present study.

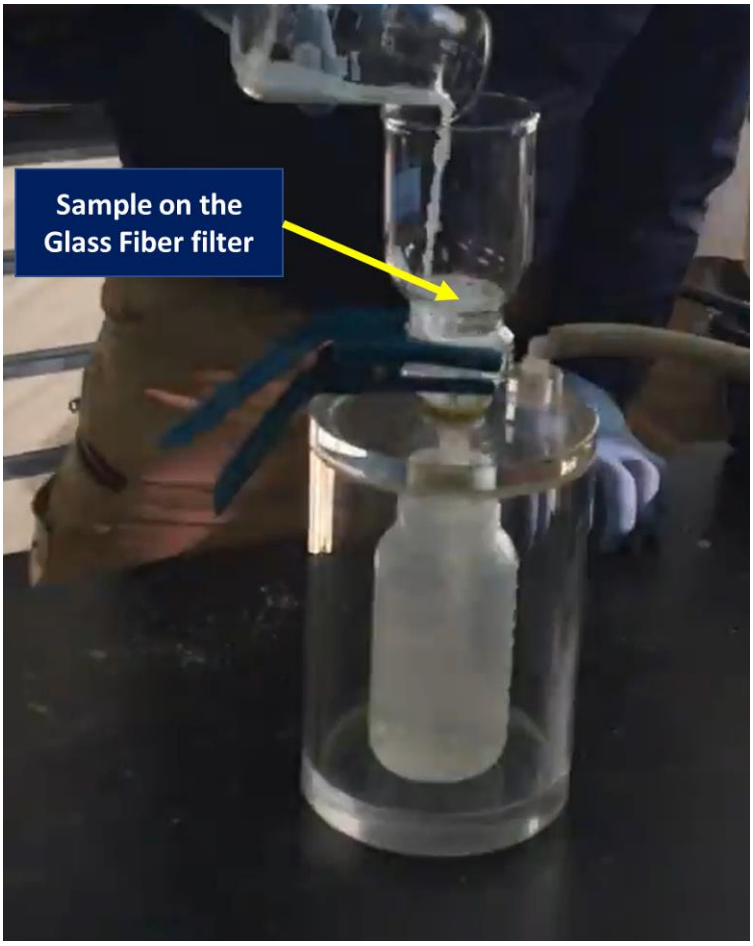
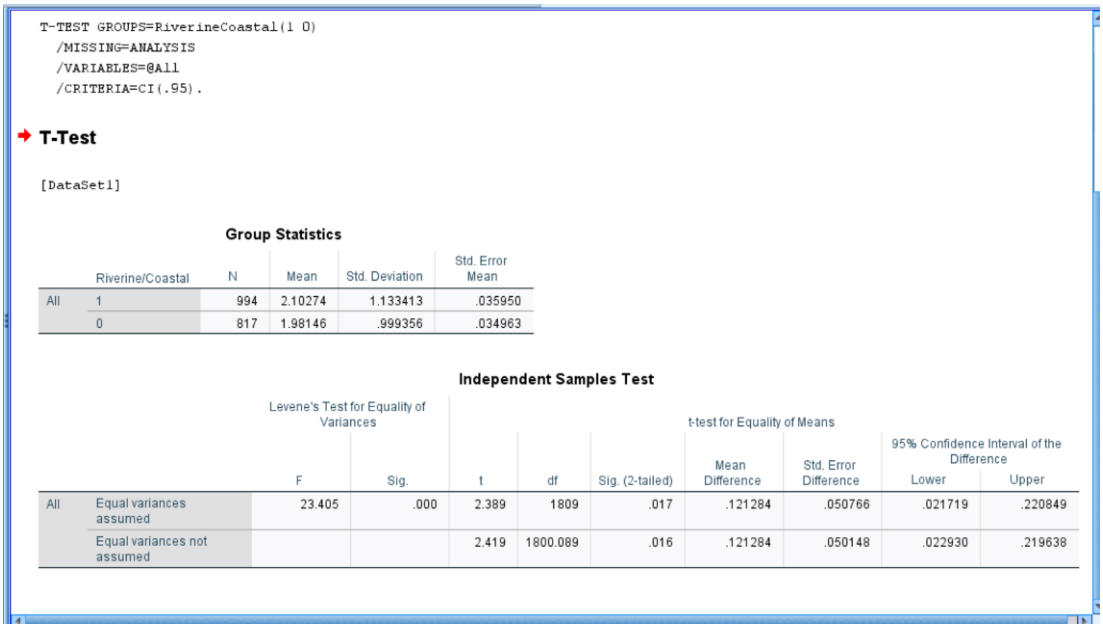


Figure S8: Deposited slat removal by washing on 2 μm glass fiber filter.

Table S1: Color and polymer type of plastic components of the devices used in the study.

Component	Plastic Information
Pump	**Red-PVC, White-PVC and White-Nylon**
Flow meter	**Transparent-Polycarbonate and Gray-Polyoxymethylene**
Net	**Transparent-Nylon**



```
T-TEST GROUPS=RiverineCoastal(1 0)
  /MISSING=ANALYSIS
  /VARIABLES=@All
  /CRITERIA=CI(.95).
```

T-Test

[DataSet1]

Group Statistics

	Riverine/Coastal	N	Mean	Std. Deviation	Std. Error Mean
All	1	994	2.10274	1.133413	.035950
	0	817	1.98146	.999356	.034963

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
All	Equal variances assumed	23.405	.000	2.389	1809	.017	.121284	.050766	.021719	.220849
	Equal variances not assumed			2.419	1800.089	.016	.121284	.050148	.022930	.219638

Figure S9: t test for Riverine and Costal particle size data sets.

Oneway

[DataSet1]

Descriptives

Concentration

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	11	1.81364	1.138598	.343300	1.04872	2.57856	.570	3.820
2	11	1.83664	1.045289	.315166	1.13440	2.53887	.390	3.910
3	11	1.75000	.901987	.271959	1.14404	2.35596	.450	4.020
4	11	1.77909	1.022707	.308358	1.09203	2.46615	.210	3.560
5	11	1.65009	1.078720	.325246	.92540	2.37478	.170	3.330
6	11	1.61636	1.243610	.374962	.78090	2.45183	.110	3.880
Total	66	1.74097	1.037932	.127761	1.48581	1.99613	.110	4.020

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Concentration	Based on Mean	.740	5	60	.597
	Based on Median	.442	5	60	.817
	Based on Median and with adjusted df	.442	5	55.240	.817
	Based on trimmed mean	.714	5	60	.615

ANOVA

Concentration

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.437	5	.087	.075	.996
Within Groups	69.587	60	1.160		
Total	70.025	65			

Robust Tests of Equality of Means

Concentration

	Statistic[a]	df1	df2	Sig.
Welch	.062	5	27.955	.997
Brown-Forsythe	.075	5	57.811	.996

a. Asymptotically F distributed.

Means Plots

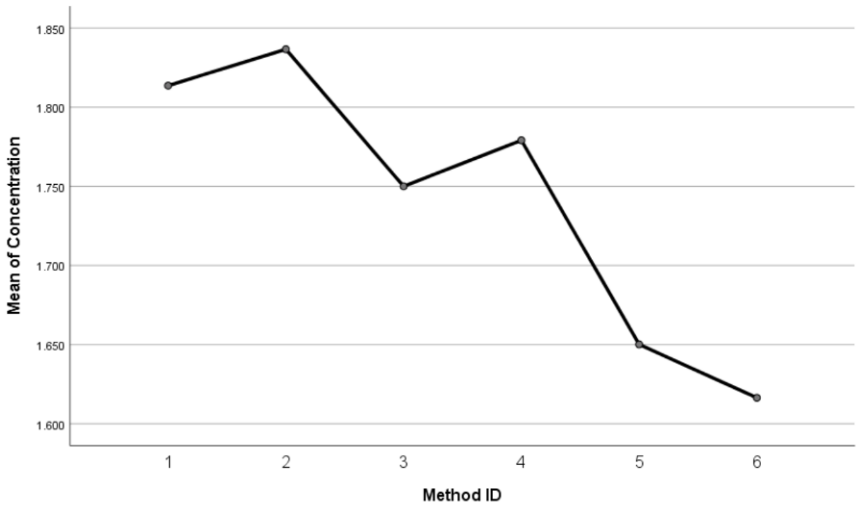


Figure S10: ANOVA test for the comparison of different sampling devices (1 to 6 is same order preseted in fugure 3: AM-6:300, AM-6:100, AM-5:300, AM-5:100, BS-PN:300 and BS-PN:100).

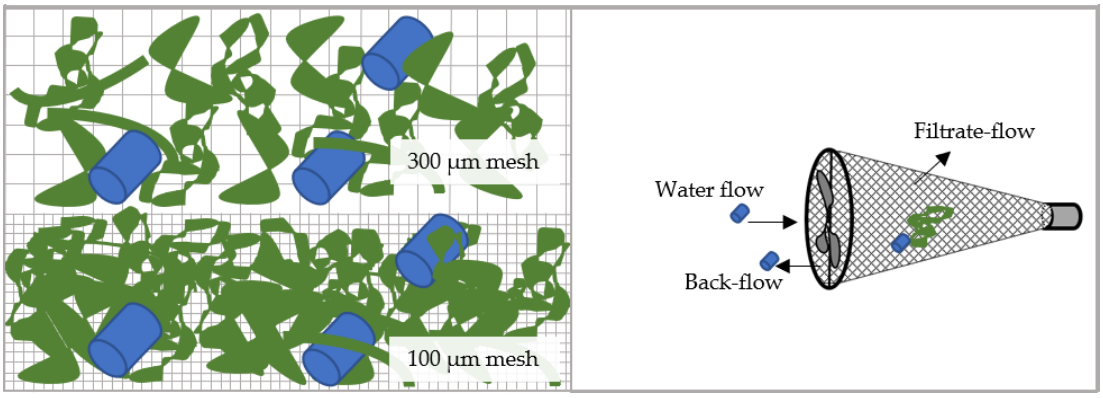


Figure S11: Clogging of nets and the back-flow. Potential escape of microplastics from the net with back-flow.

References

1. Isobe, A.; Uchida, K.; Tokai, T.; Iwasaki, S. East Asian seas: A hot spot of pelagic microplastics. *Mar. Pollut. Bull.* **2015**, *101*, 618–623.