

Supplementary Information

Global Atmospheric Distribution of Microplastics with Evidence of Low Oceanic Emissions

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Supplementary notes

All figures have been created using the open access general-purpose programming language Python version 3.

Fig. S1: Spatial range of the global near-surface mass concentration of microplastic particles in 6 size bins as provided by the model.

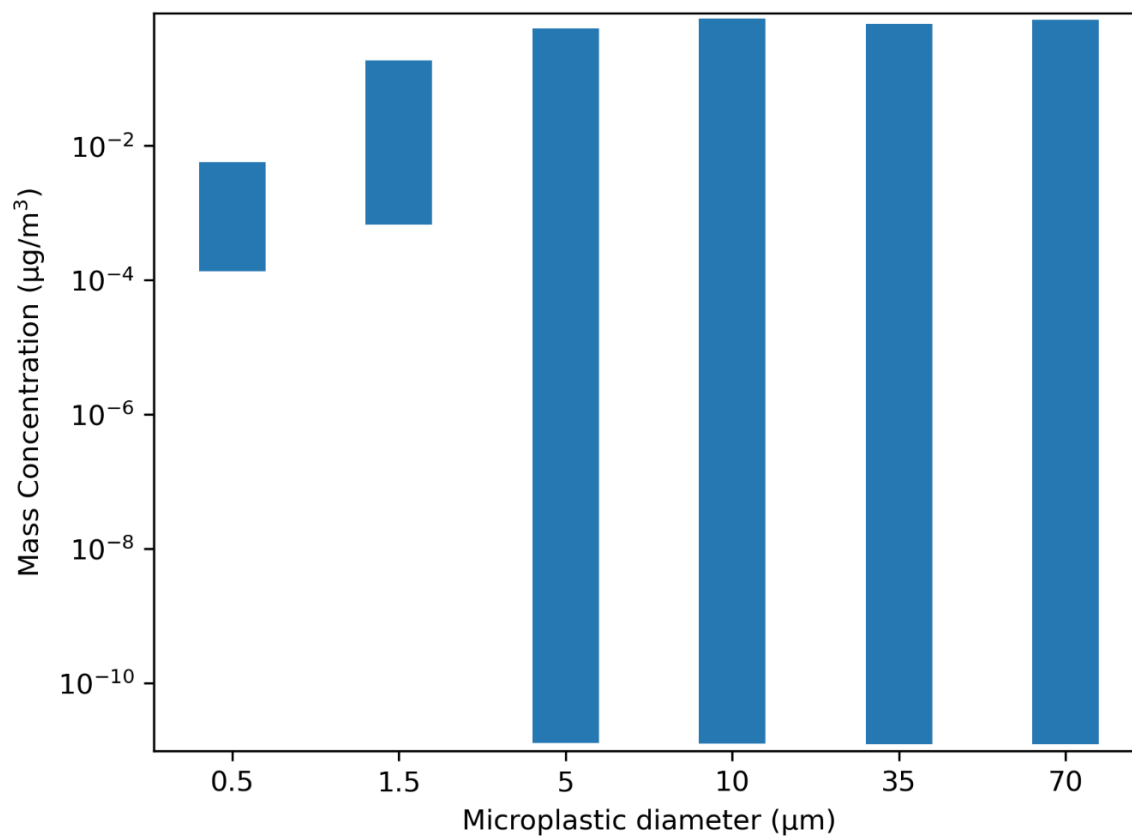


Fig. S2: Horizontal distribution of microplastic mass density. a-f Spatial concentration distribution of microplastic particles with diameters of 0.5, 1.5, 5, 10, 35 and 70 μm in the lowest layer of the model (0 to 50 m).

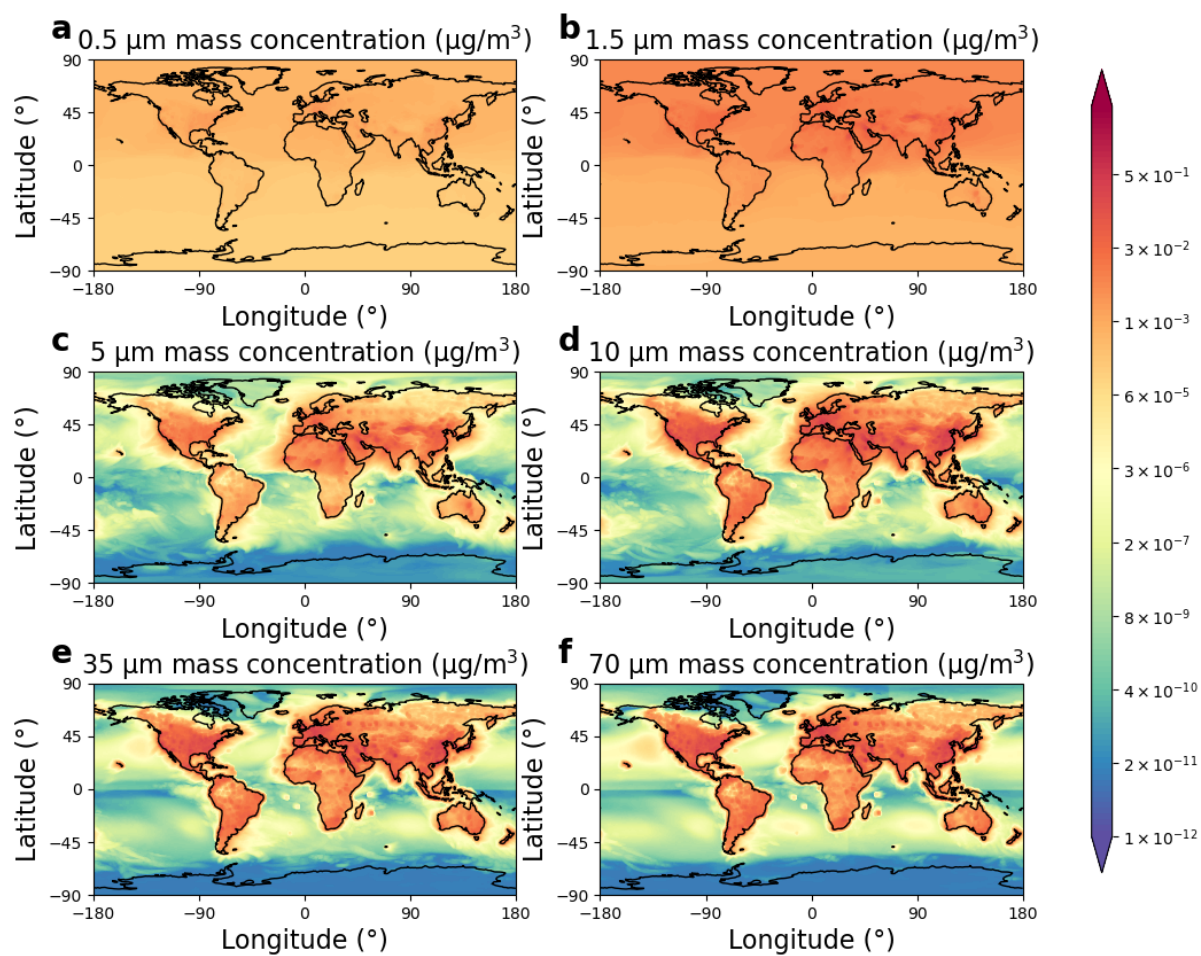


Fig. S3: Zonal mean distribution of microplastic mass density. a-f Vertical and latitudinal distribution of microplastic particles with diameters of 0.5, 1.5, 5, 10, 35 and 70 μm .

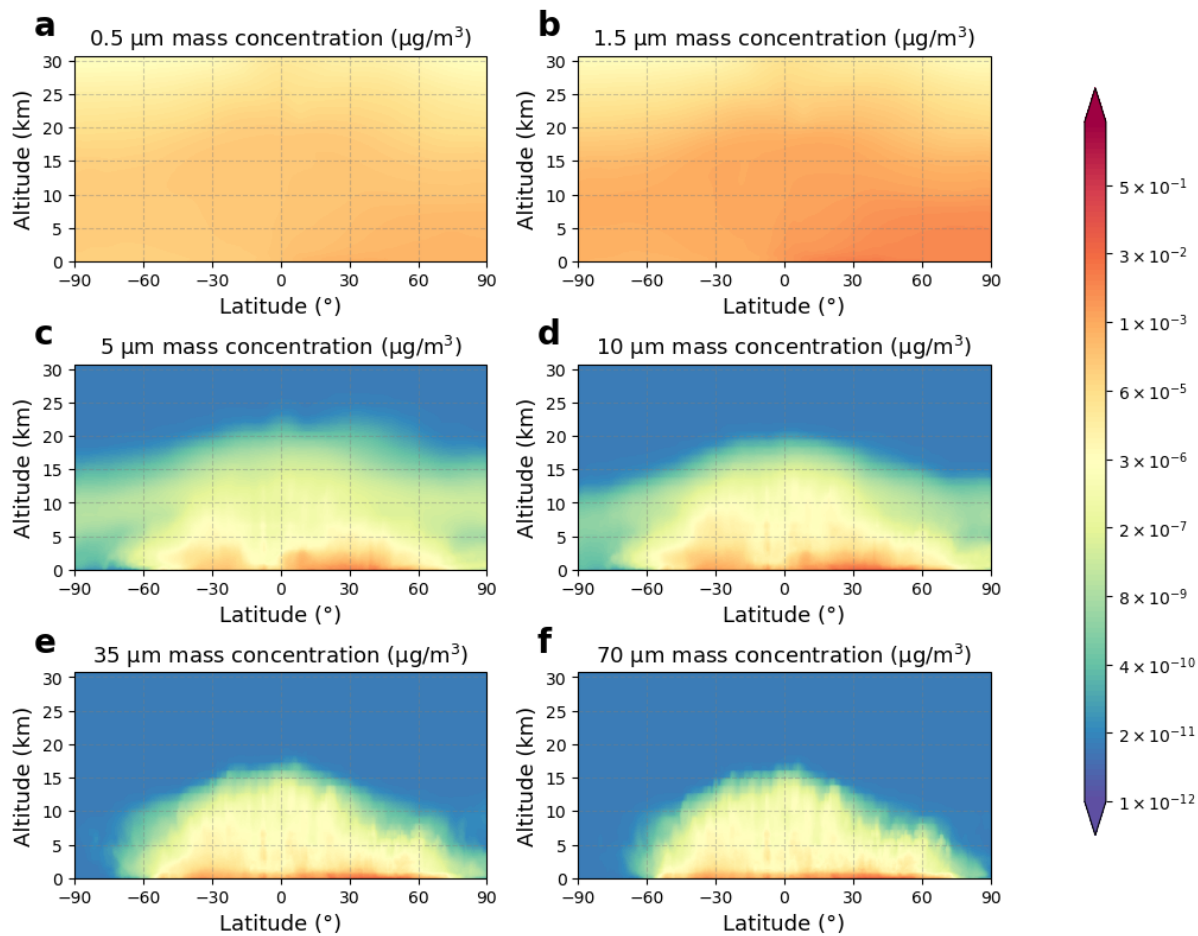


Fig. S4: Global emissions fluxes of sub-70 μm microplastic particles as adopted in the global model.
Mass fluxes for current and year 2050 conditions, based on Brahney et al.¹, Evangeliou et al.², and Fu et al.³.

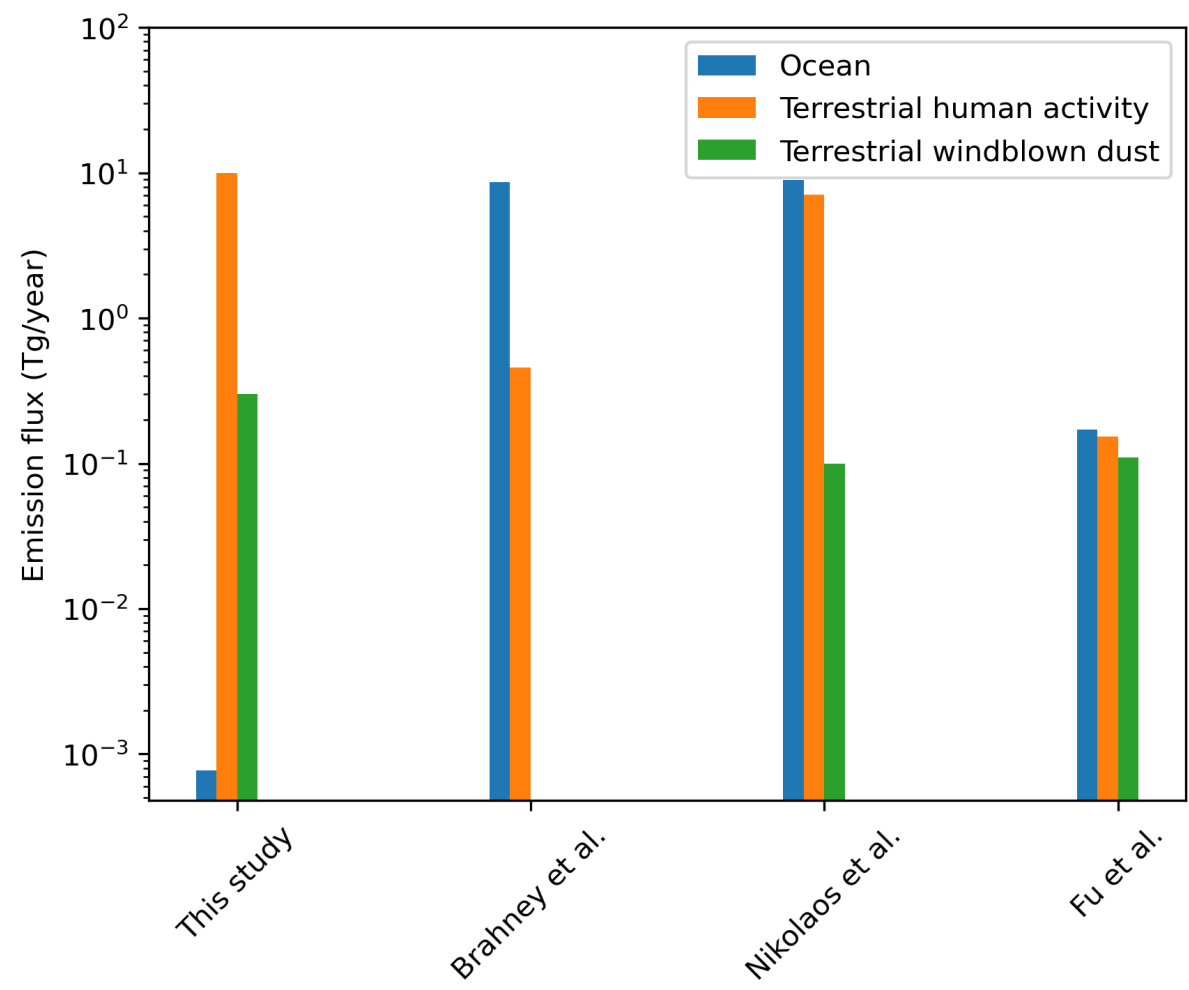


Fig. S5: Geographical distribution of surface deposition rates for microplastic particles in mass.
a-f Deposition mass distribution of microplastic particles in diameter of 0.5, 1.5, 5, 10, 35 and 70 μm on the ground.

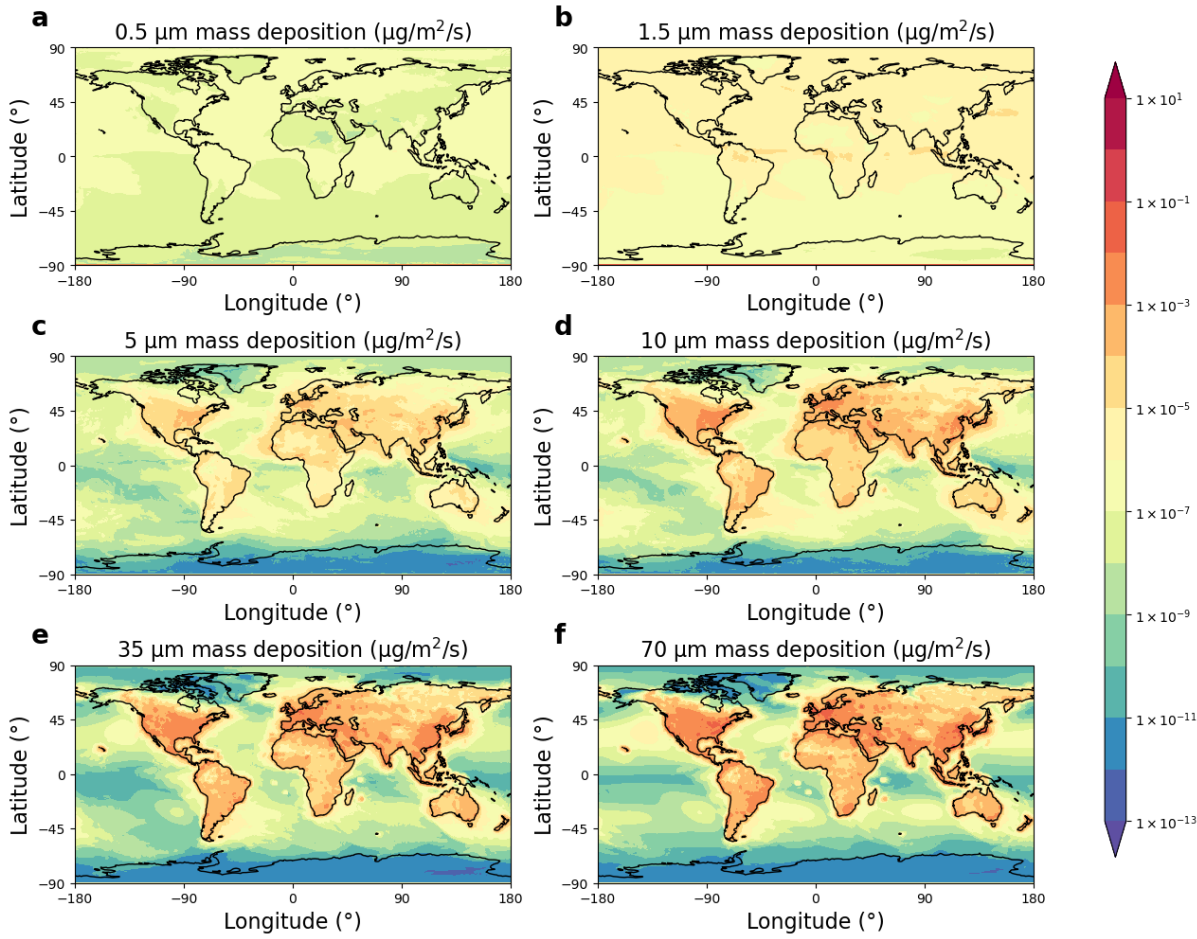


Fig. S6. Microplastic particle emissions in mass adopted in the present study. a-f Geographic distribution of microplastic particles emission rates for particles with diameter of 0.5, 1.5, 5, 10, 35 and 70 μm .

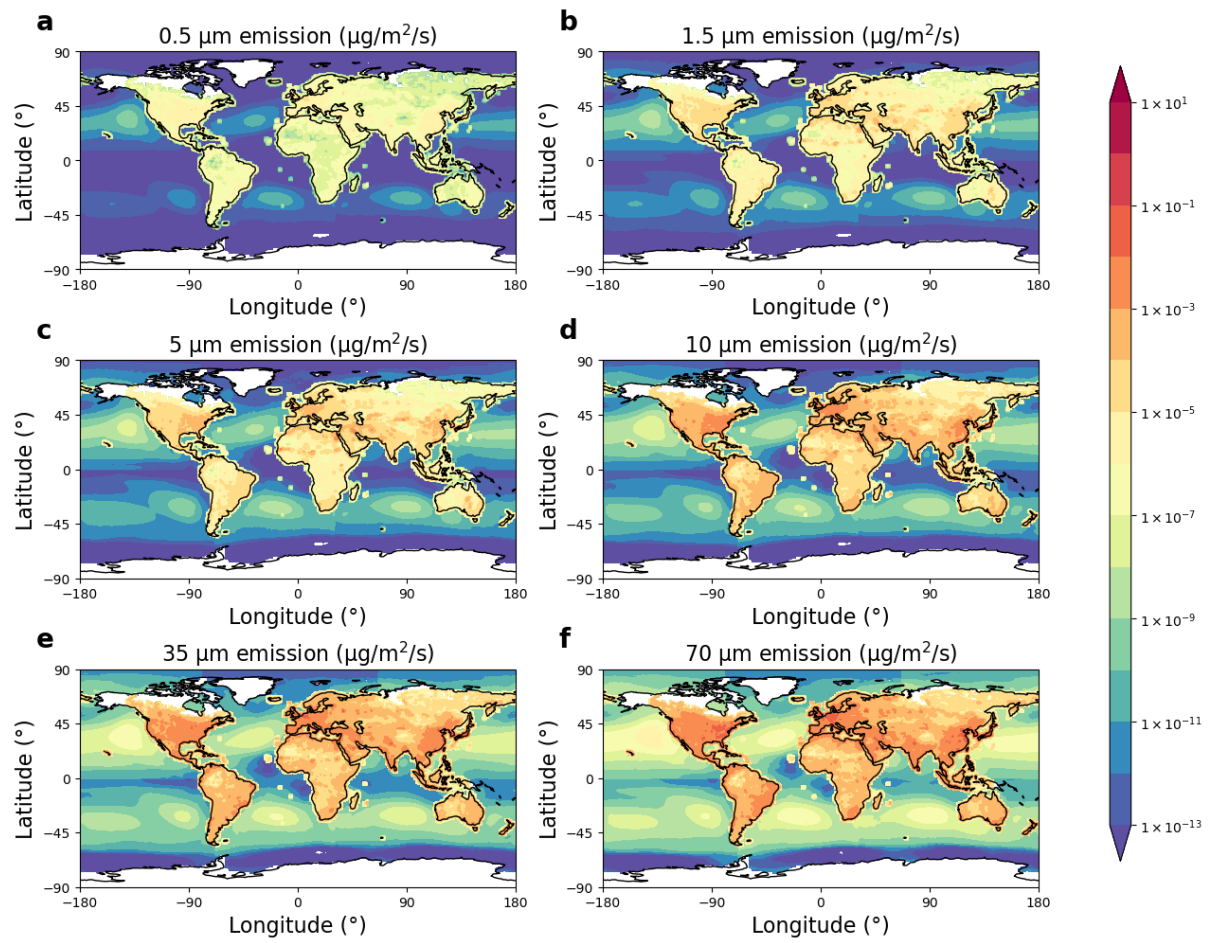


Table S1: Base model deposition rate (in mass) of atmospheric microplastics particles in different countries and regions.

No.	0.5 µm		1.5 µm		5 µm		10 µm		35 µm		70 µm	
	Country	Dep. (kg/year)	Country	Dep. (kg/year)	Country	Dep. (kg/year)	Country	Dep. (kg/year)	Country	Dep. (kg/year)	Country	Dep. (kg/year)
1	Brazil	1.10E+05	Brazil	1.53E+06	U. S. A.	1.60E+07	U. S. A.	1.98E+08	U. S. A.	6.52E+08	U. S. A.	1.24E+09
2	Russia	5.93E+04	Russia	1.15E+06	China	1.31E+07	China	1.24E+08	China	4.27E+08	China	8.06E+08
3	Dem. Rep. Congo	3.06E+04	U. S. A.	6.49E+05	Iran	3.37E+06	Brazil	3.57E+07	India	1.19E+08	India	2.25E+08
4	Indonesia	3.03E+04	China	5.72E+05	Brazil	3.09E+06	India	3.42E+07	Brazil	1.16E+08	Brazil	2.23E+08
5	Canada	3.02E+04	Canada	5.62E+05	Iraq	2.98E+06	Russia	2.36E+07	Germany	7.61E+07	Germany	1.44E+08
6	U. S. A.	2.90E+04	Dem. Rep. Congo	5.41E+05	India	2.87E+06	Germany	2.27E+07	Russia	6.63E+07	Russia	1.23E+08
7	Colombia	1.86E+04	Indonesia	3.67E+05	Russia	2.58E+06	Canada	2.15E+07	Iran	6.25E+07	Canada	1.12E+08
8	China	1.54E+04	Colombia	2.48E+05	Kazakhstan	2.29E+06	Iran	1.92E+07	Canada	5.95E+07	Iran	1.12E+08
9	Peru	1.25E+04	Kazakhstan	2.07E+05	Canada	2.21E+06	Mexico	1.68E+07	Mexico	4.03E+07	Mexico	1.08E+08
10	Australia	1.22E+04	Australia	1.76E+05	Saudi Arabia	1.98E+06	Saudi Arabia	1.52E+07	Saudi Arabia	5.56E+07	Japan	1.07E+08
11	Venezuela	1.22E+04	Venezuela	1.73E+05	Egypt	1.80E+06	France	1.48E+07	Japan	5.18E+07	Saudi Arabia	1.04E+08
12	Angola	1.03E+04	India	1.65E+05	Germany	1.77E+06	Japan	1.37E+07	France	5.05E+07	France	9.76E+07
13	Mexico	9.04E+03	Peru	1.62E+05	Australia	1.64E+06	Iraq	1.27E+07	Australia	4.03E+07	Australia	7.55E+07
14	Kazakhstan	8.92E+03	Mexico	1.48E+05	Algeria	1.63E+06	Italy	1.13E+07	Italy	3.81E+07	Italy	7.21E+07
15	Tanzania	8.87E+03	Angola	1.47E+05	Mexico	1.29E+06	Egypt	1.12E+07	Egypt	3.69E+07	Turkey	7.07E+07
16	Bolivia	8.27E+03	Tanzania	1.35E+05	Nigeria	1.29E+06	Indonesia	1.05E+07	Turkey	3.67E+07	United Kingdom	6.97E+07
17	Malaysia	7.94E+03	Congo	1.12E+05	Turkey	1.18E+06	Australia	1.05E+07	United Kingdom	3.45E+07	Spain	6.11E+07
18	Zambia	7.02E+03	Malaysia	1.05E+05	Dem. Rep. Congo	1.15E+06	Poland	1.04E+07	Iraq	3.43E+07	Egypt	6.03E+07
19	Congo	5.77E+03	Bolivia	1.03E+05	France	1.14E+06	Turkey	9.86E+06	Poland	3.22E+07	Indonesia	5.95E+07
20	India	5.73E+03	Gabon	1.03E+05	Sudan	1.14E+06	United Kingdom	8.92E+06	Indonesia	3.19E+07	Poland	5.87E+07
21	Gabon	5.41E+03	Iran	1.00E+05	Japan	1.10E+06	Spain	7.50E+06	Spain	3.11E+07	Iraq	5.58E+07
22	Philippines	5.14E+03	Cameroon	9.92E+04	Afghanistan	1.07E+06	Argentina	7.09E+06	Argentina	2.70E+07	Argentina	5.07E+07
23	Papua New Guinea	4.74E+03	Nigeria	9.70E+04	Uzbekistan	9.23E+05	Algeria	6.96E+06	South Korea	2.53E+07	South Korea	5.02E+07
24	Cameroon	4.73E+03	Saudi Arabia	9.64E+04	Indonesia	9.20E+05	South Africa	6.82E+06	South Africa	2.37E+07	South Africa	4.59E+07
25	Kenya	4.29E+03	Algeria	9.54E+04	Libya	9.13E+05	South Korea	6.56E+06	Thailand	2.16E+07	Thailand	4.17E+07
26	Mozambique	4.29E+03	Zambia	9.13E+04	Italy	8.82E+05	Libya	6.03E+06	Pakistan	2.03E+07	Pakistan	3.73E+07
27	Argentina	4.22E+03	Kenya	7.66E+04	Syria	8.54E+05	Pakistan	6.02E+06	Libya	1.98E+07	Libya	3.60E+07
28	France	3.93E+03	France	7.52E+04	Poland	8.31E+05	Thailand	5.86E+06	Algeria	1.73E+07	Algeria	2.98E+07
29	Greenland	3.86E+03	Greenland	7.49E+04	South Africa	7.29E+05	Kazakhstan	5.76E+06	Malaysia	1.54E+07	Venezuela	2.95E+07
30	Madagascar	3.70E+03	Libya	7.22E+04	Turkmenistan	7.27E+05	Colombia	5.20E+06	Venezuela	1.51E+07	Malaysia	2.95E+07
31	South Africa	3.63E+03	Egypt	6.95E+04	Pakistan	6.47E+05	Vietnam	5.04E+06	Colombia	1.44E+07	Colombia	2.70E+07
32	Guyana	3.55E+03	Sudan	6.72E+04	United Kingdom	6.43E+05	Malaysia	4.86E+06	Vietnam	1.22E+07	Vietnam	2.26E+07
33	Antarctica	3.52E+03	Philippines	6.68E+04	Vietnam	5.73E+05	Sudan	4.61E+06	Netherlands	1.14E+07	Czechia	2.18E+07
34	Nigeria	3.52E+03	Iraq	6.52E+04	Argentina	5.54E+05	Afghanistan	4.38E+06	Czechia	1.13E+07	Netherlands	2.13E+07
35	Myanmar	3.42E+03	Myanmar	6.26E+04	Cameroon	5.45E+05	Ukraine	3.98E+06	Ukraine	1.13E+07	Austria	2.09E+07
36	Japan	3.15E+03	Japan	6.07E+04	Morocco	5.37E+05	Venezuela	3.98E+06	Nigeria	1.08E+07	Peru	2.06E+07
37	Suriname	2.78E+03	Argentina	5.89E+04	South Korea	5.06E+05	Nigeria	3.77E+06	Peru	1.07E+07	Ukraine	2.06E+07
38	Algeria	2.75E+03	Mozambique	5.76E+04	Spain	4.91E+05	Netherlands	3.65E+06	Austria	1.06E+07	Chile	1.91E+07
39	Thailand	2.48E+03	Guyana	5.37E+04	Tunisia	4.90E+05	Peru	3.51E+06	Morocco	1.05E+07	Nigeria	1.88E+07
40	Libya	2.31E+03	South Africa	5.23E+04	Colombia	4.84E+05	Sweden	3.42E+06	Afghanistan	1.04E+07	Morocco	1.84E+07
41	Norway	2.29E+03	Antarctica	5.13E+04	Thailand	4.58E+05	Syria	3.33E+06	Kazakhstan	9.78E+06	Kazakhstan	1.69E+07
42	Ecuador	2.23E+03	Thailand	5.09E+04	Mauritania	4.40E+05	Czechia	3.28E+06	Chile	9.33E+06	Afghanistan	1.66E+07
43	Sweden	2.18E+03	Turkey	5.09E+04	Central African Rep.	4.33E+05	Morocco	3.00E+06	Sweden	8.36E+06	Sweden	1.56E+07
44	Côte d'Ivoire	2.18E+03	Ethiopia	4.81E+04	S. Sudan	4.10E+05	Turkmenistan	2.96E+06	Belgium	7.19E+06	Belgium	1.51E+07
45	Ethiopia	2.01E+03	Côte d'Ivoire	4.71E+04	Malaysia	4.09E+05	Austria	2.77E+06	Syria	7.10E+06	Switzerland	1.34E+07
46	Turkey	1.91E+03	Papua New Guinea	4.66E+04	Ukraine	3.95E+05	Belarus	2.56E+06	Switzerland	6.74E+06	Ecuador	1.25E+07
47	Uganda	1.90E+03	Mongolia	4.48E+04	Mongolia	3.73E+05	Uzbekistan	2.42E+06	Ecuador	6.62E+06	Syria	1.22E+07
48	Finland	1.86E+03	Madagascar	4.37E+04	Sweden	3.60E+05	Myanmar	2.24E+06	Turkmenistan	6.35E+06	Romania	1.15E+07
49	Iran	1.85E+03	Suriname	4.34E+04	Niger	3.30E+05	Dem. Rep. Congo	2.22E+06	Hungary	6.26E+06	Hungary	1.15E+07

50			Central African Rep.									
	Ukraine	1.78E+03		4.32E+04	Chad	3.25E+05	Ecuador	2.19E+06	Tunisia	6.22E+06	Portugal	1.11E+07
51	Nicaragua	1.78E+03	Germany	4.18E+04	Venezuela	3.20E+05	Chile	2.08E+06	Romania	6.13E+06	Turkmenistan	1.06E+07
52	United Kingdom	1.77E+03	Ukraine	3.99E+04	Peru	3.15E+05	Hungary	2.08E+06	Portugal	5.72E+06	Tunisia	1.05E+07
53	Central African Rep.	1.75E+03	Sweden	3.88E+04	Côte d'Ivoire	3.01E+05	Tunisia	2.03E+06	Belarus	5.54E+06	Yemen	1.02E+07
54	Germany	1.64E+03	Italy	3.80E+04	Ethiopia	2.95E+05	Romania	1.96E+06	Yemen	5.34E+06	Philippines	1.01E+07
55	Botswana	1.62E+03	Norway	3.77E+04	Netherlands	2.90E+05	North Korea	1.91E+06	Myanmar	5.26E+06	North Korea	1.01E+07
56	Italy	1.59E+03	Afghanistan	3.67E+04	Belarus	2.59E+05	Laos	1.86E+06	Greece	5.20E+06	Greece	9.98E+06
57	Zimbabwe	1.53E+03	Uganda	3.58E+04	Czechia	2.54E+05	Belgium	1.82E+06	Sudan	5.20E+06	Belarus	9.87E+06
58	Panama	1.53E+03	Uzbekistan	3.56E+04	Myanmar	2.54E+05	Taiwan	1.72E+06	Philippines	5.19E+06	Taiwan	9.67E+06
59	Namibia	1.51E+03	Pakistan	3.29E+04	Ghana	2.53E+05	Bolivia	1.59E+06	Taiwan	5.18E+06	Dem. Rep. Congo	9.42E+06
60	Liberia	1.47E+03	Mauritania	3.25E+04	Laos	2.31E+05	Greece	1.59E+06	North Korea	5.11E+06	Myanmar	9.30E+06
61	Saudi Arabia	1.46E+03	Finland	3.20E+04	North Korea	2.14E+05	Switzerland	1.58E+06	Dem. Rep. Congo	4.99E+06	Jordan	8.56E+06
62	Vietnam	1.41E+03	Poland	3.16E+04	Senegal	2.13E+05	Portugal	1.57E+06	Kenya	4.58E+06	Kenya	8.52E+06
63	Somalia	1.40E+03	Vietnam	3.15E+04	Austria	2.00E+05	Philippines	1.55E+06	Jordan	4.57E+06	Israel	8.51E+06
64	Spain	1.34E+03	Turkmenistan	3.13E+04	Ecuador	1.93E+05	Finland	1.54E+06	Bolivia	4.45E+06	Laos	8.45E+06
65	Poland	1.32E+03	Spain	3.09E+04	Yemen	1.85E+05	Bangladesh	1.44E+06	Bangladesh	4.40E+06	Bolivia	8.38E+06
66	Ghana	1.29E+03	United Kingdom	3.05E+04	Kenya	1.80E+05	Niger	1.42E+06	Israel	4.36E+06	Bangladesh	8.31E+06
67	Guatemala	1.25E+03	Chad	3.01E+04	Tajikistan	1.79E+05	Yemen	1.41E+06	Tanzania	4.34E+06	Tanzania	8.26E+06
68	Mongolia	1.24E+03	Ecuador	3.00E+04	Jordan	1.76E+05	Kenya	1.40E+06	Laos	4.28E+06	Bulgaria	8.08E+06
69	Uzbekistan	1.20E+03	Ghana	2.98E+04	Oman	1.76E+05	Tanzania	1.36E+06	Finland	4.24E+06	Finland	7.92E+06
70	Egypt	1.12E+03	Somalia	2.95E+04	Hungary	1.76E+05	Cambodia	1.35E+06	Bulgaria	4.18E+06	New Zealand	7.47E+06
71	Honduras	1.10E+03	Niger	2.94E+04	Romania	1.68E+05	Mauritania	1.31E+06	Niger	4.10E+06	Paraguay	7.28E+06
72	Sudan	9.80E+02	Mali	2.88E+04	Bolivia	1.61E+05	Jordan	1.30E+06	Paraguay	4.06E+06	Serbia	7.28E+06
73	Malawi	9.79E+02	Liberia	2.85E+04	Guinea	1.58E+05	Ethiopia	1.27E+06	Uzbekistan	4.06E+06	Cambodia	7.13E+06
74	Turkmenistan	9.54E+02	Morocco	2.85E+04	Finland	1.54E+05	Norway	1.21E+06	Cambodia	3.95E+06	Ireland	7.05E+06
75	Sierra Leone	9.50E+02	S. Sudan	2.35E+04	Uganda	1.53E+05	Serbia	1.18E+06	Serbia	3.84E+06	Slovakia	6.98E+06
76	Laos	9.17E+02	Nicaragua	2.32E+04	Kyrgyzstan	1.53E+05	Bulgaria	1.15E+06	Ethiopia	3.70E+06	Sudan	6.82E+06
77	Belarus	9.12E+02	Namibia	2.19E+04	Taiwan	1.51E+05	Lithuania	1.13E+06	Mauritania	3.65E+06	Uzbekistan	6.55E+06
78	Costa Rica	9.00E+02	Botswana	2.19E+04	Mali	1.50E+05	Chad	1.12E+06	New Zealand	3.62E+06	Norway	6.46E+06
79	Guinea	8.83E+02	Laos	2.11E+04	Greece	1.48E+05	Slovakia	1.12E+06	Slovakia	3.59E+06	Ethiopia	6.41E+06
80	Paraguay	8.77E+02	Zimbabwe	1.99E+04	Tanzania	1.47E+05	Paraguay	1.10E+06	Norway	3.33E+06	Guatemala	6.06E+06
81	Sri Lanka	8.70E+02	Syria	1.95E+04	Chile	1.40E+05	Denmark	1.06E+06	Oman	3.31E+06	Oman	5.96E+06
82	Mauritania	8.69E+02	Panama	1.93E+04	Benin	1.35E+05	Croatia	1.05E+06	Ireland	3.27E+06	Croatia	5.90E+06
83	Morocco	8.40E+02	Belarus	1.91E+04	Bangladesh	1.32E+05	Oman	1.03E+06	Croatia	3.14E+06	Niger	5.69E+06
84	Chile	8.39E+02	Guinea	1.86E+04	Belgium	1.31E+05	New Zealand	1.01E+06	Guatemala	3.00E+06	Zimbabwe	5.21E+06
85	Iraq	8.29E+02	Sierra Leone	1.77E+04	Cambodia	1.26E+05	Israel	9.94E+05	Zimbabwe	2.69E+06	Somalia	5.19E+06
86	Cambodia	8.28E+02	Guatemala	1.68E+04	Philippines	1.24E+05	S. Sudan	9.78E+05	Somalia	2.56E+06	Mauritania	5.19E+06
87	Eq. Guinea	8.08E+02	Cambodia	1.66E+04	Norway	1.23E+05	Senegal	9.18E+05	Denmark	2.41E+06	Sri Lanka	4.62E+06
88	Afghanistan	8.06E+02	Tunisia	1.61E+04	Lithuania	1.19E+05	Mongolia	8.61E+05	Angola	2.37E+06	Denmark	4.50E+06
89	Greece	7.54E+02	Eq. Guinea	1.58E+04	Portugal	1.17E+05	Guatemala	8.59E+05	Sri Lanka	2.34E+06	Angola	4.48E+06
90	Cuba	7.41E+02	Greece	1.55E+04	Sierra Leone	1.11E+05	Azerbaijan	8.11E+05	Lithuania	2.33E+06	Mozambique	4.48E+06
91	Mali	6.64E+02	Honduras	1.45E+04	Congo	1.10E+05	Angola	7.99E+05	Mozambique	2.26E+06	Lithuania	4.11E+06
92	New Zealand	6.53E+02	Yemen	1.39E+04	Liberia	1.10E+05	Ireland	7.52E+05	Senegal	2.26E+06	Azerbaijan	4.03E+06
93	S. Sudan	6.45E+02	Malawi	1.31E+04	United Arab Emirates	1.08E+05	Cameroon	7.49E+05	Azerbaijan	2.25E+06	Uruguay	3.84E+06
94	Ireland	6.29E+02	Sri Lanka	1.30E+04	Azerbaijan	1.06E+05	Zimbabwe	7.09E+05	Botswana	2.13E+06	United Arab Emirates	3.75E+06
95	Iceland	5.98E+02	Paraguay	1.21E+04	Denmark	1.03E+05	Botswana	7.06E+05	Uruguay	1.99E+06	Botswana	3.74E+06
96	Tunisia	5.75E+02	Romania	1.18E+04	Eritrea	9.72E+04	Mali	7.03E+05	Slovenia	1.95E+06	Slovenia	3.71E+06
97	Syria	5.55E+02	Oman	1.17E+04	Kuwait	9.52E+04	Sri Lanka	6.82E+05	United Arab Emirates	1.94E+06	Nicaragua	3.32E+06
98	Dominican Rep.	5.50E+02	Chile	1.17E+04	Serbia	9.39E+04	Côte d'Ivoire	6.65E+05	Mongolia	1.78E+06	Georgia	3.21E+06
99	Burundi	5.08E+02	Costa Rica	1.15E+04	Slovakia	9.20E+04	Nepal	6.64E+05	Georgia	1.71E+06	Bosnia and Herz.	3.15E+06
100	Pakistan	4.90E+02	South Korea	1.13E+04	Israel	9.18E+04	Mozambique	6.36E+05	Nepal	1.66E+06	Nepal	3.01E+06
101	Niger	4.72E+02	Cuba	1.06E+04	Switzerland	9.14E+04	Latvia	6.05E+05	Guinea	1.59E+06	Senegal	3.01E+06
102	Portugal	4.64E+02	Ireland	9.98E+03	Croatia	9.08E+04	Somalia	5.87E+05	Bosnia and Herz.	1.58E+06	Guinea	2.94E+06
103	Chad	4.35E+02	Benin	9.89E+03	Namibia	8.88E+04	Slovenia	5.68E+05	Nicaragua	1.51E+06	Honduras	2.81E+06
104	Romania	4.03E+02	Iceland	9.65E+03	Bulgaria	8.42E+04	Kyrgyzstan	5.63E+05	Zambia	1.43E+06	Mongolia	2.79E+06

105	South Korea	4.03E+02	Kyrgyzstan	9.62E+03	New Zealand	8.31E+04	Tajikistan	5.56E+05	Mali	1.43E+06	Cuba	2.59E+06
106	Eritrea	3.99E+02	Eritrea	9.42E+03	Botswana	7.60E+04	Uruguay	5.49E+05	Chad	1.42E+06	Zambia	2.57E+06
107	Lithuania	3.82E+02	Senegal	9.27E+03	Paraguay	7.48E+04	Guinea	5.18E+05	Cameroon	1.39E+06	Cameroon	2.52E+06
108	Benin	3.71E+02	Portugal	9.04E+03	Somalia	7.46E+04	United Arab Emirates	5.16E+05	Côte d'Ivoire	1.37E+06	Kyrgyzstan	2.51E+06
109							Central African Rep.				Côte d'Ivoire	
110	Latvia	3.54E+02	Tajikistan	8.32E+03	Angola	7.42E+04	African Rep.	5.16E+05	Namibia	1.36E+06	d'Ivoire	2.49E+06
111	Kyrgyzstan	3.44E+02	Burundi	8.31E+03	Guatemala	7.26E+04	Zambia	5.14E+05	Kyrgyzstan	1.35E+06	Mali	2.46E+06
112	Tajikistan	3.36E+02	New Zealand	8.21E+03	Latvia	7.23E+04	Ghana	5.12E+05	Honduras	1.31E+06	El Salvador	2.43E+06
113	Denmark	3.30E+02	North Korea	7.78E+03	Togo	7.13E+04	Georgia	4.94E+05	North Macedonia	1.23E+06	North Macedonia	2.38E+06
114	Belize	3.11E+02	Bangladesh	7.52E+03	Nepal	7.07E+04	Namibia	4.90E+05	Cuba	1.21E+06	Albania	2.31E+06
115	Uruguay	2.91E+02	Hungary	7.44E+03	Zimbabwe	5.73E+04	Kuwait	4.57E+05	Albania	1.20E+06	Chad	2.27E+06
116	Rwanda	2.89E+02	Dominican Rep.	7.44E+03	Burkina Faso	5.61E+04	Bosnia and Herz.	4.51E+05	Latvia	1.14E+06	Namibia	2.20E+06
117	Bangladesh	2.88E+02	Czechia	7.44E+03	Sri Lanka	5.59E+04	Uganda	4.00E+05	El Salvador	1.09E+06	Latvia	2.09E+06
118	Hungary	2.78E+02	Lithuania	7.39E+03	Mozambique	5.44E+04	Estonia	3.67E+05	Burkina Faso	1.07E+06	Armenia	2.02E+06
119	North Korea	2.76E+02	Jordan	7.29E+03	Ireland	5.25E+04	Honduras	3.42E+05	Armenia	1.05E+06	Burkina Faso	2.01E+06
120	Netherlands	2.74E+02	Latvia	6.51E+03	W. Sahara	5.17E+04	Nicaragua	3.39E+05	Kuwait	1.05E+06	Madagascar	1.98E+06
121	Estonia	2.71E+02	Austria	6.44E+03	Uruguay	4.86E+04	Benin	3.32E+05	Tajikistan	1.04E+06	Tajikistan	1.92E+06
122	Czechia	2.67E+02	Burkina Faso	5.98E+03	Zambia	4.82E+04	Congo	3.25E+05	Madagascar	1.02E+06	Qatar	1.71E+06
123			Bulgaria	5.92E+03	Somaliland	4.65E+04	North Macedonia	3.24E+05	S. Sudan	9.31E+05	Lebanon	1.68E+06
124	Croatia	2.34E+02	Netherlands	5.81E+03	Estonia	4.41E+04	Burkina Faso	3.13E+05	Lebanon	8.85E+05	Congo	1.67E+06
125	Jordan	2.24E+02	Denmark	5.78E+03	Qatar	4.30E+04	Madagascar	3.07E+05	Congo	8.82E+05	Costa Rica	1.65E+06
126	Haiti	2.23E+02	Croatia	5.45E+03	Lebanon	4.27E+04	Albania	3.00E+05	Ghana	8.78E+05	Moldova	1.62E+06
127	Togo	2.19E+02	Togo	5.37E+03	Slovenia	4.27E+04	Sierra Leone	2.90E+05	Moldova	8.56E+05	Somaliland	1.58E+06
128	Solomon Is.	2.15E+02	Rwanda	5.11E+03	Georgia	4.01E+04	Armenia	2.85E+05	Costa Rica	8.37E+05	S. Sudan	1.54E+06
129	Yemen	2.09E+02	Azerbaijan	5.08E+03	Guinea-Bissau	3.88E+04	Lebanon	2.77E+05	Somaliland	8.07E+05	Ghana	1.52E+06
130	Austria	2.09E+02	Estonia	4.90E+03	Bhutan	3.75E+04	Moldova	2.66E+05	Estonia	7.96E+05	Estonia	1.45E+06
131	Israel	2.06E+02	Israel	4.86E+03	Bosnia and Herz.	3.72E+04	Cuba	2.60E+05	Qatar	7.91E+05	Kuwait	1.36E+06
132	Trinidad and Tobago	2.02E+02	Serbia	4.68E+03	Gabon	3.19E+04	Costa Rica	2.43E+05	Uganda	7.25E+05	Uganda	1.25E+06
133	Bulgaria	2.02E+02	United Arab Emirates	4.29E+03	Armenia	3.08E+04	Liberia	2.43E+05	Benin	6.62E+05	Sierra Leone	1.11E+06
134			Uruguay	4.17E+03	Cyprus	2.80E+04	Bhutan	2.21E+05	Sierra Leone	6.13E+05	Benin	1.10E+06
135	Oman	1.77E+02	Belize	4.06E+03	Madagascar	2.79E+04	Somaliland	1.97E+05	Kosovo	5.51E+05	Malawi	1.08E+06
136	Azerbaijan	1.73E+02	Taiwan	3.97E+03	Honduras	2.72E+04	Qatar	1.90E+05	Malawi	5.42E+05	Kosovo	1.06E+06
137	Timor-Leste	1.62E+02	Somaliland	3.96E+03	Nicaragua	2.46E+04	Lesotho	1.84E+05	Central African Rep.	5.21E+05	Liberia	9.36E+05
138	Senegal	1.60E+02	W. Sahara	3.74E+03	Moldova	2.39E+04	Eritrea	1.82E+05	Liberia	5.01E+05	Burundi	9.31E+05
139	Serbia	1.60E+02	Nepal	3.50E+03	North Macedonia	2.27E+04	El Salvador	1.67E+05	Lesotho	4.84E+05	Central African Rep.	9.23E+05
140											Guinea-Bissau	
141	Fiji	1.40E+02	Slovakia	3.40E+03	Albania	2.17E+04	Burundi	1.52E+05	Bhutan	4.71E+05	Bhutan	8.76E+05
142	Belgium	1.38E+02	Switzerland	3.39E+03	Rwanda	2.08E+04	Malawi	1.46E+05	Dominican Rep.	4.38E+05	Lesotho	8.67E+05
143	Georgia	1.36E+02	Georgia	3.38E+03	Costa Rica	2.04E+04	Kosovo	1.45E+05	Panama	3.95E+05	Montenegro	7.74E+05
144	Bhutan	1.35E+02	Belgium	3.12E+03	Burundi	2.01E+04	Guinea-Bissau	1.28E+05	Montenegro	3.84E+05	Panama	7.57E+05
145	Slovakia	1.30E+02	Haiti	3.05E+03	Cuba	1.89E+04	Panama	1.25E+05	Rwanda	3.51E+05	Rwanda	6.88E+05
146	Puerto Rico	1.29E+02	Kuwait	2.94E+03	Djibouti	1.23E+04	Dominican Rep.	1.21E+05	Haiti	3.39E+05	Haiti	6.81E+05
147	Lesotho	1.22E+02	Bosnia and Herz.	2.92E+03	Malawi	1.22E+04	Rwanda	1.10E+05	Guinea-Bissau	3.21E+05	Guyana	6.36E+05
148	W. Sahara	1.21E+02	Brunei	2.86E+03	Panama	1.09E+04	Cyprus	1.09E+05	Belize	3.01E+05	Jamaica	5.95E+05
149	Burkina Faso	1.19E+02	Trinidad and Tobago	2.85E+03	Kosovo	1.02E+04	W. Sahara	1.02E+05	Guyana	3.00E+05	Belize	5.89E+05
150	Jamaica	1.16E+02	Bhutan	2.62E+03	eSwatini	1.01E+04	Gabon	1.02E+05	Brunei	2.85E+05	Guinea-Bissau	5.58E+05
151	Bosnia and Herz.	1.16E+02	Albania	2.51E+03	El Salvador	9.82E+03	eSwatini	9.89E+04	Togo	2.80E+05	Brunei	5.29E+05
152	Albania	1.11E+02	Lebanon	2.37E+03	Dominican Rep.	9.52E+03	Brunei	9.72E+04	Gabon	2.74E+05	Gabon	5.20E+05
153	eSwatini	1.04E+02	Solomon Is.	2.16E+03	Eq. Guinea	8.72E+03	Montenegro	9.39E+04	Jamaica	2.69E+05	Iceland	5.07E+05
154	Lebanon	1.01E+02	Moldova	2.02E+03	Brunei	8.62E+03	Suriname	9.17E+04	Suriname	2.57E+05	Suriname	4.67E+05

154	Bahamas	9.88E+01	Timor-Leste	1.79E+03	Suriname	8.56E+03	Belize	9.13E+04	eSwatini	2.53E+05	Togo	4.64E+05
155	Switzerland	9.48E+01	Lesotho	1.75E+03	Belize	7.42E+03	Guyana	8.59E+04	Iceland	2.46E+05	eSwatini	4.62E+05
156	Somaliland	9.36E+01	Puerto Rico	1.74E+03	Guyana	7.34E+03	Haiti	8.42E+04	Eritrea	2.40E+05	Puerto Rico	4.03E+05
157	El Salvador	8.95E+01	Slovenia	1.61E+03	Gambia	7.33E+03	Jamaica	6.14E+04	Puerto Rico	2.03E+05	Eritrea	3.46E+05
158	Nepal	8.44E+01	Jamaica	1.55E+03	Montenegro	6.89E+03	Iceland	6.09E+04	Cyprus	1.97E+05	Cyprus	3.24E+05
159	Moldova	8.08E+01	North Macedonia	1.53E+03	Haiti	6.55E+03	Puerto Rico	5.39E+04	W. Sahara	1.48E+05	Djibouti	2.66E+05
160	United Arab Emirates	7.14E+01	Bahamas	1.46E+03	Jamaica	4.43E+03	Djibouti	3.73E+04	Djibouti	1.28E+05	W. Sahara	2.58E+05
161	Cyprus	6.18E+01	Fiji	1.45E+03	Iceland	4.32E+03	Gambia	2.79E+04	Gambia	8.61E+04	Gambia	1.59E+05
162	Slovenia	5.81E+01	Cyprus	1.41E+03	Puerto Rico	3.86E+03	Eq. Guinea	2.11E+04	Eq. Guinea	5.27E+04	Eq. Guinea	9.97E+04
163	Vanuatu	5.65E+01	eSwatini	1.38E+03	Bahamas	1.57E+03	Papua New Guinea	1.19E+04	Papua New Guinea	3.30E+04	Papua New Guinea	6.04E+04
164	North Macedonia	5.34E+01	Armenia	1.35E+03	Papua New Guinea	1.16E+03	Bahamas	1.15E+04	Falkland Is.	2.47E+04	Falkland Is.	5.46E+04
165	New Caledonia	4.65E+01	El Salvador	1.34E+03	Falkland Is.	7.66E+02	Falkland Is.	8.68E+03	Trinidad and Tobago	2.43E+04	Trinidad and Tobago	5.37E+04
166	Armenia	3.82E+01	Qatar	1.12E+03	Timor-Leste	6.08E+02	Timor-Leste	6.60E+03	Timor-Leste	1.92E+04	Timor-Leste	3.56E+04
167	Montenegro	2.94E+01	Djibouti	7.54E+02	Trinidad and Tobago	4.38E+02	Trinidad and Tobago	6.04E+03	Bahamas	1.74E+04	Bahamas	2.27E+04
168	Falkland Is.	2.63E+01	Montenegro	7.16E+02	Greenland	2.42E+02	Greenland	4.75E+02	Fr. S. Antarctic Lands	1.92E+02	Fr. S. Antarctic Lands	4.75E+02
169	Djibouti	2.17E+01	Vanuatu	5.93E+02	New Caledonia	9.41E+01	New Caledonia	1.36E+02	Greenland	2.77E+01	Antarctica	1.85E+00
170	Kosovo	1.89E+01	Kosovo	5.86E+02	Antarctica	2.28E+01	Fr. S. Antarctic Lands	5.79E+01	New Caledonia	9.05E+00	Greenland	4.16E-01
171	Kuwait	1.33E+01	New Caledonia	5.23E+02	Fiji	7.05E+00	Antarctica	5.60E+01	Antarctica	1.47E+00	New Caledonia	1.06E-01
172	Fr. S. Antarctic Lands	1.30E+01	Gambia	4.24E+02	Fr. S. Antarctic Lands	6.02E+00	Fiji	8.22E+00	Vanuatu	5.74E-01	Solomon Is.	5.25E-02
173	Gambia	1.21E+01	Falkland Is.	2.99E+02	Vanuatu	2.37E+00	Vanuatu	6.57E+00	Fiji	8.86E-02	Fiji	3.43E-02
174	Qatar	1.01E+01	Fr. S. Antarctic Lands	1.52E+02	Solomon Is.	2.02E+00	Solomon Is.	3.42E+00	Solomon Is.	3.89E-02	Vanuatu	1.64E-02
175	N. Cyprus	0.00E+00	N. Cyprus	0.00E+00	Palestine	0.00E+00	Luxembourg	0.00E+00	N. Cyprus	0.00E+00	N. Cyprus	0.00E+00
176	Palestine	0.00E+00	Luxembourg	0.00E+00	Luxembourg	0.00E+00	Palestine	0.00E+00	Luxembourg	0.00E+00	Luxembourg	0.00E+00

Table S2 Settling velocities and deposition parameters adopted for each particle diameter D .

D (μm)	0.5	1.5	5	10	35	70
C_c of sphere	1.326	1.082	1.032	1.016	1.008	1.003
Settling velocity as sphere (cm/s)	0.00097	0.0087	0.097	0.39	3.61	14.39
Settling velocity as fiber (cm/s)	-	-	-	-	2.7	4.98
Parameter $a(D)$	7.1×10^{-8}	1.1×10^{-7}	9.7×10^{-5}	1.7×10^{-4}	2.8×10^{-4}	3.9×10^{-4}
Parameter $b(D)$	6.9×10^{-7}	1.2×10^{-6}	1.8×10^{-3}	3.6×10^{-3}	5.5×10^{-3}	6.4×10^{-3}

53 **Table S3 Emission and deposition in 2014; burden in the last month of 2014.**

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<i>D</i> (μm)	0.5	1.5	5	10	35	70	Total
Emission (Tg/year)	0.0031	0.0424	0.1369	1.1211	3.2025	5.8683	10.3743
Deposition (Tg/year)	0.0030	0.0444	0.1230	1.0094	3.0754	5.7518	10.0639
Burden (Tg)	0.0031	0.0190	0.0005	0.0013	0.0006	0.0006	0.0251
Residence time	1 year	5 months	1.5 days	11 hours	1.7 hours	1 hour	0.9 days

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