Supporting Information for "Attribution of River-Sourced Floating Plastic in the South Atlantic Ocean Using Bayesian Inference"

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Text S1. Likelihood Maps . Figure S1 shows the likelihood maps for particles released at each source R_i, averaged over a period of 3.4 years. The values for the likelihood in the bins are between 0 to 10^{-4}, as they represent the proportion of particles (in relation to the total number of particles from a source in the domain) that cross a grid cell. Each source has 100 000 particles, minus the particles that exited the domain at a certain time step, so if in one bin there are 100 particles, the likelihood would in the order of 10^{-4}.

In general, the dark blue areas represent regions where almost no particles were found from a specific source, while the yellow regions represent locations where it was more likely to find particles from that source. Specifically, for the South American sources, the likelihood of finding particles from Recife, Santos, and Salvador is almost zero in the open ocean between 20 °S to 40 °S, that is, where the subtropical gyre is located. The particles released from those sources tend to stay close to shore and beach because of the effect of Stokes drift that pushes them towards the coast.

For the sources Itajaí, Paraíba, Porto Alegre, Rio de Janeiro, and Rio de la Plata, the likelihood to find particles released by any of those sources is the highest in the subtropical gyre (between 20 °S to 40 °S), with values ranging from 1×10^{-4} to 3×10^{-4}, suggesting a high chance of finding particles from those sources, with Porto Alegre being the largest contributor. Closer to the South American coast, the likelihood is above 3×10^{-4} for all these sources. North of the gyre, from 20°S and further North, the likelihood of finding particles from the American coast is near-zero.

For the African sources, shown on the right of Figure S1, we see that the likelihood of finding particles released in Cape Town is the highest in the Benguela Current. These particles are likely to reach the South American coast near the Cape of Saõ Roque, and will less likely get carried by the Brazil Current towards the coast of Argentina. The particles released at the Congo get carried away northward to the Equator, outside of the domain of our simulation, and are unlikely to find these particles in other parts of the studied domain.

References

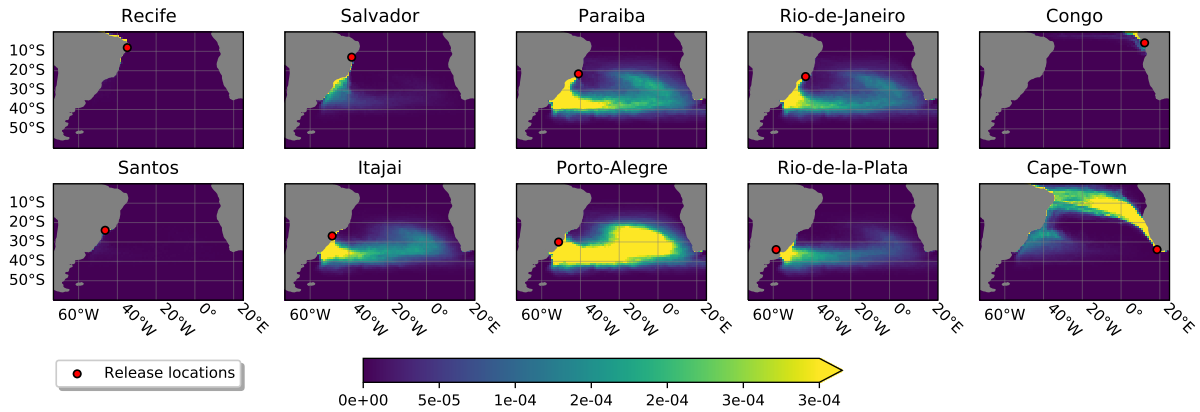

Figure S1. Likelihood maps of the spatially binned $p(S_{loc}|R_i)$ for each source. The color scale indicates the probability of finding a plastic particle coming from the source (indicated as a red point).

Sources (R_i)	Proportion (%)	$p(R_i)$
Congo	1.6	0.019
Cape Town	4.2	0.051
Rio de la Plata	9.8	0.121
Porto Alegre	8.3	0.099
Santos	4.6	0.048
Paraibá	3.8	0.031
Itajaí	7.5	0.086
Rio de Janeiro	28.5	0.334
Salvador	6.8	0.078
Recife	12.7	0.133
Other rivers	12.1	-

Table S1. The proportion of the total annual plastic released to the South Atlantic and the prior probability $p(R_i)$ of a particle being released at a specific source R_i. The "Other rivers" row indicates the proportion of plastic from rivers outside the clusters and is therefore not considered in $p(R_i)$.