PUERTO BAHÍA BLANCA

MINISTERIO DE AMBIENTE
GOBIERNO DE LA PROVINCIA DE BUENOS AIRES

CONICET

Microplásticos en el ambiente marino

26 de Septiembre de 2025

Pampa AZUL BONAERENSE

@LABORATORIO.DE.COPS.IADO

UNIVERSIDAD NACIONAL DEL SUR BAHÍA BLANCA

IADO CONICET UNS

GESAMP
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection

aharias@iado-conicet.gov.ar

@andrewharias

PAMPA AZUL

Elon Musk
@elonmusk
En respuesta a @WorldAndScience
Earth should be called Water. Our surface is 71% water. Mars land area is roughly equal to Earth, as it's all land. Even when warmed up & water ice turns liquid, Mars will be about 2/3 land.

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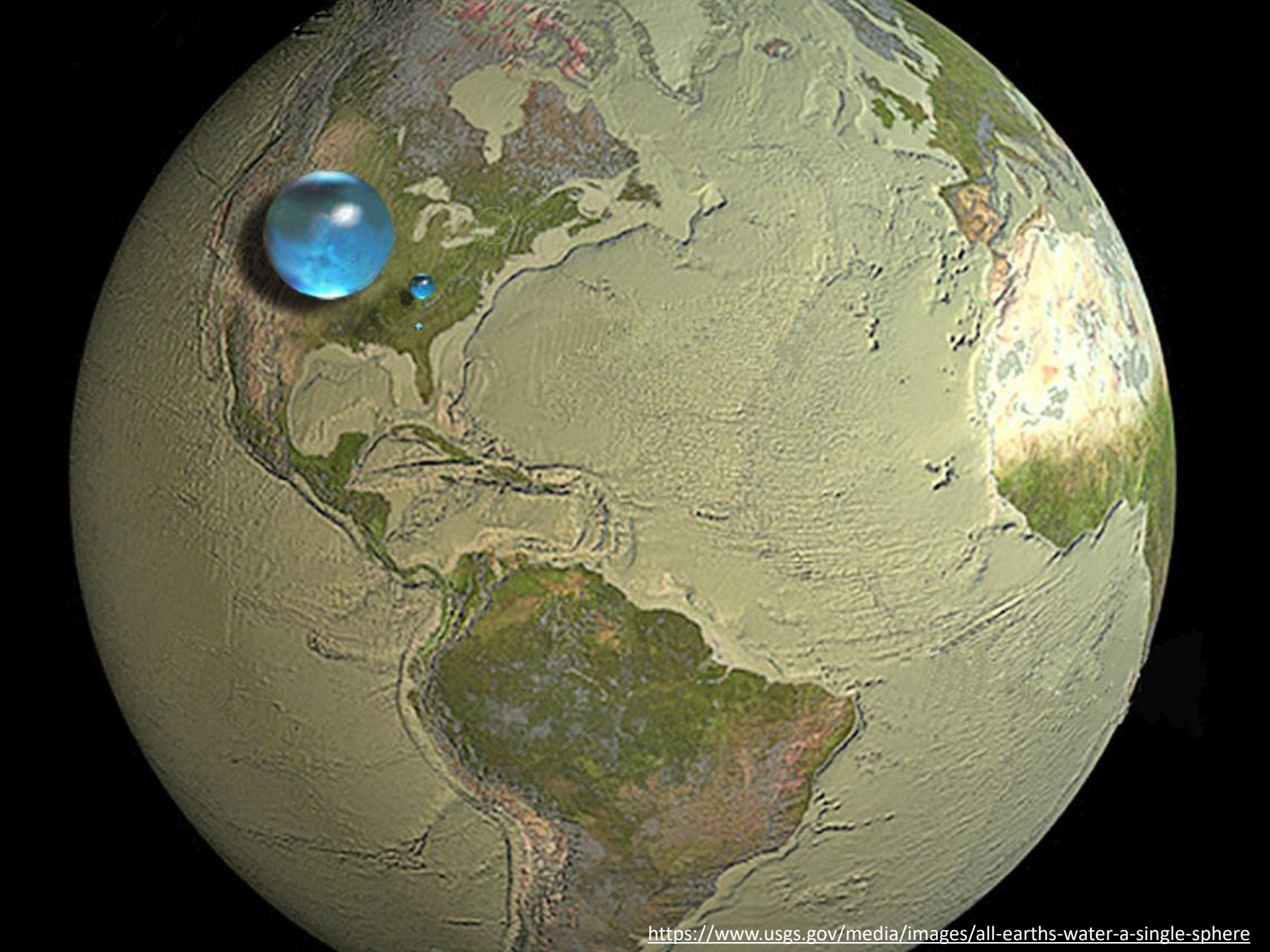
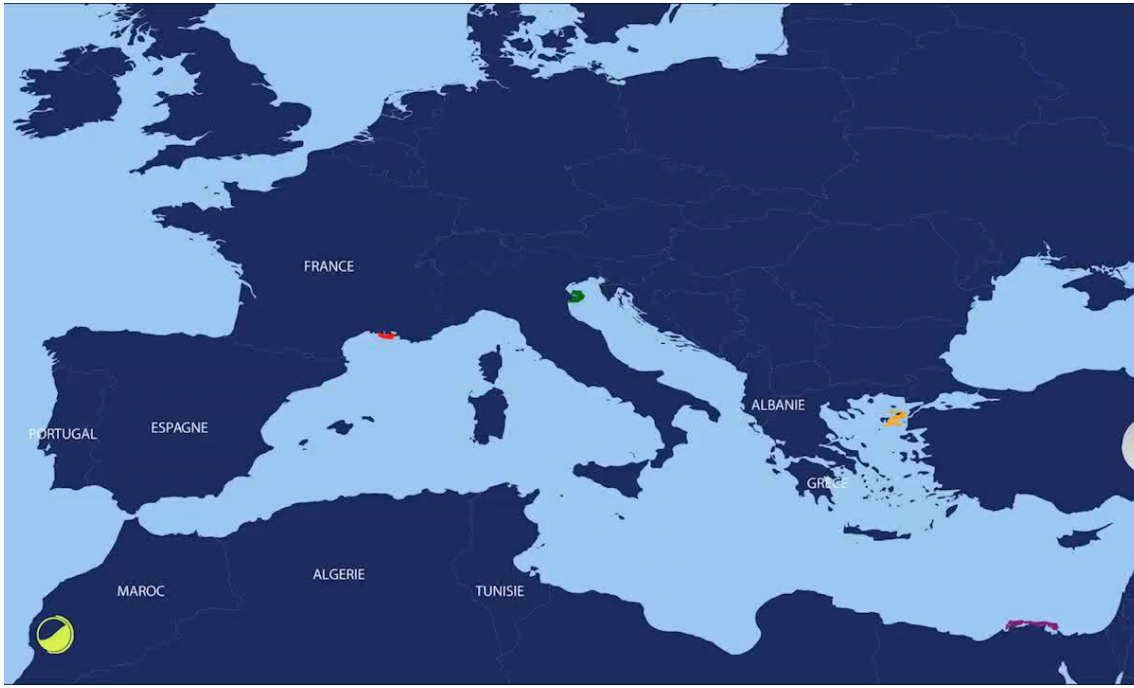


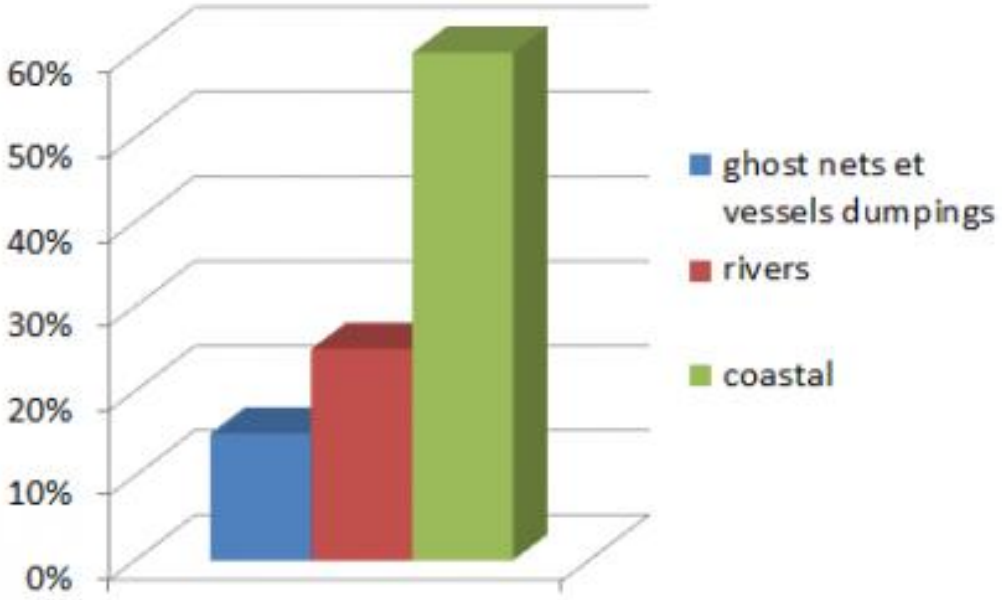
https://www.usgs.gov/media/images/all-earths-water-a-single-sphere

De la tierra al océano

La mayor parte de los desechos plásticos marinos provienen del continente.

Los desechos plásticos continentales son arrastrados al océano por las **tormentas y los sistemas fluviales, o son descargados directamente en las aguas costeras**.





RIVER PLASTIC EMISSIONS TO THE WORLD'S OCEANS

DOI: 10.1126/sciadv.aaz5803

Rivers are a major source of plastic waste in the oceans. We estimate that 1000 rivers, represented by the red dots, are accountable for nearly 80% of global annual riverine plastic emissions, which range between 0.8 – 2.7 million metric tons per year, with small urban rivers amongst the most polluting. The remaining 20% of plastic emissions are distributed over 30,000 rivers, represented by smaller blue dots.

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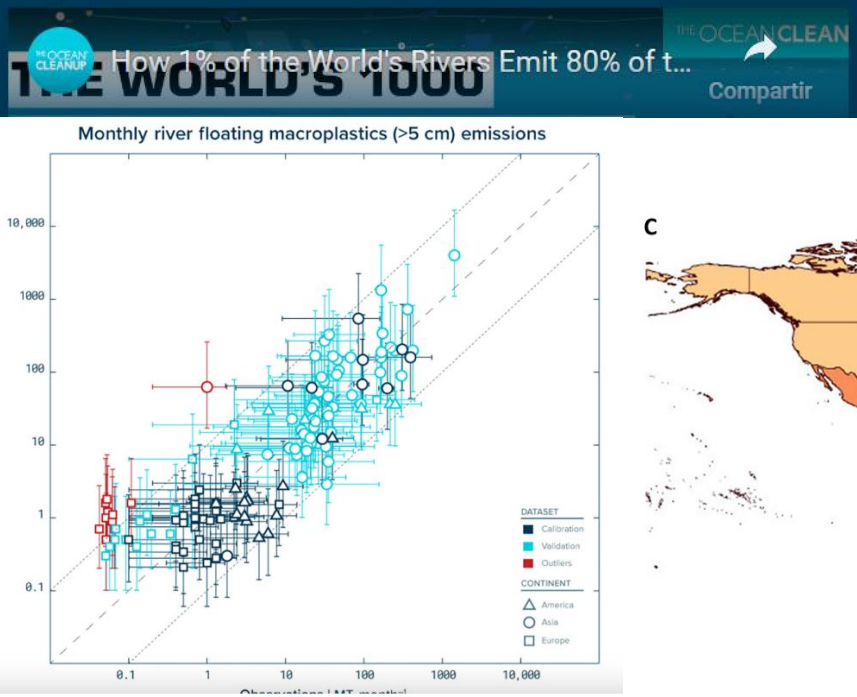
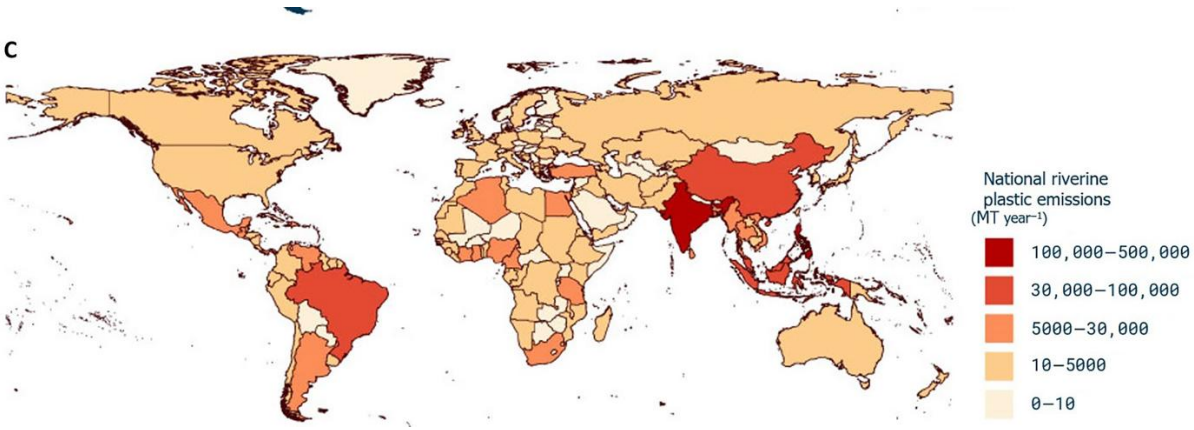




Nairobi River, Kenya

Ngaba River, Congo

Motagua River, Guatemala

Estuario del Río de la Plata, Buenos Aires

Maldonado River, Bahía Blanca, Argentina

Rich Horner

ENVIRONMENTAL RESEARCH
LETTERS

LETTER • OPEN ACCESS

Origin, dynamics and evolution of ocean garbage patches from observed surface drifters

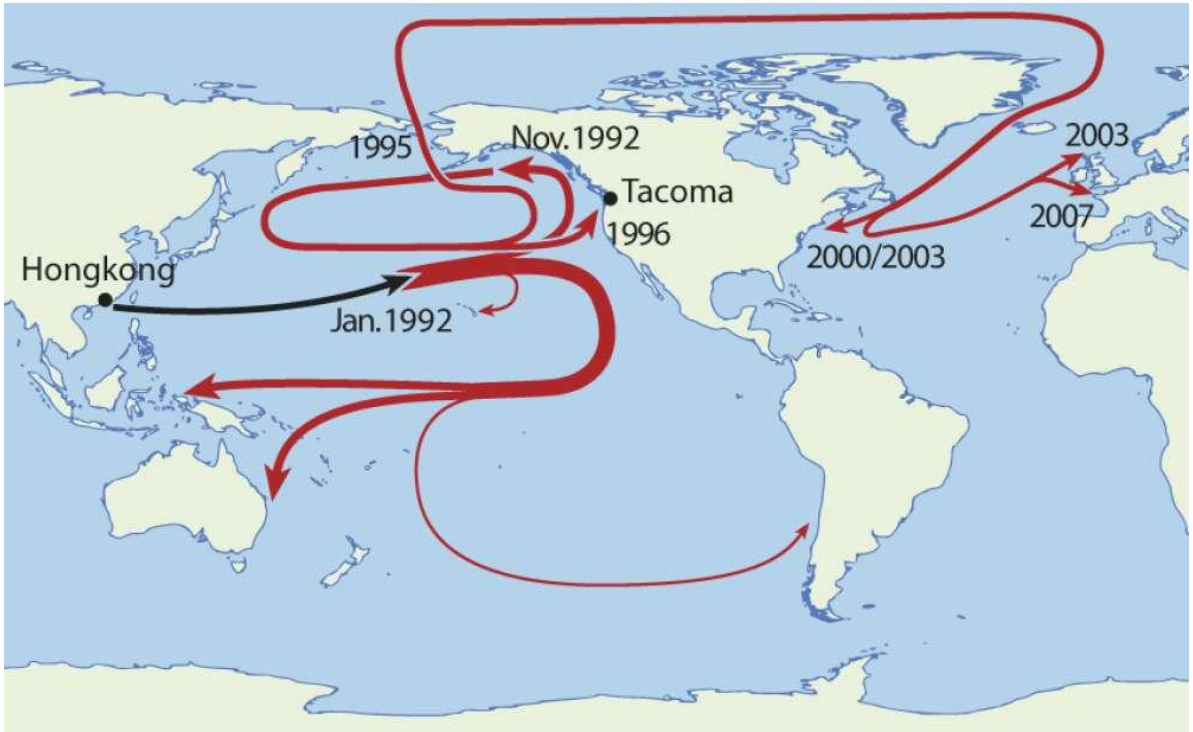
Erik van Sebille[3,1], Matthew H England[1] and Gary Froyland[2]

Published 19 December 2012 • © 2012 IOP Publishing Ltd

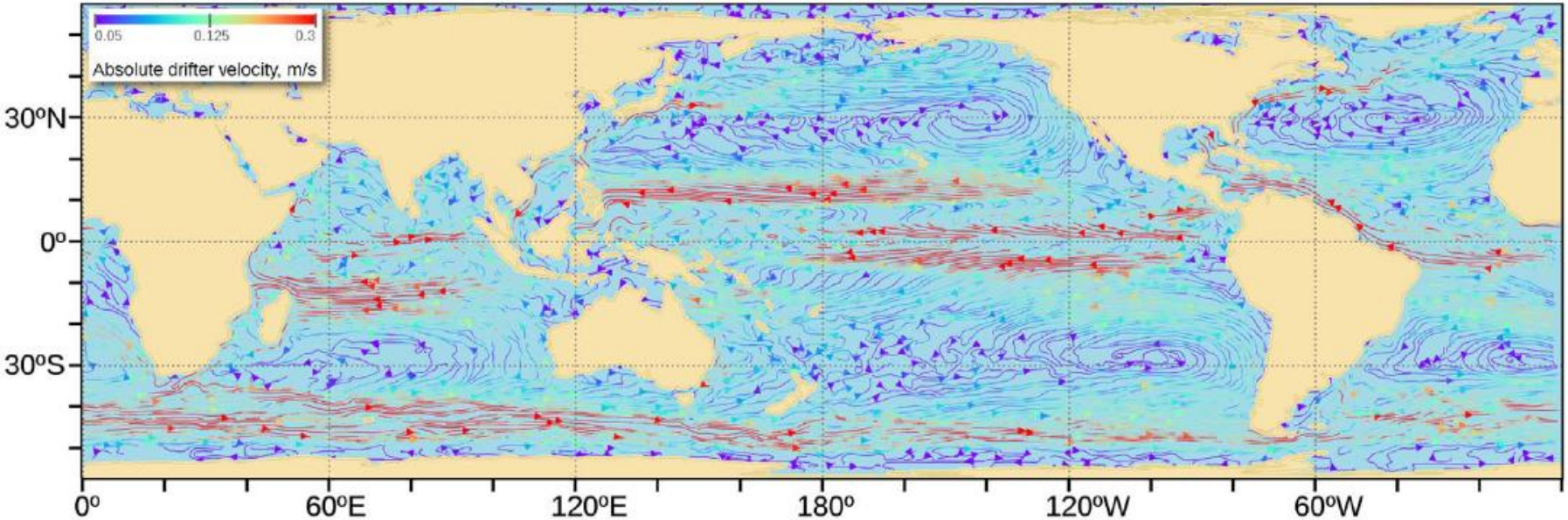
Environmental Research Letters, Volume 7, Number 4

Citation Erik van Sebille *et al* 2012 *Environ. Res. Lett.* **7** 044040

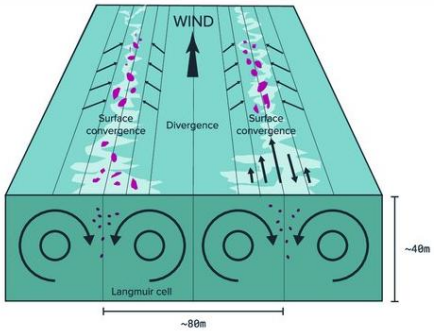
DOI 10.1088/1748-9326/7/4/044040



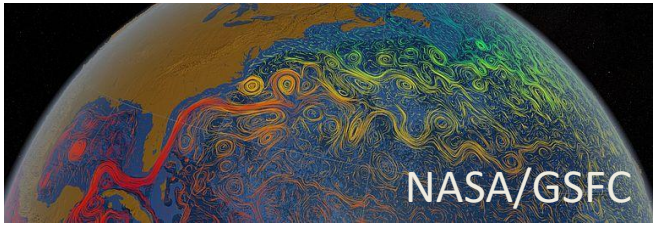
Distribución de corrientes superficiales. Color=velocidad



Corrientes de Langmuir



Procesos mesoescala: eddies



11/10/2022 10086Kg 6,5days run

REGLAS BASICAS DE LA SOSTENIBILIDAD

- 1. Ningún recurso renovable deberá utilizarse a un ritmo superior al de su generación.

2. Ningún contaminante deberá producirse a un ritmo superior al que pueda ser reciclado, neutralizado o absorbido por el medio ambiente

- 3. Ningún recurso no renovable deberá aprovecharse a mayor velocidad de la necesaria para sustituirlo por un recurso renovable

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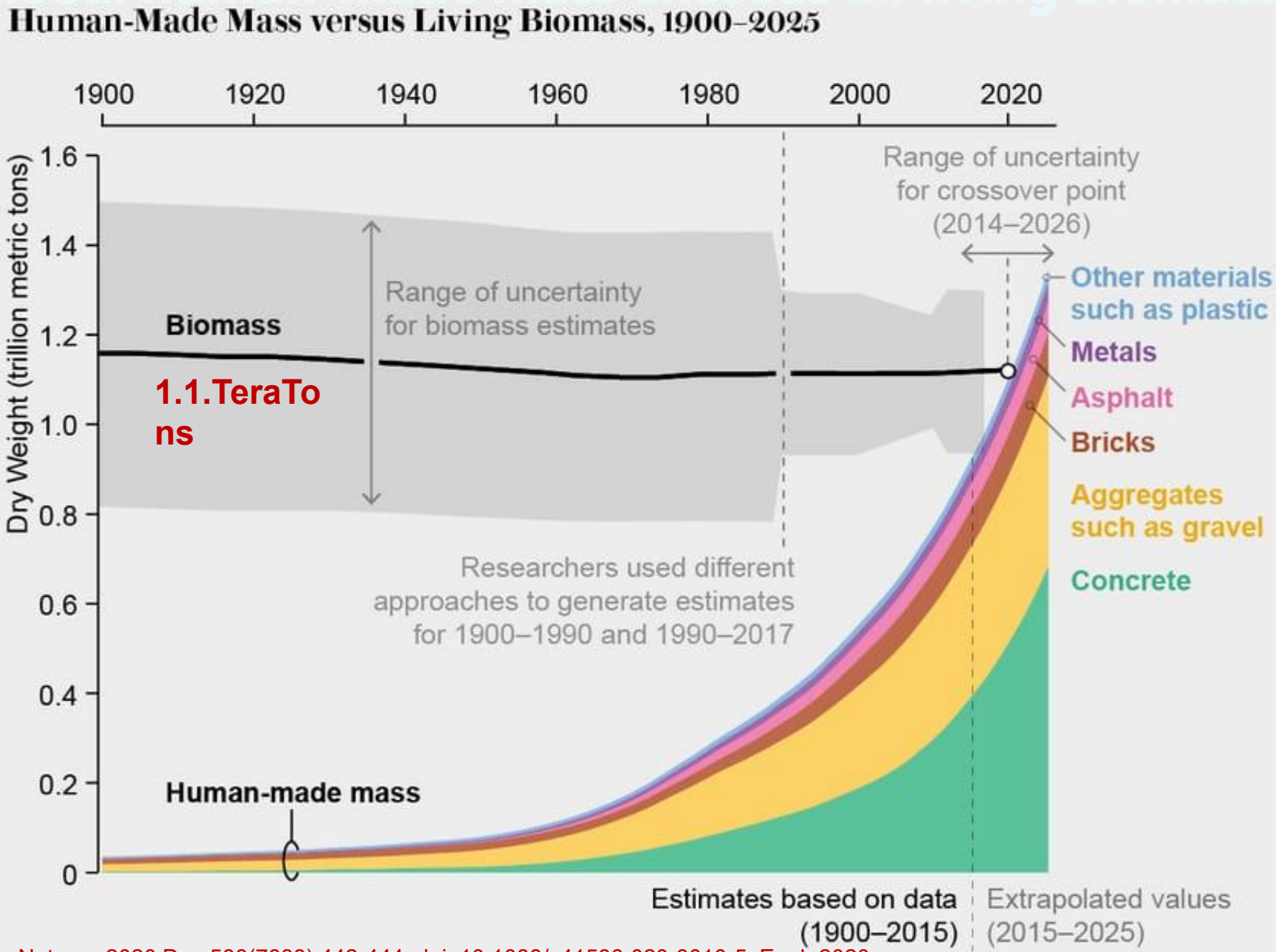
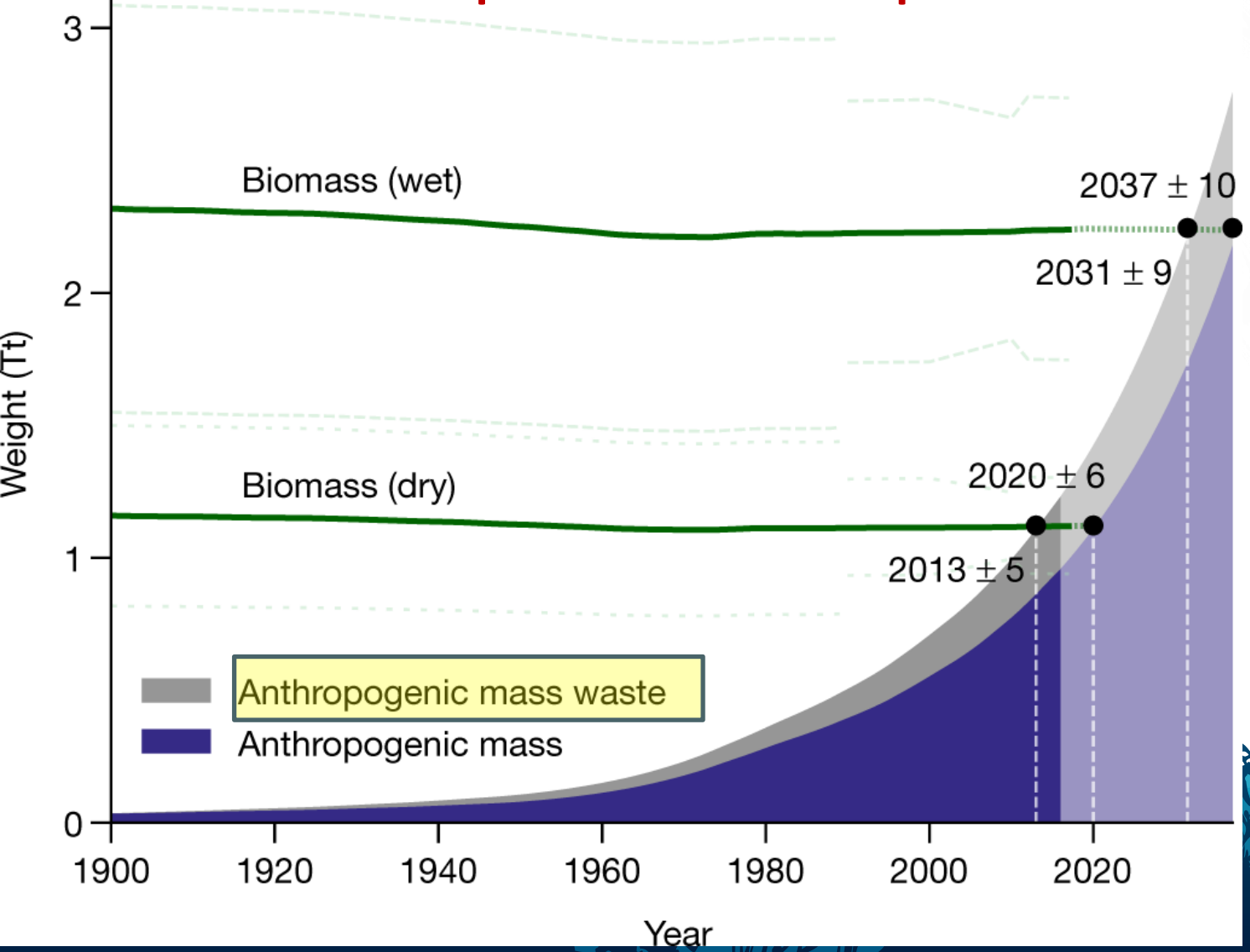
7770000 espécies do Reino Animal
953434 catalogado

Global human-made mass exceeds all living biomass



Nature . 2020 Dec;588(7838):442-444. doi: 10.1038/s41586-020-3010-5. Epub 2020

This quantification of the human enterprise gives a mass-based quantitative and symbolic characterization of the human-induced epoch of the Anthropocene.



El ciclo de vida de los plásticos

El ciclo de vida de los plásticos incluye la extracción de materias primas; el diseño y la producción; el envasado y la distribución; el uso y el mantenimiento; y el reciclaje, la reutilización, la recuperación o la disposición final. Después de que los artículos de plástico han sido consumidos o utilizados, estos pueden seguir varias rutas diferentes

Plastic waste in numbers

In 2018, of the **291 million tonnes** (Mt) of non-fibre plastic waste estimated to be generated globally →

Total primary plastic wast

by polymer

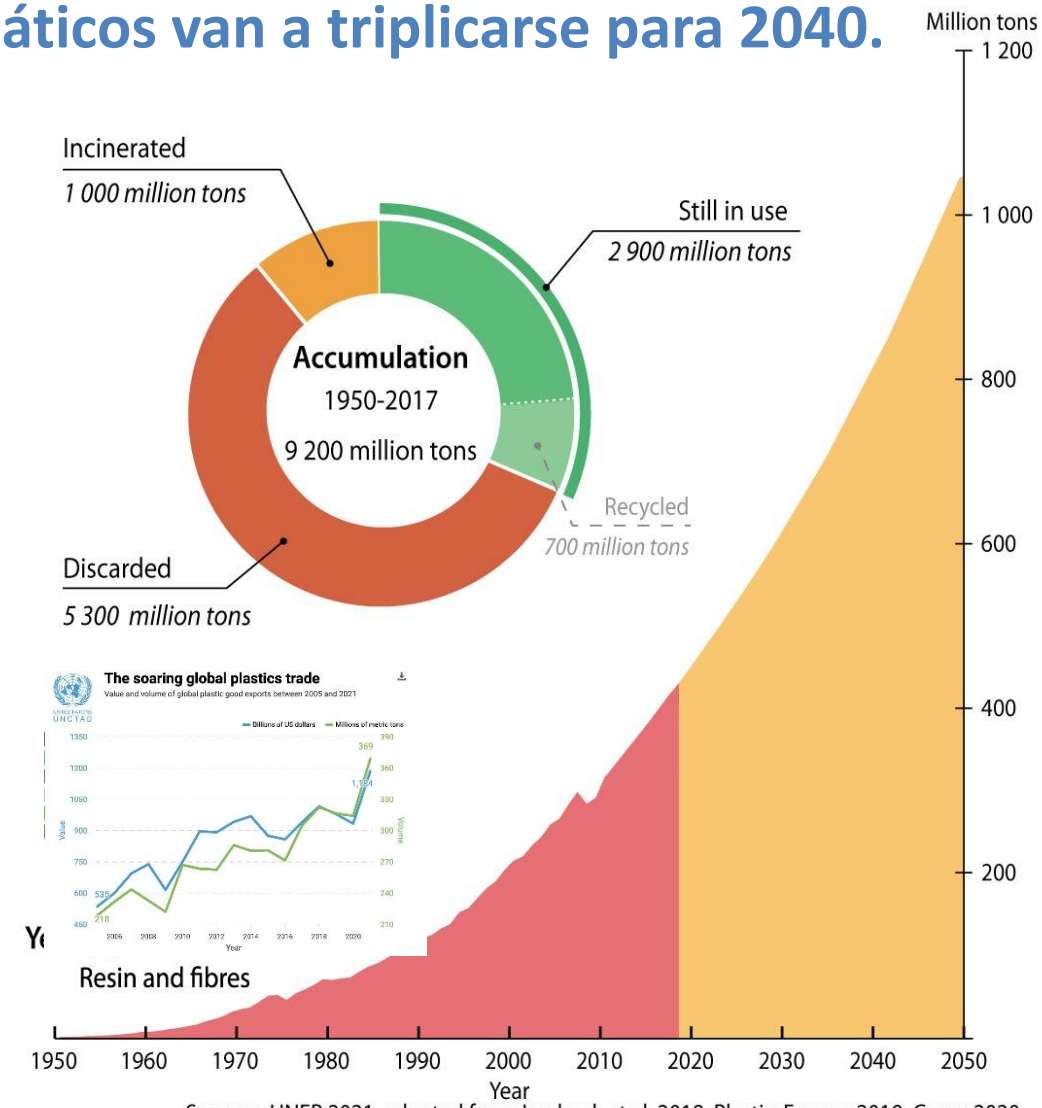
Recycled: **62 Mt**

Incinerated: **78 Mt**

Discarded: **151 Mt**

La cantidad de basura marina y contaminación plástica ha estado creciendo rápidamente. Se proyecta que, sin una acción significativa, las emisiones de desechos plásticos hacia los ecosistemas acuáticos van a triplicarse para 2040.

Producción mundial de plásticos, acumulación y proyección futura



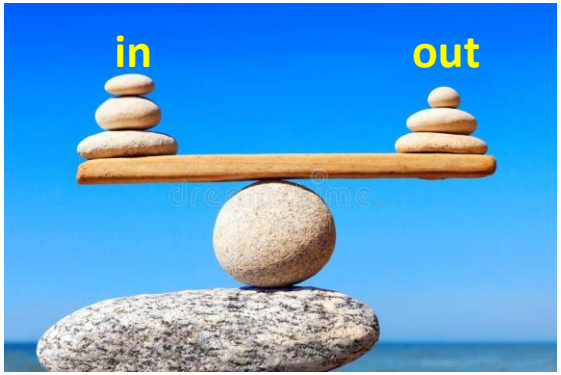
Sources: UNEP 2021, adapted from Jambeck et al. 2018; PlasticsEurope 2019; Geyer 2020.
Illustrated by GRID-Arendal

Acumulado actual

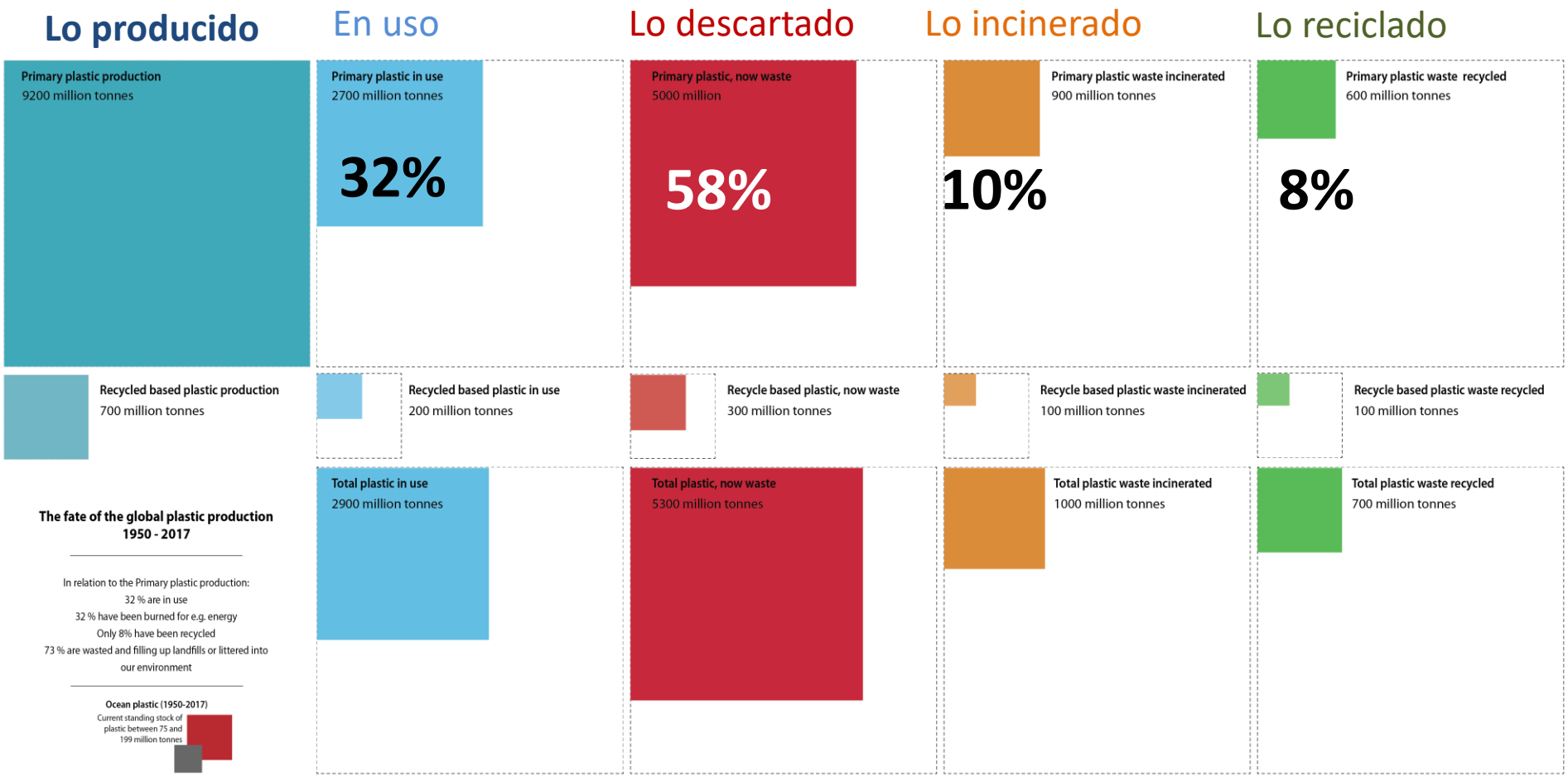
75-199 million tons

Tasa de emisión

from some 9-14 million tons per year in 2016 to a projected 23-37 million tons per year by 2040

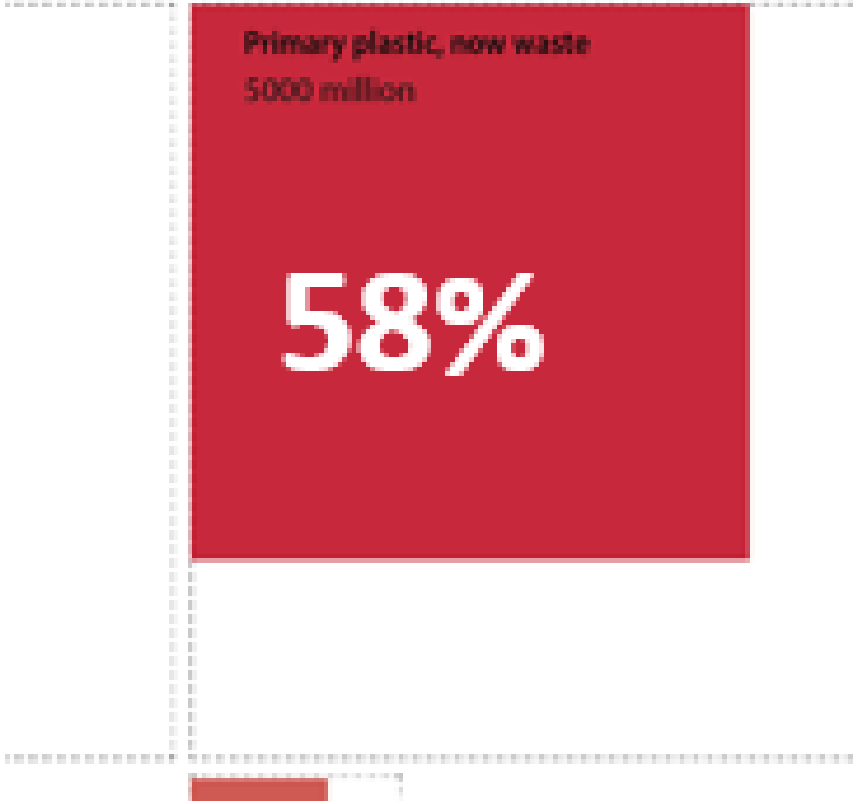


1756, MiKail Lomonosov, “En un sistema aislado, la materia no se crea ni se destruye”

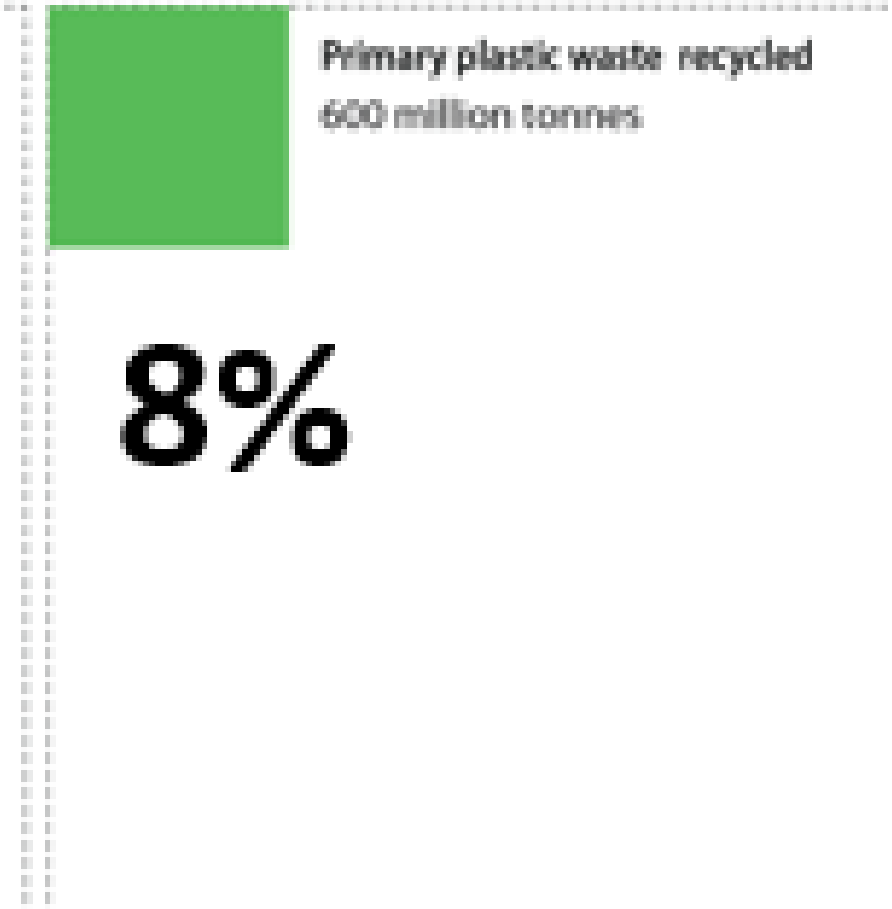


Geyer et al. 2020; Need the specific reference for the standing stock Number)

Lo descartado

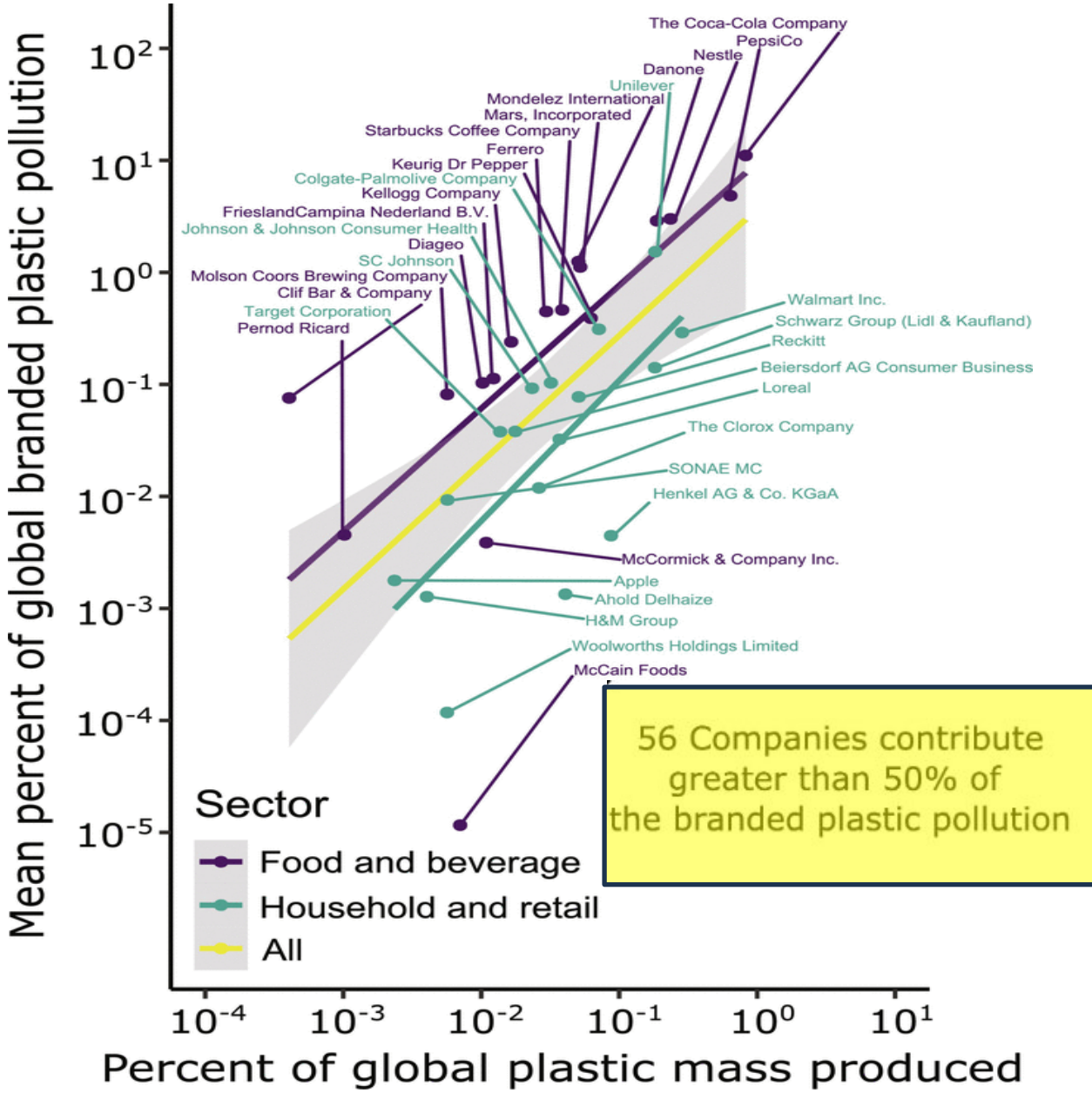


Lo reciclado

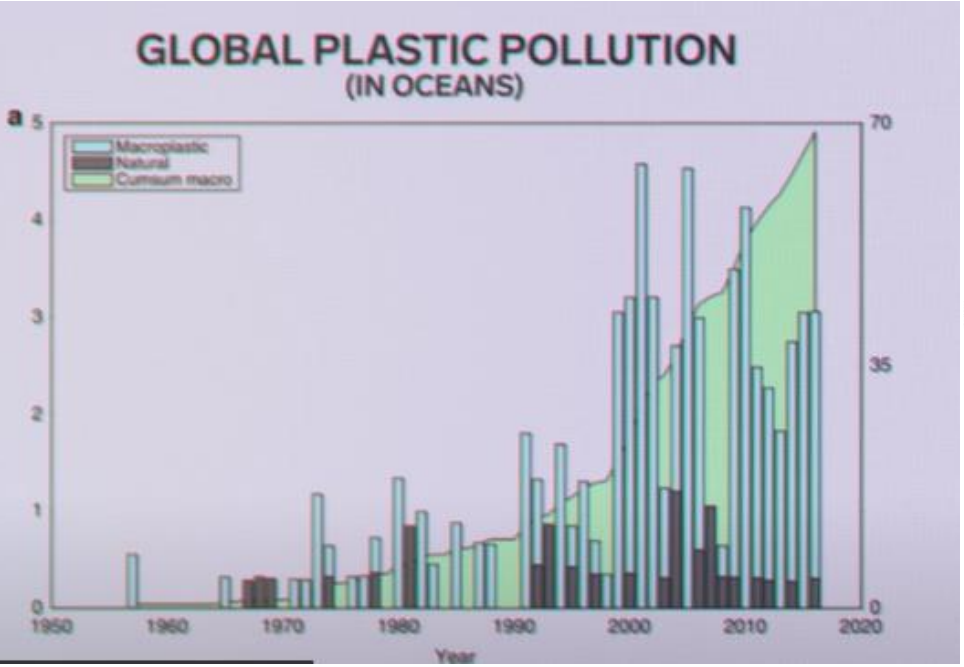


Science Advances | AAAS
SIGNIFICANT RESEARCH, GLOBAL IMPACT

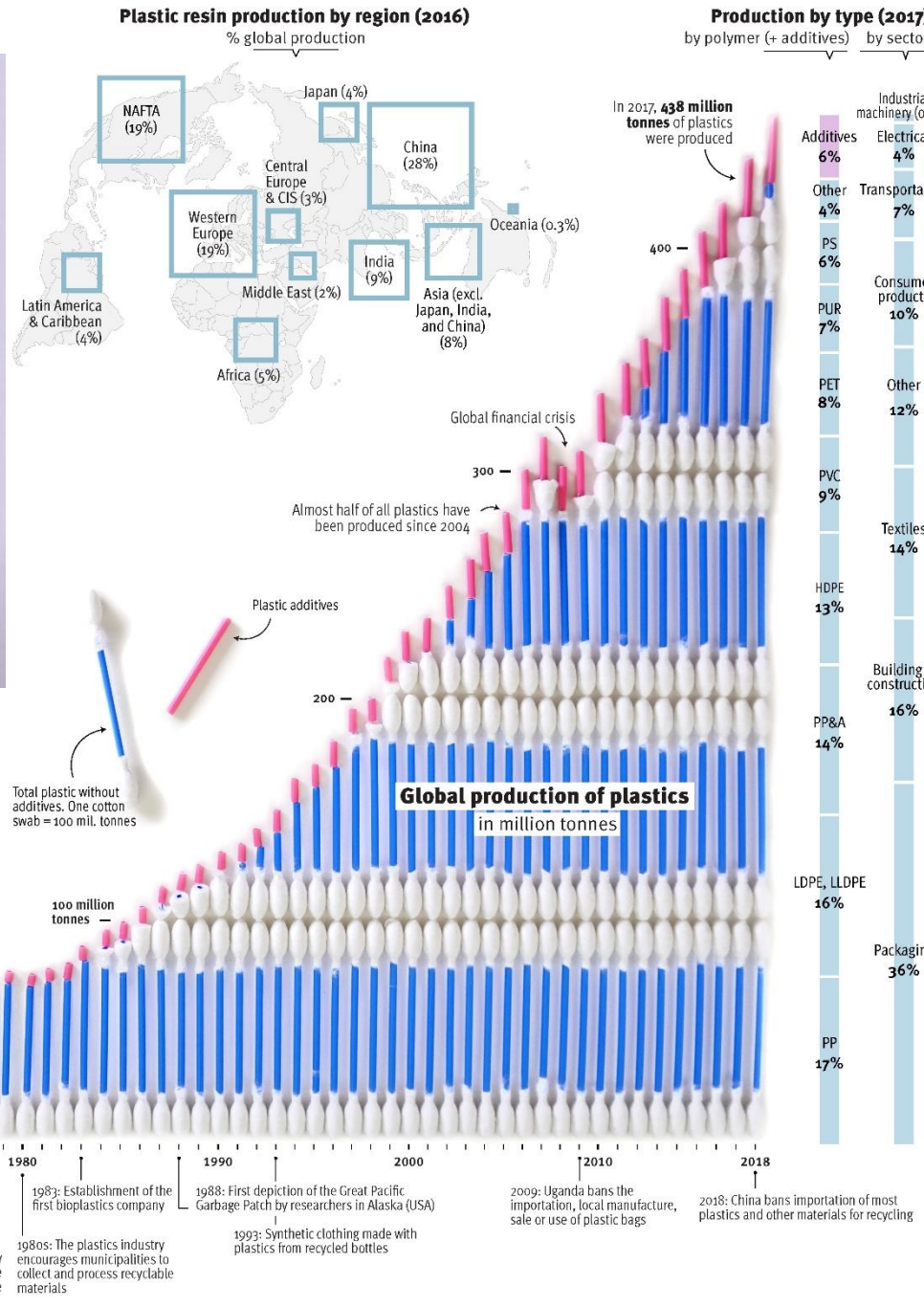
Existe una **fuerte relación lineal log-log entre la cantidad de plástico que se produce y la cantidad de ese plástico que termina en el medio ambiente como contaminación**



Global producer responsibility for plastic pollution, Volume: 10, Issue: 17, DOI: (10.1126/sciadv.adj8275)



Relación entre la cantidad de plástico que se produce y la cantidad de ese plástico que termina en el medio marino



THE OCEAN CLEANUP

RETURN TO THE OCEAN CLEANUP

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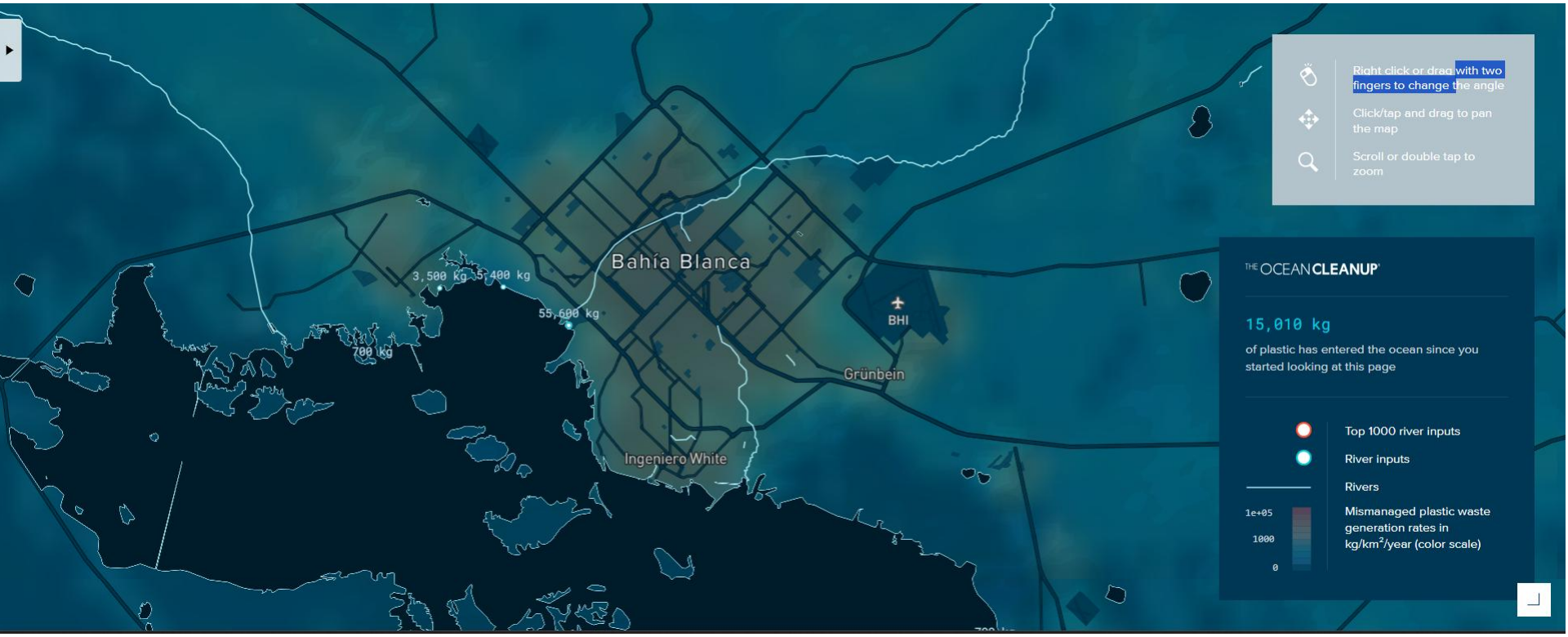
START EXPLORING


Right click or drag with two fingers to change the angle
Click/tap and drag to pan the map
Scroll or double tap to zoom
Bahía Blanca
3,500 kg
5,400 kg
55,600 kg
700 kg
BHI
Grünbein
Ingeniero White
THE OCEAN CLEANUP
15,010 kg
of plastic has entered the ocean since you started looking at this page
Top 1000 river inputs
River inputs
Rivers
1e+05
1000
0
Mismanaged plastic waste generation rates in kg/km²/year (color scale)

Seguimiento de la Trayectoria de Contaminantes Orgánicos Persistentes y Plásticos desde la Tierra al Mar: Análisis de su Presencia en la Deposición Atmosférica, el Polvo Urbano y los Cursos de Agua en Bahía Blanca, Argentina

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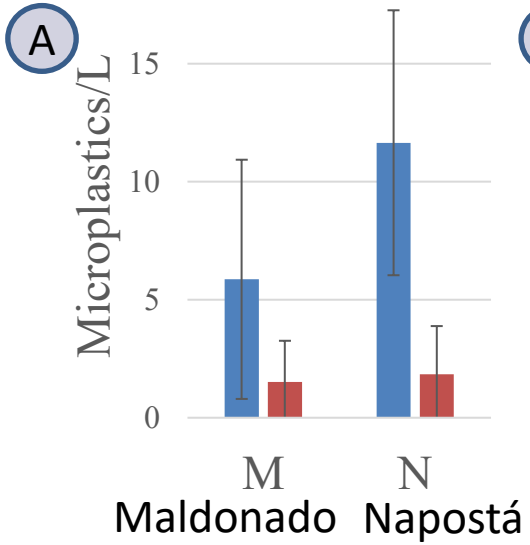
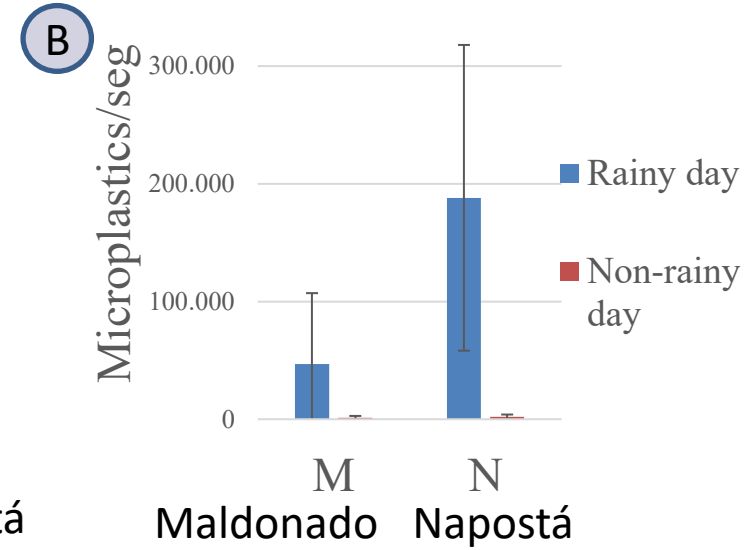
Seguimiento de la Trayectoria de Contaminantes Orgánicos Persistentes y Plásticos desde la Tierra al Mar: Análisis de su Presencia en la Deposición Atmosférica, el Polvo Urbano y los Cursos de Agua en Bahía Blanca, Argentina





Abundancia promedio de **Microplásticos** (MP) y caudal másico de MP en **días lluviosos y no lluviosos en los ríos urbanos Maldonado** (M) y **Napostá** (N).

Los plásticos ingresan principalmente al estuario a través de la escorrentía pluvial y las vías acuáticas urbanas

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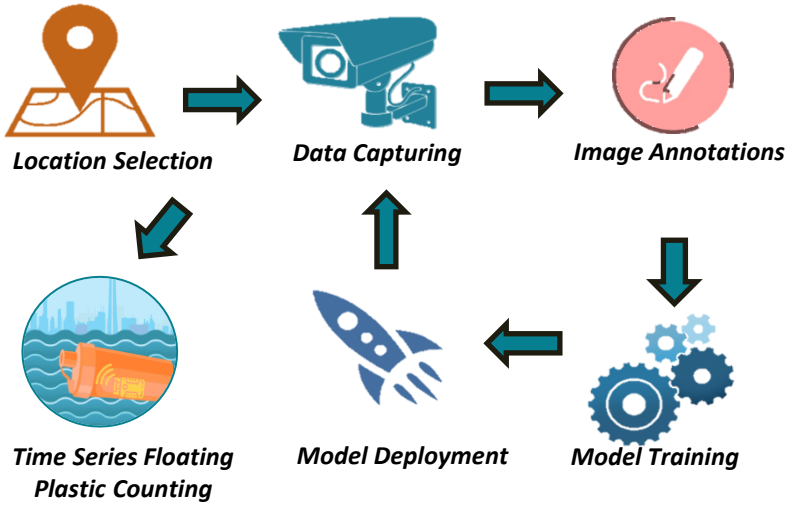
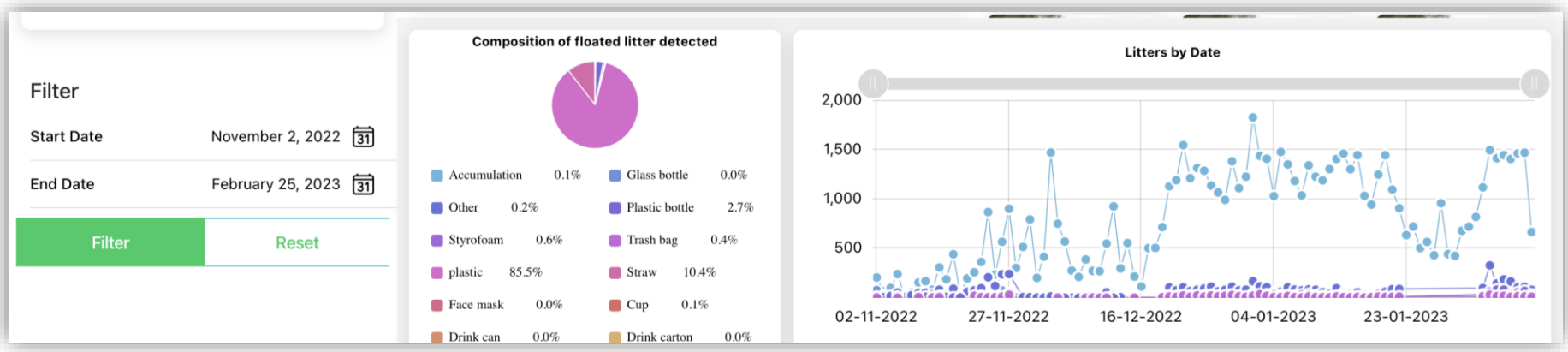

Location Selection
Data Capturing
Image Annotations
Time Series Floating Plastic Counting
Model Deployment
Model Training

[redacted]


Filter
Start Date November 2, 2022
End Date February 25, 2023
Filter
Reset
Composition of floated litter detected
Accumulation 0.1%
Glass bottle 0.0%
Other 0.2%
Plastic bottle 2.7%
Styrofoam 0.6%
Trash bag 0.4%
plastic 85.5%
Straw 10.4%
Face mask 0.0%
Cup 0.1%
Drink can 0.0%
Drink carton 0.0%
Litters by Date
2,000
1,500
1,000
500
02-11-2022
27-11-2022
16-12-2022
04-01-2023
23-01-2023

Otra de las vías de ingreso es la atmosférica

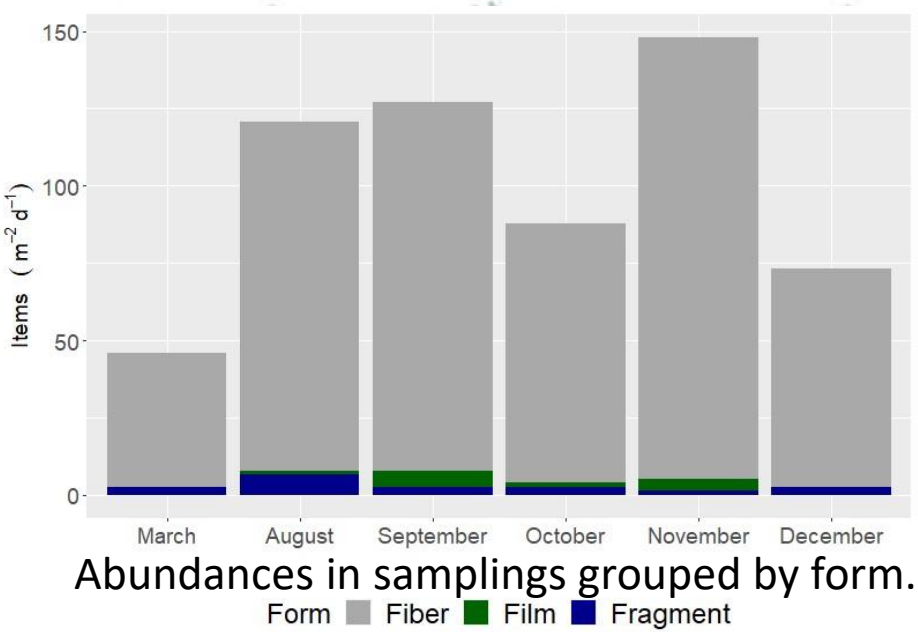
Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Villafañe et al., 2023

Microplastics and anthropogenic debris in rainwater from Bahia Blanca, Argentina



Abundances in samplings grouped by form.

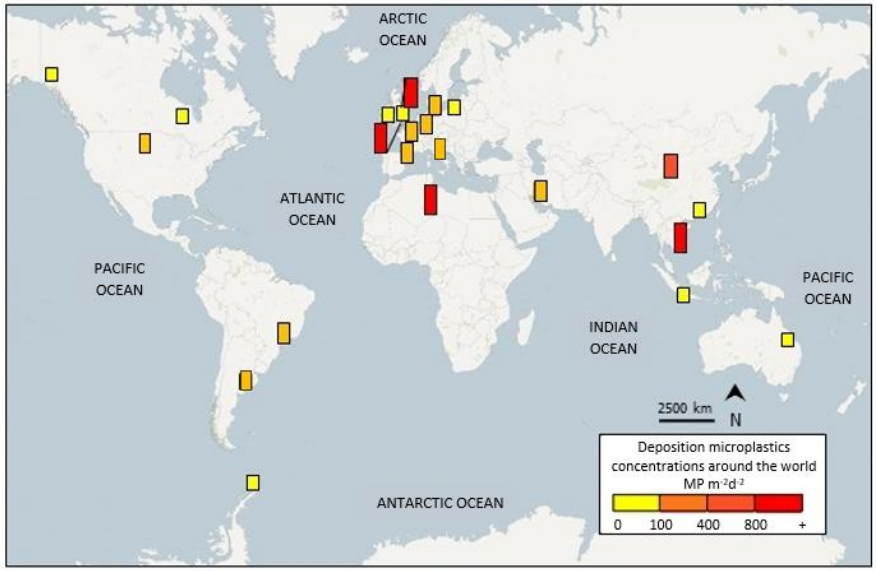
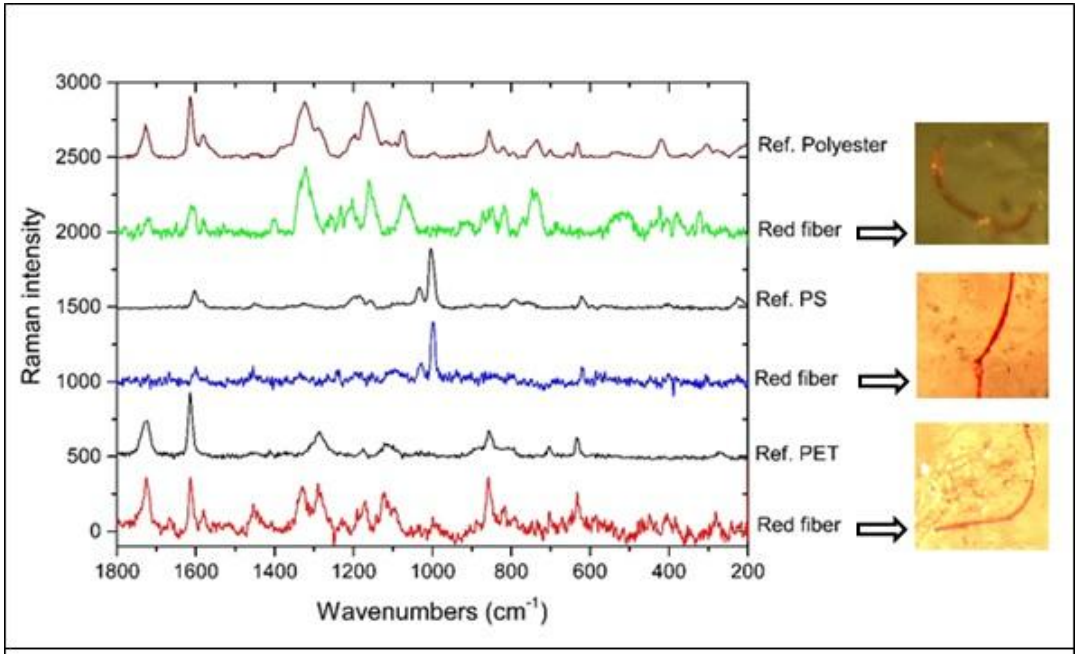
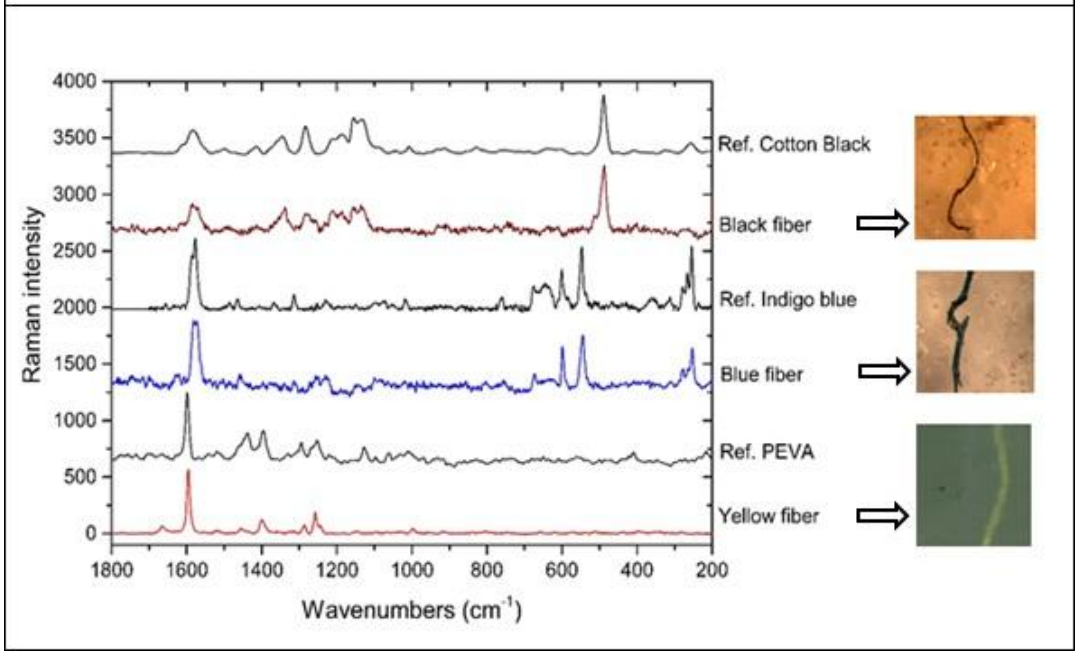


Figure 4. Atmospheric MP deposition around the world, including the present study.

(148 items m^{-2}d^{-1}) while the lowest was debris ranged in size from 0.1 mm to 3.87 mm with the most abundant particles being smaller than 1 mm (77.8%). The dominant form of particles found were fibers (95%), followed by fragments (3.1%). Blue color predominated (37.2%) in the total number of samples, followed by light blue (23.3%) and black (21.7%). Further, small particles (<2 mm), apparently composed of mineral material and plastic fibers, were recognized. The chemical composition of suspected MPs was examined by Raman microscopy. The analysis of μ-Raman spectra confirmed the presence of polystyrene, polyethylene terephthalate, and polyethylene vinyl acetate fibers and provided evidence of fibers containing industrial additives such as indigo dye. This is the first assessment of MP pollution in rain in Argentina.





Mps concentration in a liter of rainfall water ranged from 14.11 (March) to 65.11 (December), with an average of **47.75 MPs/L**. The deposition fluxes of MPs ranged from 11.46 (March) to 37.02 (November) MPs $m^{-2}d^{-1}$, with an average of **25.25 MPs $m^{-2}d^{-1}$**

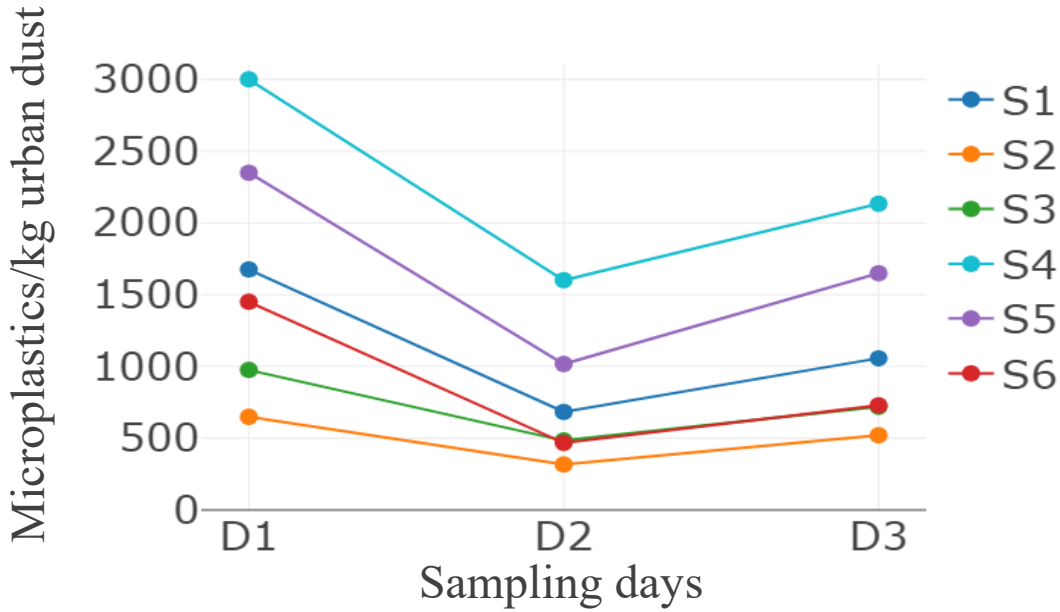


Fig. 4. Variation in MPs abundance in urban dust: one day before (D1), one day after (D2), and two days after (D3) rainfall at different Bahía Blanca sites (S).

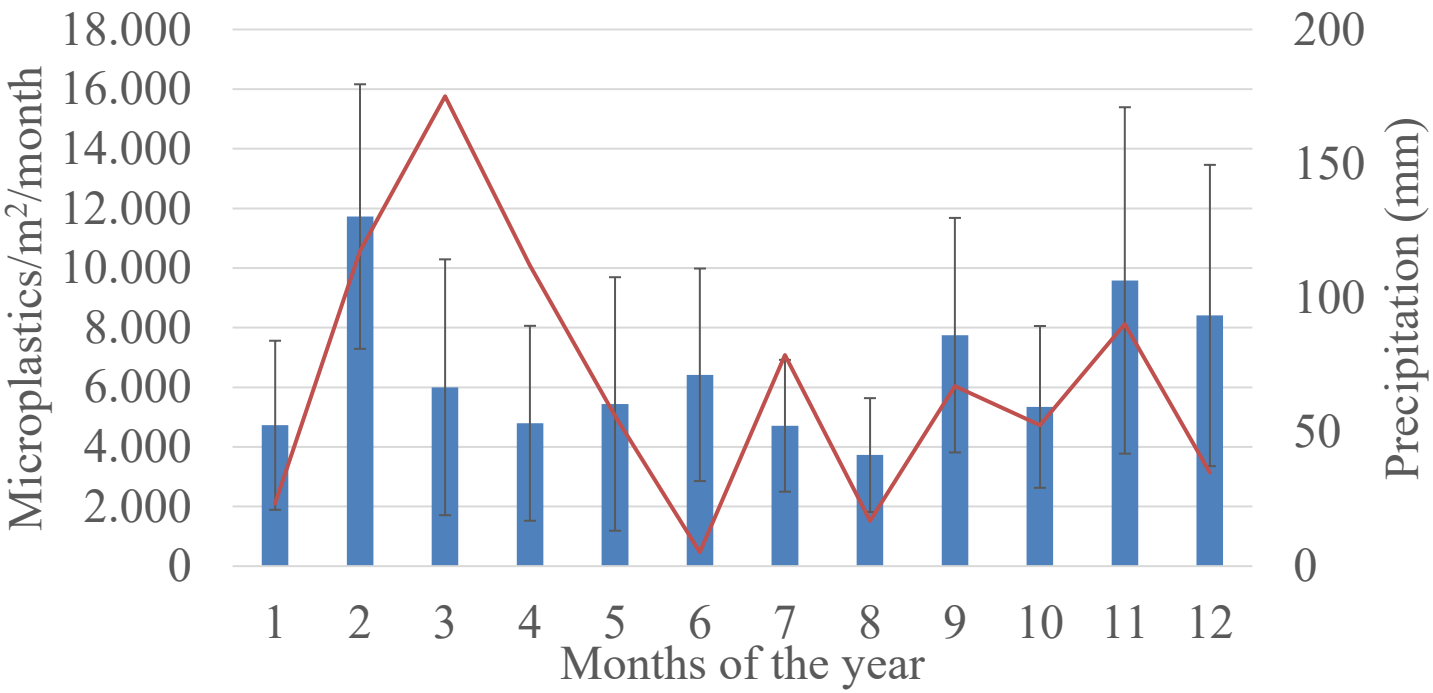


Fig. 3. Average and SD (; n=14) total atmospheric deposition rate of MPs (MPs/m²/month) in Bahía Blanca City in relation to monthly precipitation ( ).

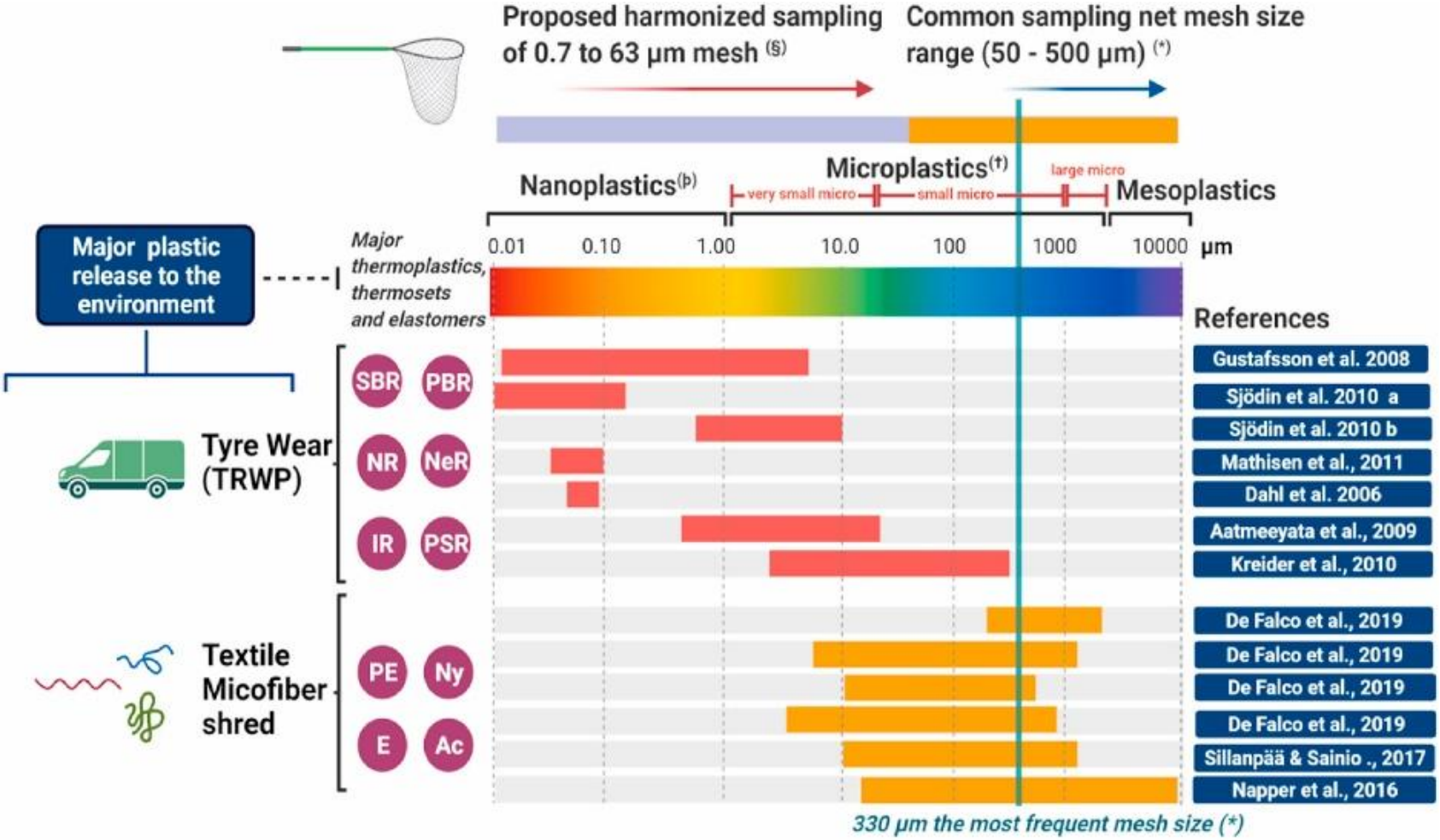
Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

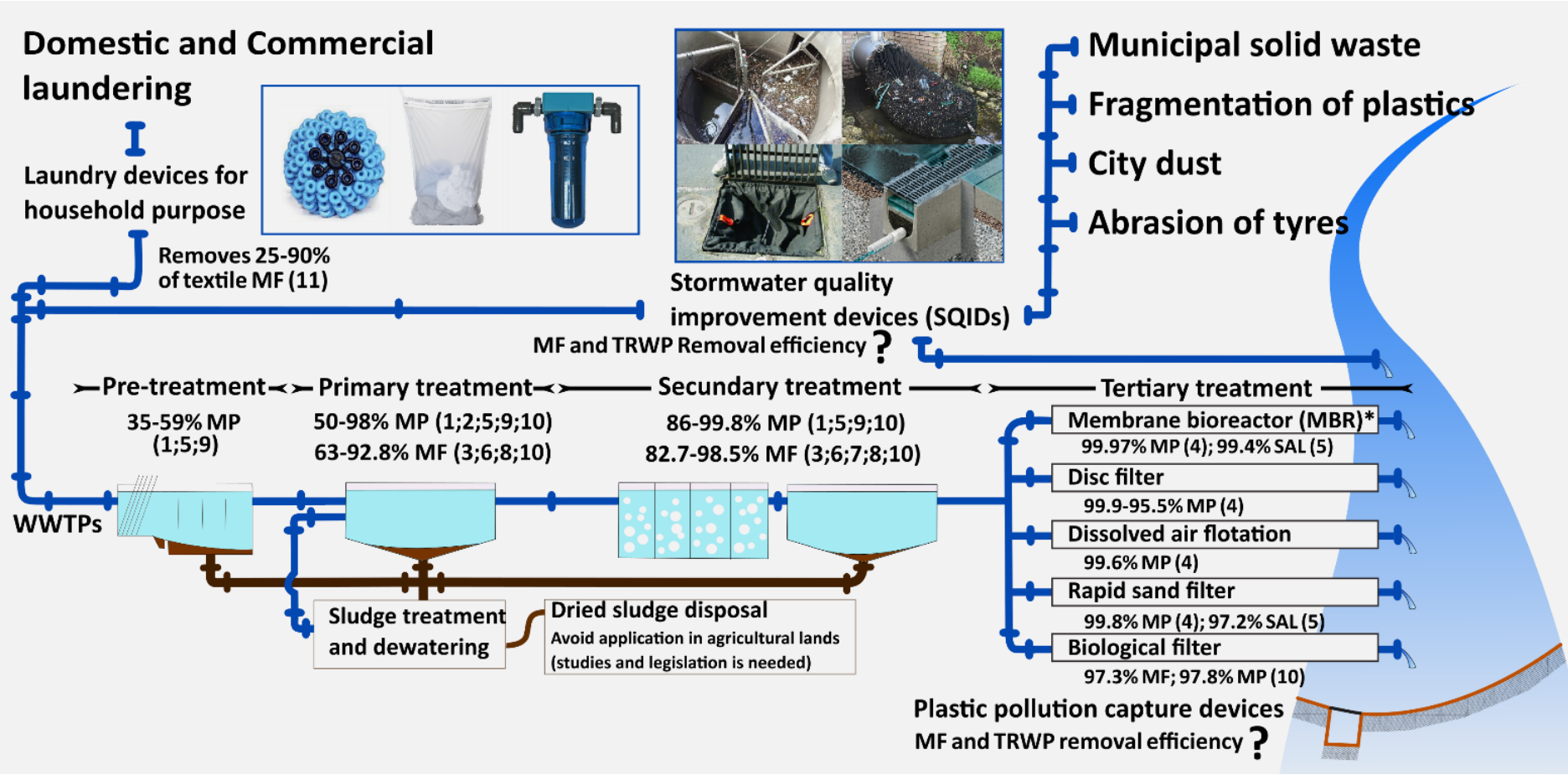
Synthetic microfibers and tyre wear particles pollution in aquatic systems: Relevance and mitigation strategies☆

•Arias A.H, et al., 2023



•Arias A.H, et al., 2022

¿Qué no estamos viendo?



Alrededor de 44% de aguas negras llegan a los cuerpos de agua sin tratamiento

Alto PBI **70%**
Medio a Alto PBI **38%**
Bajo a Medio **28%**
Bajo PBI **8%**

840 million washing machines worldwide use about 740 TWh electricity

Importancia de del control de vías acuáticas y Plantas de tratamiento en la prevención de ingreso de contaminantes al estuario

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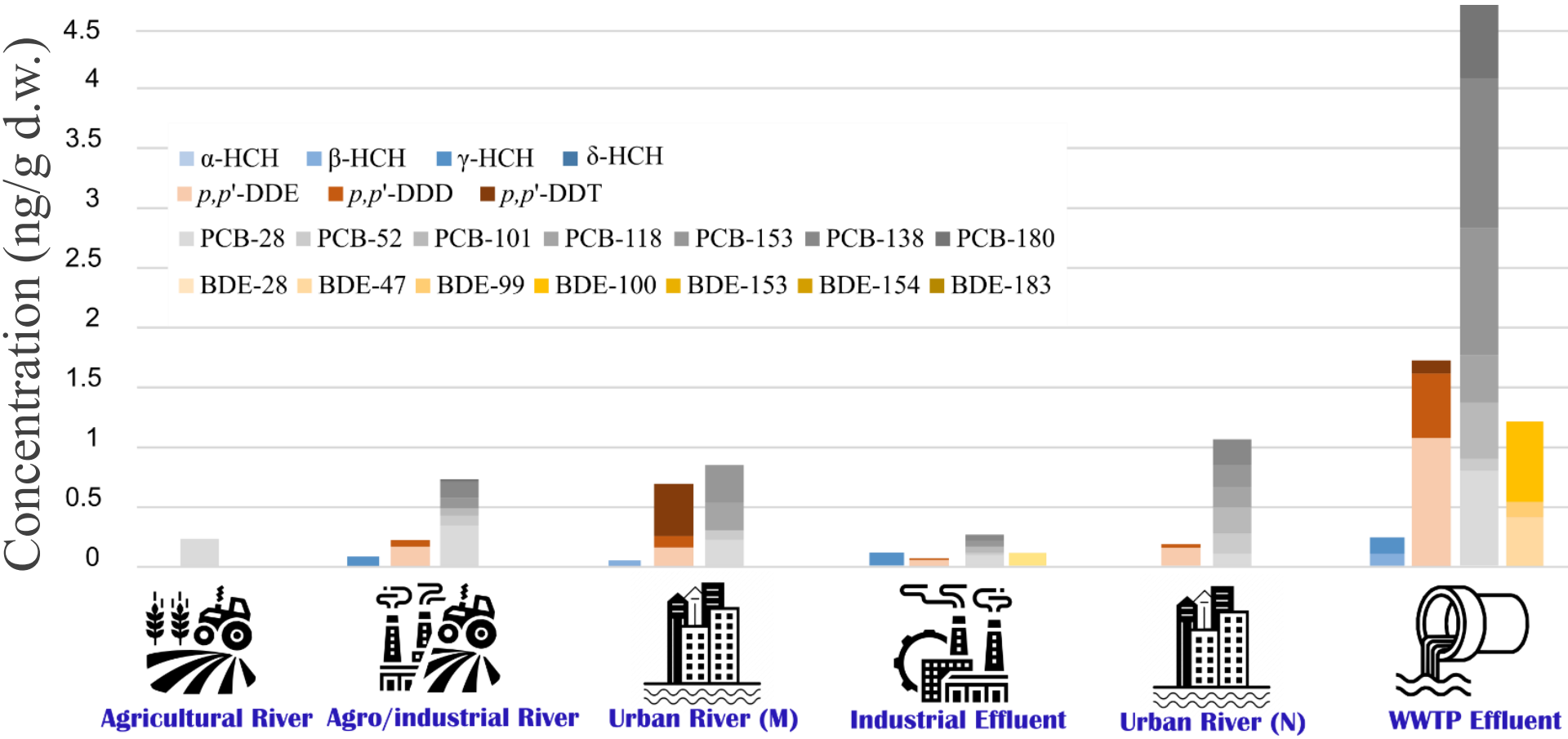
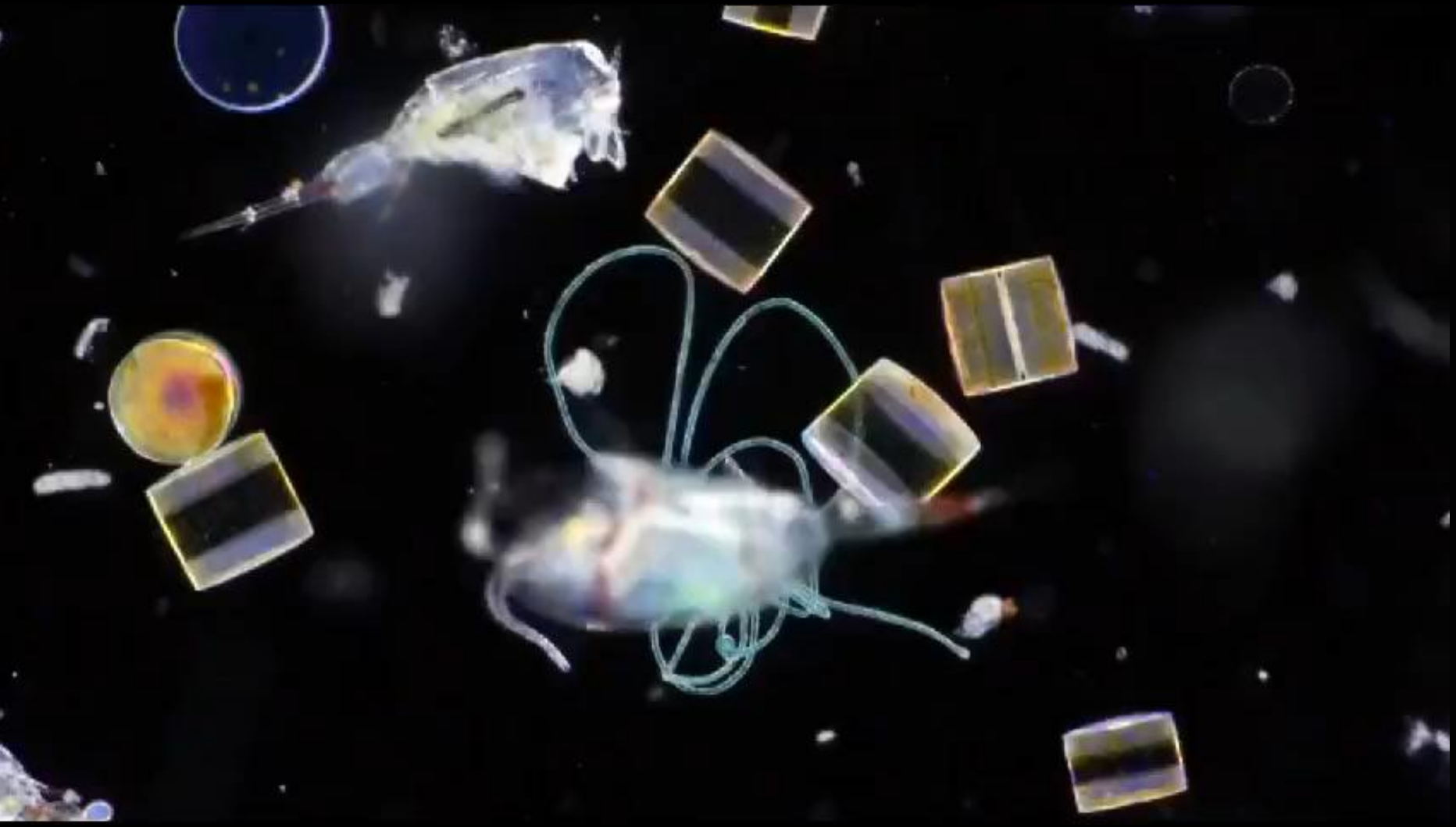


Girones et al., 2023



- Nivel Micro

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Environmental Pollution

Available online 3 July 2025, 126772

In Press, Journal Pre-proof What's this?

MICROPLASTIC INGESTION BY ZOOPLANKTON IN SURF ZONE WATERS OF SANDY BEACHES: ARE COPEPODS POTENTIAL RESERVOIRS OF THESE EMERGING POLLUTANTS?

Rosario Corradini [a b], M. Clara Menéndez [a], F. Micaela Gonella [a], Carla A.
Victória Gómez Texeira [c], Adriana E. Larrea Valdivia [d], Carlos Valenzuela Huillc
, Andrés H. Arias [a b]

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https://doi.org/10.1016/j.envpol.2025.126772 Ge

Corradini et al., 2025

infobae

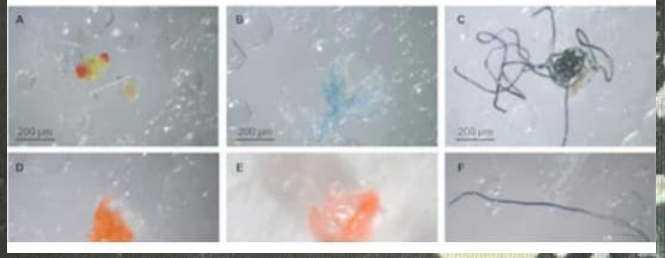
CIENCIA >

Por primera vez hallan microplásticos en el zooplancton marino de América Latina

Los identificaron investigadores de Argentina, Brasil y Perú. En diálogo con Infobae, los expertos contaron que puede implicar un riesgo de transferencia de contaminantes a los peces y a las aves que forman parte de la alimentación humana

Por **Valeria Román**

22 Ago, 2025 09:33 p.m. AR



Article | Published: 09 November 2023

Microplastic fragmentation by rotifers in aquatic ecosystems contributes to global nanoplastic pollution

Jian Zhao, Ruyi Lan, Zhenyu Wang, Wenli Su, Dongpo Song, Runze Xue, Zhuomiao Liu, Xia Liu, Yanhui Dai, Tongtao Yue & Baoshan Xing

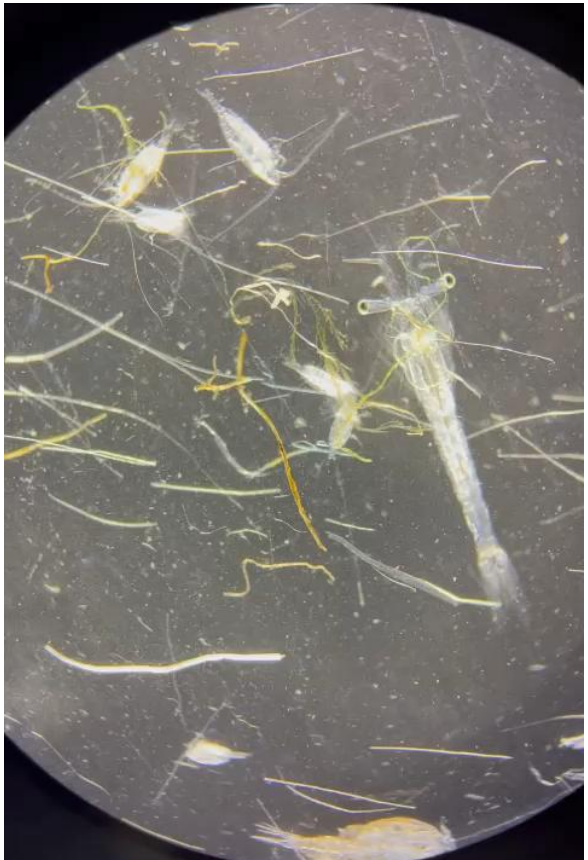
Nature Nanotechnology (2023) | Cite this article

3848 Accesses | **238** Altmetric | Metrics

Abstract

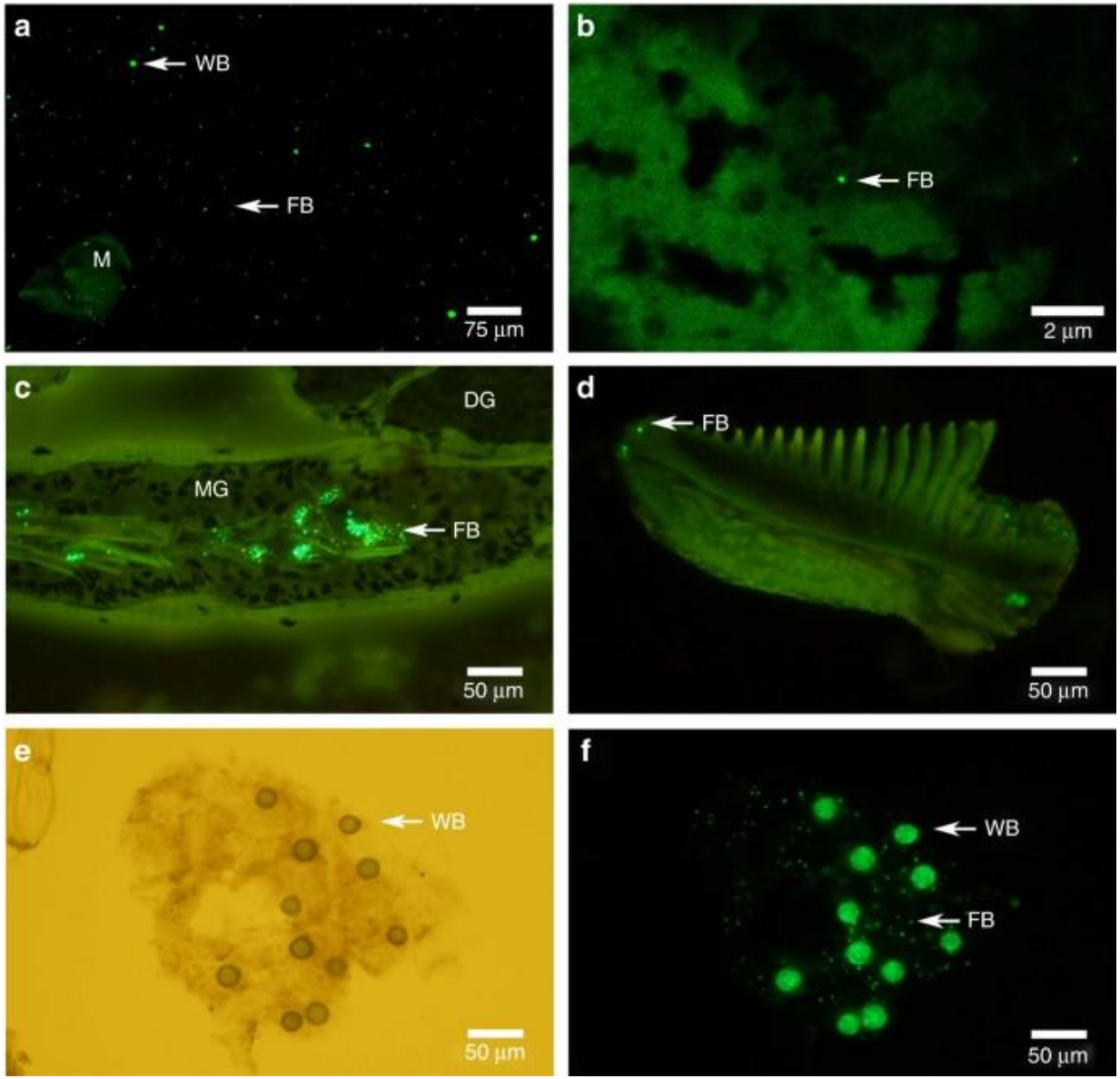
The role of aquatic organisms in the biological fragmentation of microplastics and their contribution to global nanoplastic pollution are poorly understood. Here we present a biological fragmentation pathway that generates nanoplastics during the ingestion of microplastics by rotifers, a commonly found and globally distributed surface water zooplankton relevant for nutrient recycling. Both marine and freshwater rotifers could rapidly grind polystyrene, polyethylene and photo-aged microplastics, thus releasing smaller particulates during ingestion. Nanoindentation studies of the trophi of the rotifer chitinous

Microplastic ingestion by zooplankton in surf zone waters of Southwestern Atlantic sandy beaches 🇦🇷



Considering the total MPs ingested, fibers were the riskiest to zooplankton (61.72%), followed by fragments (23.5%) and films (14.8%). The most abundant colors were transparent (30.8 %) and blue (29.6 %). High ingested MPs (**0.13 MPs/zooplankton**) were registered in beaches with high MP concentrations in seawater samples.

Baleani, C.; Corradini, R.; Gomes Texeira, V.; Oliva, A. L; Menéndez, M. C.; Arias, A. H.. SETAC Argentina 2024



Una vez que los microplásticos llegan al océano, la situación empeora

Dawson, A. L., Kawaguchi, S., King, C. K., Townsend, K. A., King, R., Huston, W. M., & Bengtson Nash, S. M. (2018). **Turning microplastics into nanoplastics through digestive fragmentation by Antarctic krill**. *Nature communications*, *9*(1), 1001.

Evidence of Microplastic Ingestion by Fish from the Bahía Blanca Estuary in Argentina, South America

Arias et al., 2018

Received: 17 November 2018 / Accepted: 29 March 2019
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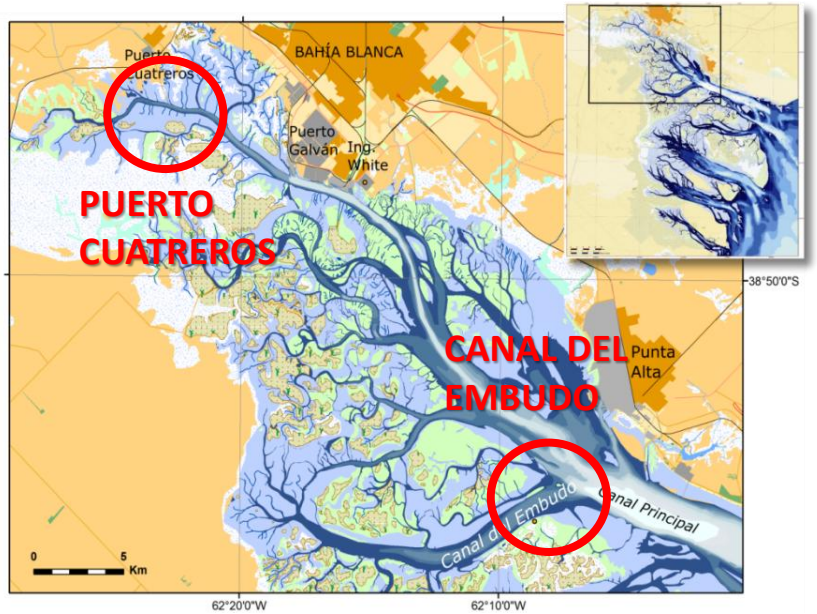
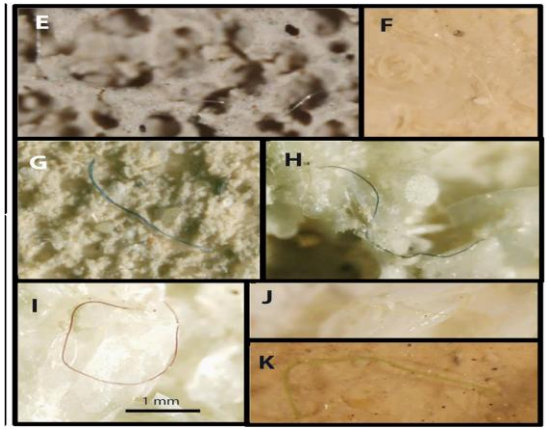




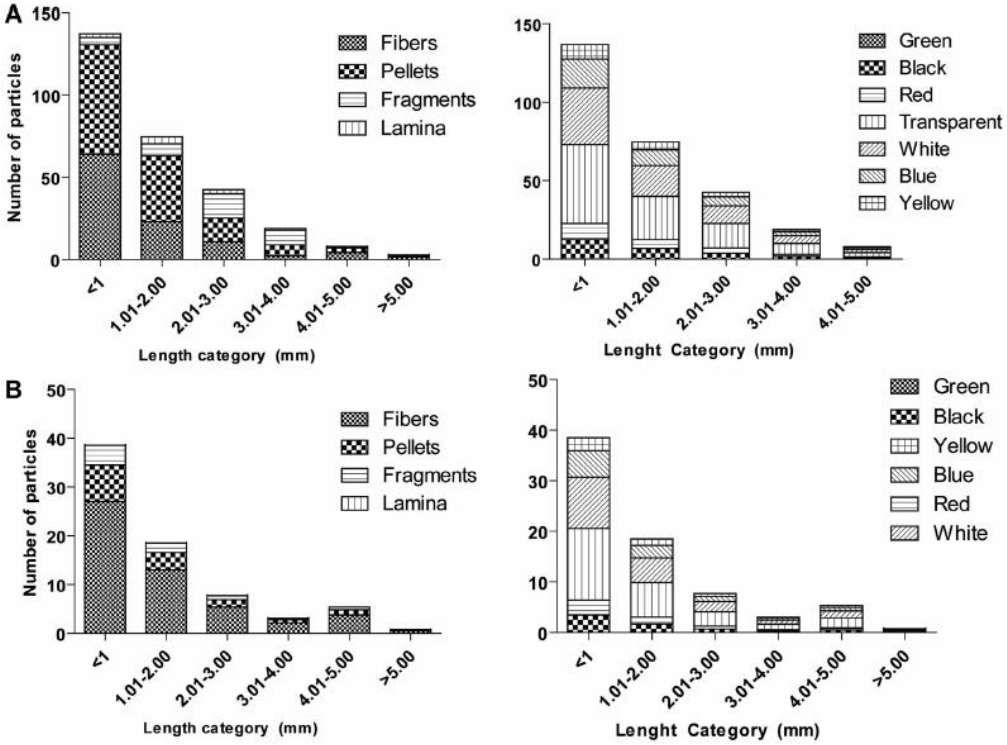
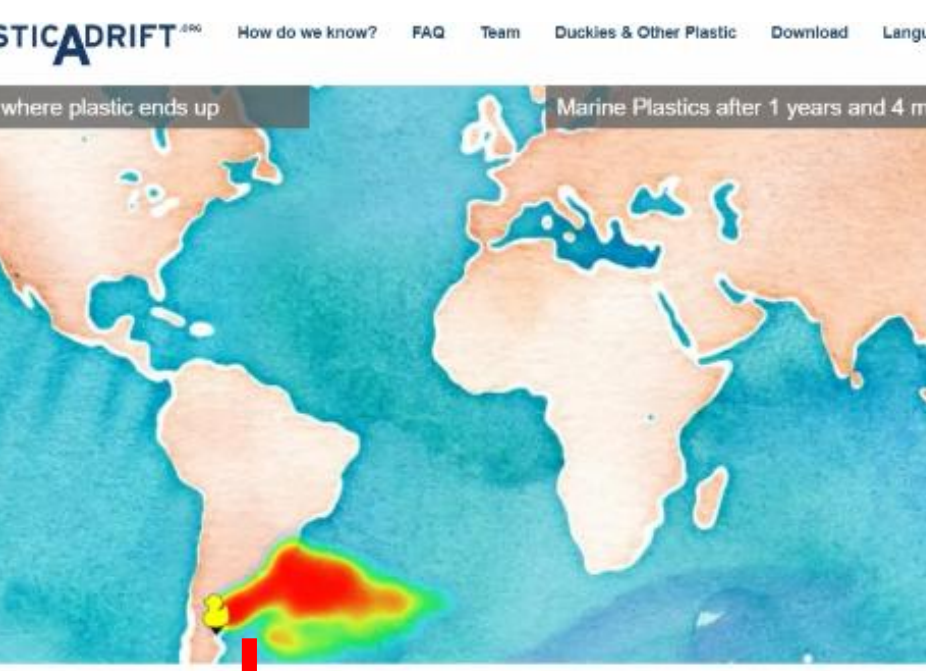
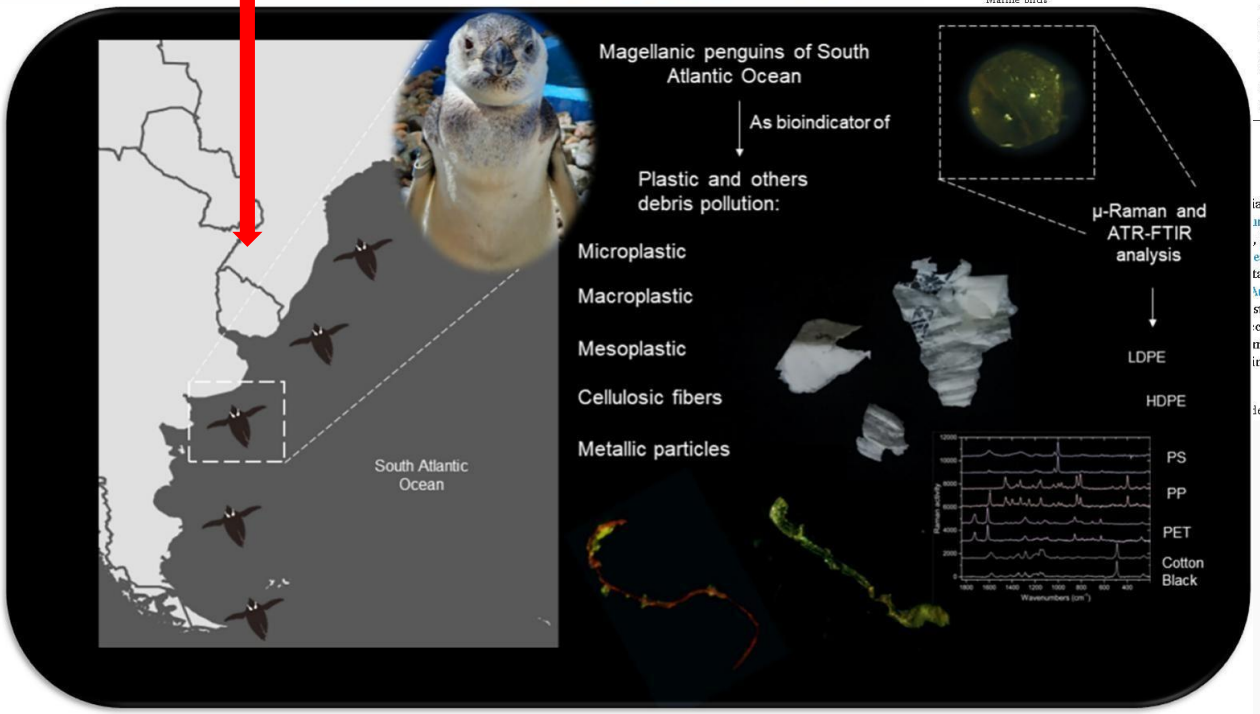


Fig. 2 Breakdown of microplastic particles inside the gastrointestinal tracts of *Micropogonias furnieri*, categorized by size and colour at **a** Cuatreros Habour; **b** Embudo Channel





Marine Pollution Bulletin 188 (2023) 114628

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

First assessment of debris pollution in the gastrointestinal content of juvenile Magellanic penguins (*Spheniscus magellanicus*) stranded on the west south Atlantic coasts

Tatiana Recabarren-Villalón [a], Ana C. Ronda [a, b], Luciano La Sala [c], Cristina Sanhueza [d], Lucrecia Díaz [e], Lucas S. Rodríguez Pirani [f], A. Lorena Picone [f], Rosana M. Romano [f], Pablo Petracci [d, g], Andrés H. Arias [a, h, *]

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[b] Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Av. Alem 1253, 8000 Bahía Blanca, Argentina
[c] Instituto de Ciencias Biológicas y Biomédicas del Sur, CONICET/UNS, Bahía Blanca, Argentina
[d] Grupo de Estudio en Conservación y Manejo (Gekko), Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, Argentina
[e] Grupo de Investigación y Rehabilitación de Tortugas Marinas (Quelonia), Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, Argentina
[f] CEQUINOR (UNLP, CCT-CONICET La Plata, associated with CIC), Departamento de Química, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Blvd. 120 N° 1465, La Plata 1900, Argentina
[g] Estación de Rescate de Fauna Marina Guillermo "Indio" Fidalgo, Sitio 11, Puerto Galván Bahía Blanca Buenos Aires, Argentina
[h] Departamento de Química, Universidad Nacional del Sur (UNS), Av. Alem 1253, 8000 Bahía Blanca, Argentina

ARTICLE INFO

Keywords:
Magellanic penguins
Plastic debris
Marine birds

ABSTRACT

This paper provides the first evidence of debris pollution, including plastic, in juvenile Magellanic penguins (*Spheniscus magellanicus*) found stranded on the Atlantic coast of southern Buenos Aires Province, Argentina. Macro-, meso- and microparticles of anthropogenic origin were observed in 100 % of the studied birds, with debris abundance ranging between 33 and 200 items/bird. Microparticles represented 91 % of the total debris and 97 % of them were fibers. Black particles were the most abundant (30 %), followed by transparent (26 %), blue (14 %), yellow (10.3 %), and red (10 %). Infrared and Raman spectroscopy identified 62.7 % of the total particles as plastics, with polypropylene (27.8 %) and polyester (21.6 %) being the most abundant polymers. Semi-synthetic cellulosic fibers, metallic particles, and pigments were also found. The presence of metallic microparticles was suggested for the first time in penguins. Stranded juvenile Magellanic penguins are proposed as promising bioindicators of plastic pollution in the South Atlantic.

ial of anthropogenic origin
n Kumara et al., 2016).
, is one of the world's most
eavly and Register, 2007)
tal concerns among scien-
Arun Kumara et al., 2016;
stic and poor waste man-
cumulation of hazardous
ms (Selvam et al., 2021).
ing plastics, in the ocean

derive from land-based sources: wastewater discharges, beaches, rivers, and transport by wind (Le Guen et al., 2020). Marine debris is fragmented under the effect of various environmental processes such as biological, photochemical, thermal, and oxidative degradation, and hydrolysis (Avio et al., 2017; Chatterjee and Sharma, 2019). As stated by the UNEP (Cheshire et al., 2009), NOAA (Lippiatt et al., 2013), and GESAMP (2019), plastic debris can be classified into different categories according to their size: megaplastics (> 1 m), macroplastics (2.5–100 cm), mesoplastics (5–25 mm), microplastics (0.001–5 mm), and nanoplastics (< 1 µm). Microplastics (MPs) can also be intentionally added as part of various personal care products and cleaning agents. Independently of their size or origin, plastic debris is finally released into the

de Oceanografía (IADO–CONICET/UNS), Camino La Carrindanga km 7.5, 8000 Bahía Blanca, Argentina.

CIENCIAS EXACTAS Y NATURALES

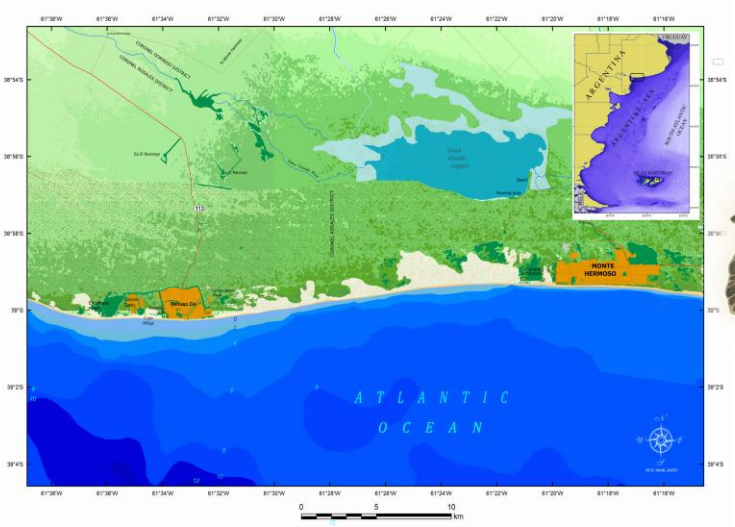
Aportan la primera evidencia de contaminación por microplásticos y otros desechos en pingüinos de Magallanes

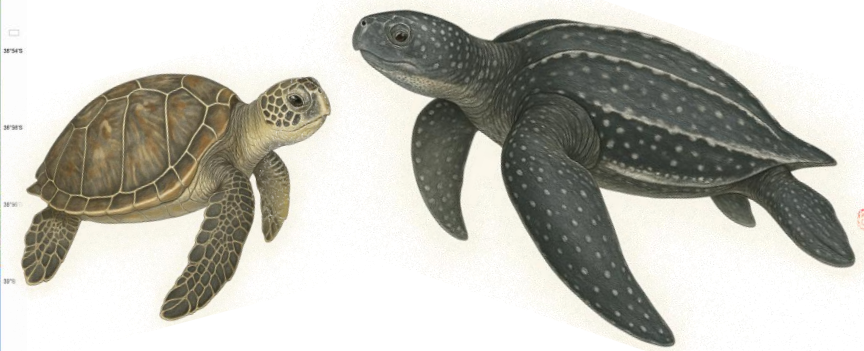
Es un trabajo de investigadores e investigadoras del CONICET. Hallaron principalmente polipropileno y poliéster, que llegan a los océanos por acción humana.

Compartir en redes sociales

Publicado el 11 de abril de 2023

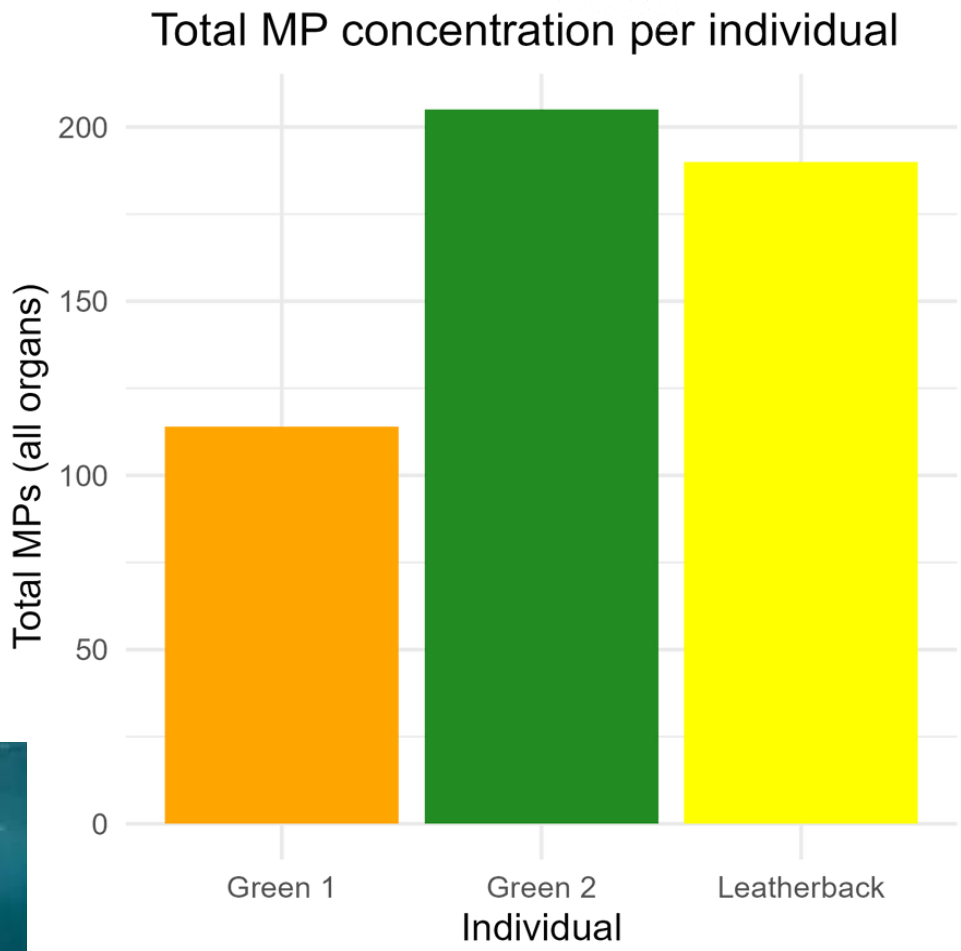
Bray et al., 2025





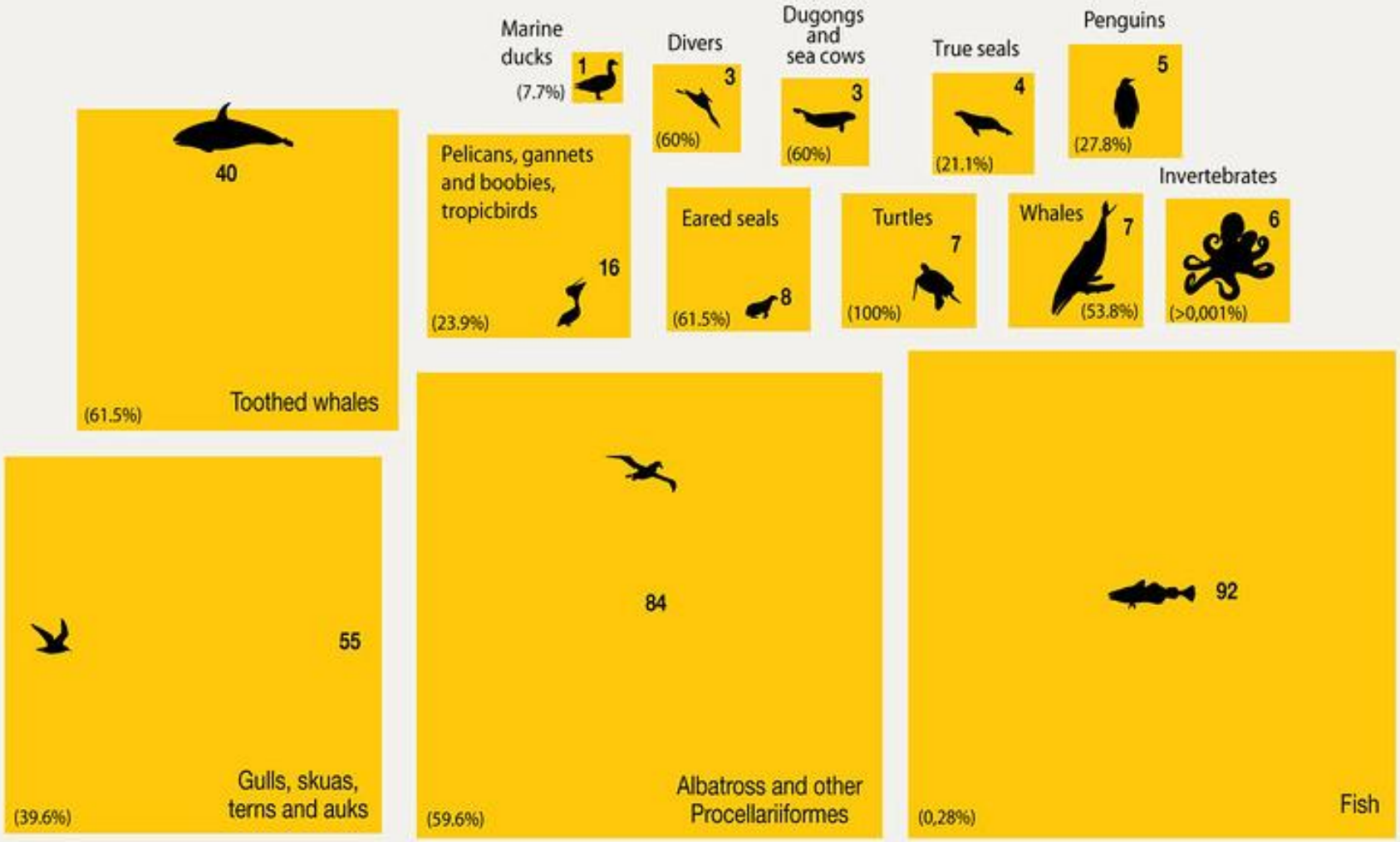
@LABORATORIO.DE.COPS.IADO

Most particles were <1 mm across all individuals, with Green 2 showing the highest abundance in this size range. Larger particles (>2 mm) were rare and unevenly distributed among individuals.



Plasticized animal species - Ingestion

Number of species with documented records of marine debris ingestion

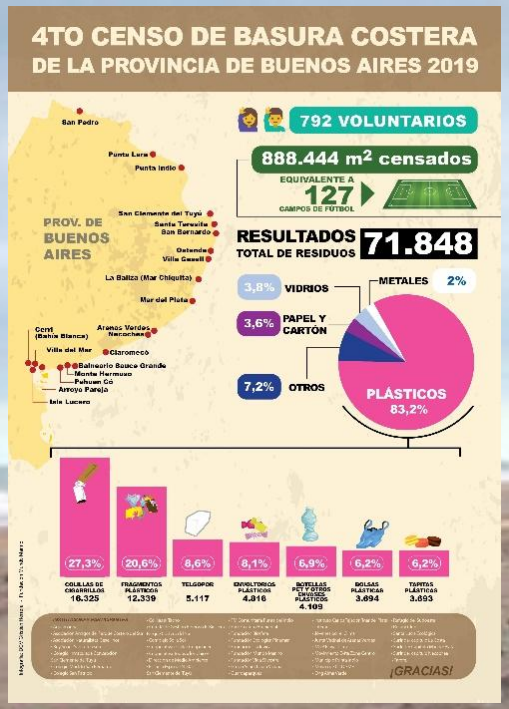


Source: Kühn, S., et al., Deleterious Effects of Litter on Marine Life, in Bergmann, M., et al., Marine Anthropogenic Litter, Springer, 2015

EST. ELLA
PATAGONICA

Bahía Blanca

WITHOUT EMBRIONTS
FLOAT
SINK
WITH EMBRIONTS
FLOAT
SINK
PLASTICS
METALS
PAPERS
GLASS
FABRIC
PROCESSED WOOD
OTHER
MEGA LITTER


4TO CENSO DE BASURA COSTERA
DE LA PROVINCIA DE BUENOS AIRES 2019
792 VOLUNTARIOS
888.444 m² censados
EQUIVALENTE A 127 CAMPOS DE FÚTBOL
RESULTADOS
TOTAL DE RESIDUOS 71.848
PROV. DE BUENOS AIRES
San Pedro
Punta Lara
Punta Indio
San Clemente del Tuyú
Santa Teresita
San Bernardo
Ostende
Villa Gesell
La Balliza (Mar Chiquita)
Mar del Plata
Cerri (Bahía Blanca)
Arenas Verdes
Necochea
Villa del Mar
Claromecó
Balneario Sauce Grande
Monte Hermoso
Pehuen Có
Arroyo Pareja
Isla Lucero
3,8% VIDRIOS
3,6% PAPEL Y CARTÓN
7,2% OTROS
METALES 2%
PLÁSTICOS 83,2%
27,3% COLILLAS DE CIGARRILLOS 16.329
20,6% FRAGMENTOS PLÁSTICOS 12.339
8,6% TELGOPOR 5.117
8,1% ENVOLTORIOS PLÁSTICOS 4.816
6,9% BOTELLAS PET Y OTROS ENVASES PLÁSTICOS 4.109
6,2% BOLSAS PLÁSTICAS 3.694
6,2% TAPITAS PLÁSTICAS 3.693
¡GRACIAS!

6TO CENSO DE BASURA COSTERA
DE LA PROVINCIA DE BUENOS AIRES 2022
Voluntarios 422
M² Censados 410.864
TOTAL DE RESIDUOS
35.741
PROV. DE BUENOS AIRES
San Pedro
Punta Lara
Punta Indio
San Clemente del Tuyú
Costa Chica
Costa del Este
Las Toninas
Mar del Tuyú
La Lucila
Mar de Ajó
San Bernardo
Ostende
Mar del Plata
Bahía Blanca
Villa del Mar
Punta Alta
3,7% PAPEL Y CARTÓN
2,6% METALES
9,9% OTROS
10,1% VIDRIOS
PLÁSTICOS 73,7%
RANKING DE PLÁSTICOS
Colilla de cigarrillo 26,4
Fragmentos plásticos 17,3
Envoltorios plásticos 13,5
Bolsas plásticas 11,7
Tapitas 5,7
Infografía: Fundación Mundo Marino

5TO CENSO DE BASURA COSTERA
DE LA PROVINCIA DE BUENOS AIRES 2021
438 VOLUNTARIOS
422.501 m² censados
EQUIVALENTE A 58 CAMPOS DE FÚTBOL
TOTAL DE RESIDUOS
40.331
PROV. DE BUENOS AIRES
San Pedro
Punta Lara
Magdalena
Punta Indio
San Clemente del Tuyú
Las Toninas
Santa Teresita
Mar de Ajó
Nueva Atlantis
Ostende
Villa Gesell
Mar Chiquita
Mar del Plata
Bahía Blanca
Balneario Marisol
Balneario Sauce Grande
Monte Hermoso
Pehuen Có
Punta Alta
Isla Lucero
4,5% VIDRIOS
2,3% METALES
2,7% PAPEL Y CARTÓN
5,9% OTROS
PLÁSTICOS 84,5%
TOP FIVE DE PLÁSTICOS
19,6% 6.692 COLILLAS DE CIGARRILLOS
18,7% 6.367 FRAGMENTOS PLÁSTICOS
13,2% 4.505 ENVOLTORIOS PLÁSTICOS
10% 3.401 BOLSAS PLÁSTICAS
8,1% 2.765 RESTOS DE NYLON
CONVOCARON

7° CENSO DE BASURA COSTERA
DE LA PROVINCIA DE BUENOS AIRES 2024
Localidades 19
Voluntarios 426
PROV. DE BUENOS AIRES
M² Censados 297.636,83
TOP FIVE DE RESIDUOS
7,55 Fragmentos de vidrio
8,38 Bolsas plásticas
11,87 Fragmentos plásticos
13,34 Colilla de cigarrillo
14,17 Envoltorios plásticos
49.913
TOTAL DE RESIDUOS
74,05% PLÁSTICOS
8,95% VIDRIOS
4,77% OTROS
3,68%METALES
2,83%PAPEL Y CARTÓN
1,68% TEXTILES
1,50% ORGÁNICOS
1,31% MADERA PROCESADA
1,22% CAUCHO, LATEX
Infografía: Fundación Mundo Marino

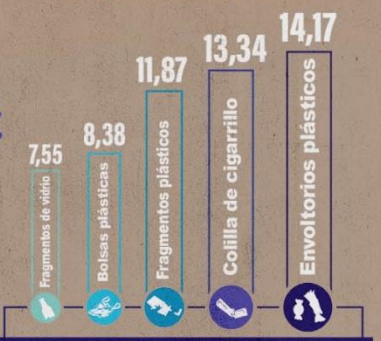
7° CENSO DE BASURA COSTERA
DE LA PROVINCIA DE BUENOS AIRES 2024

Localidades
19

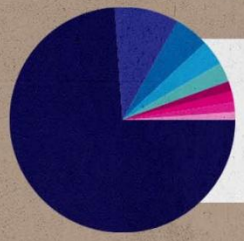
Voluntarios
426

M² Censados
297.636,83

TOP FIVE DE RESIDUOS

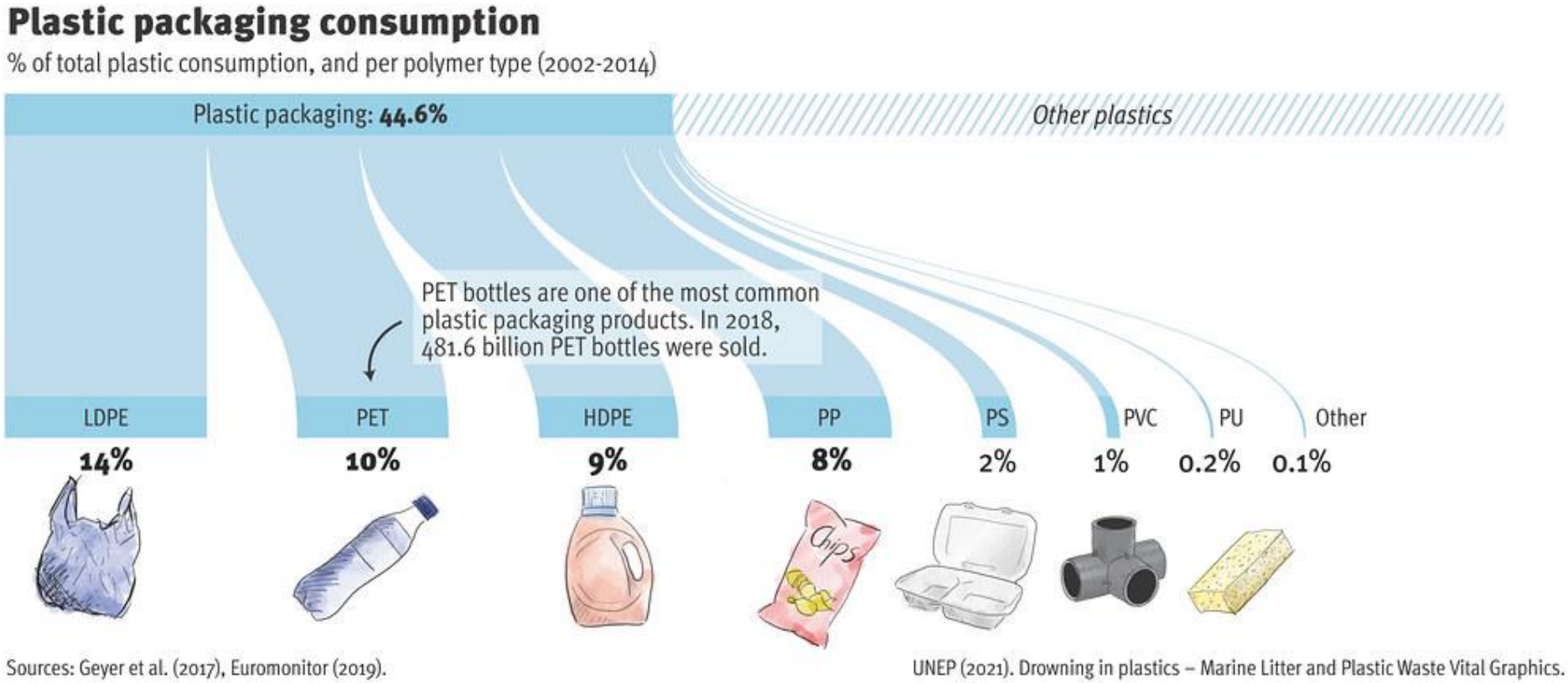


49.913
TOTAL DE RESIDUOS



- 74,05% PLÁSTICOS
- 8,95% VIDRIOS
- 4,77% OTROS
- 3,68%METALES
- 2,83%PAPEL Y CARTÓN
- 1,68% TEXTILES
- 1,50% ORGÁNICOS
- 1,31% MADERA PROCESADA
- 1,22% CAUCHO, LATEX

Infografía: Fundación Mundo Marino



Plastic packaging consumption

Se estima que 3.400 millones de toneladas de envases de plástico entraron en nuestras vidas entre 1950 y 2017 (Geyer, 2020). Los envases de plástico se utilizan en los sectores comercial, minorista, doméstico, turístico y agrícola.

Contents lists available at ScienceDirect

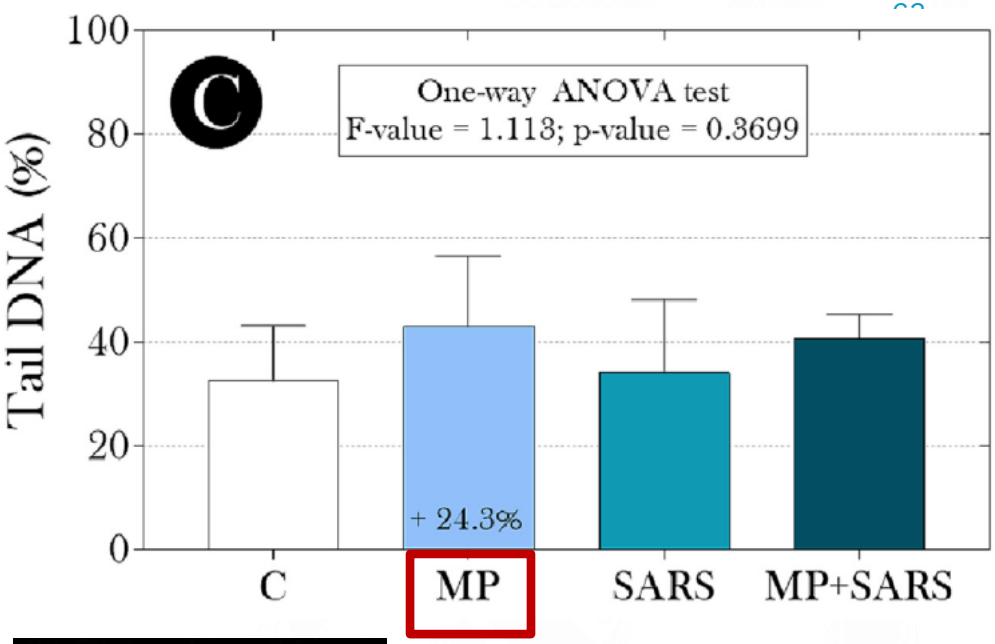
Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

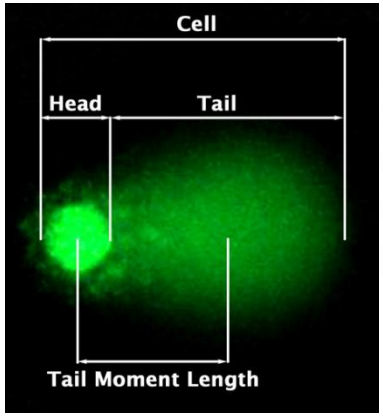
First report on the toxicity of SARS-CoV-2, alone and in combination with polyethylene microplastics in neotropical fish

Raíssa de Oliveira Ferreira [a,b,m], Abraão Tiago Batista Guimarães [a], Thiarlen Marinho da Luz [a,b], Aline Sueli de Lima Rodrigues [a,b], Abu Reza Md. Towfiqul Islam [c], Md. Mostafizur Rahman [d], Chinnasamy Ragavendran [e], Chinnaperumal Kamaraj [f], Ives Charlie-Silva [g], Edison Luiz Durigon [h], Helyson Lucas Bezerra Braz [i], Andrés Hugo Arias [j], Omar Cruz Santiago [k], Damià Barceló [l], Guilherme Malafaia [a,b,n,o,p,*]

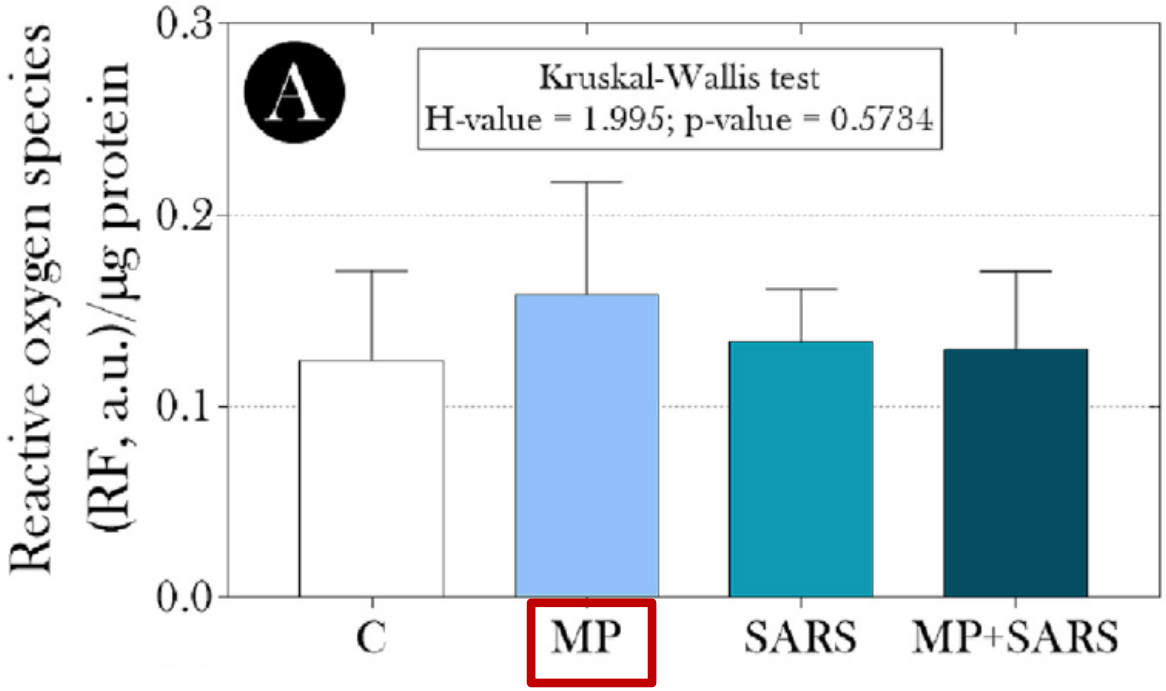
[a] Laboratory of Toxicology Applied to the Environment, Goiano Federal Institute, Urutaí, GO, Brazil
[b] Post-Graduation Program in Conservation of Cerrado Natural Resources, Goiano Federal Institute, Urutaí, GO, Brazil
[c] Begum Rokeya University, Department of Disaster Management, Rangpur 5404, Bangladesh
[d] Laboratory of Environmental Health and Ecotoxicology, Department of Environmental Sciences, Jahangirnagar University, Dhaka 1342, Bangladesh
[e] Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Chennai, India
[f] Interdisciplinary Institute of Indian System of Medicine (IIISM), Directorate of Research and Virtual Education, SRM Institute of Science and Technology (SRMIST), Kattankulathur 603203, Tamil Nadu, India
[g] Chemistry Institute, São Paulo State University (UNESP) Campus Araraquara, Brazil
[h] Laboratory of Clinical and Molecular Virology, Institute of Biomedical Sciences, University of São Paulo, Brazil
[i] Laboratory of Toxicology, Federal University of Ceará, Brazil
[j] National University of the South Bahía Blanca, CONICET Instituto Argentino de Oceanografía (IADO), Argentina



Regarding the single-cell gel electrophoresis assay (comet assay), our data suggest a genotoxic effect only arising from exposure to PE MPs ("MP" group), inferred by the significant increase in the parameters "tail length" and "OTM" and by the increase of 24.3 % of the "Tail DNA (%)", in relation to the "control" group



the **ROS** production in the "MP" group was 21.8 % higher than that observed in the "control" group



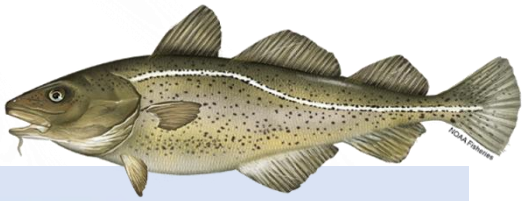
Dish gloves

TRWP (car tyres)

>>

ballons

Lab gloves



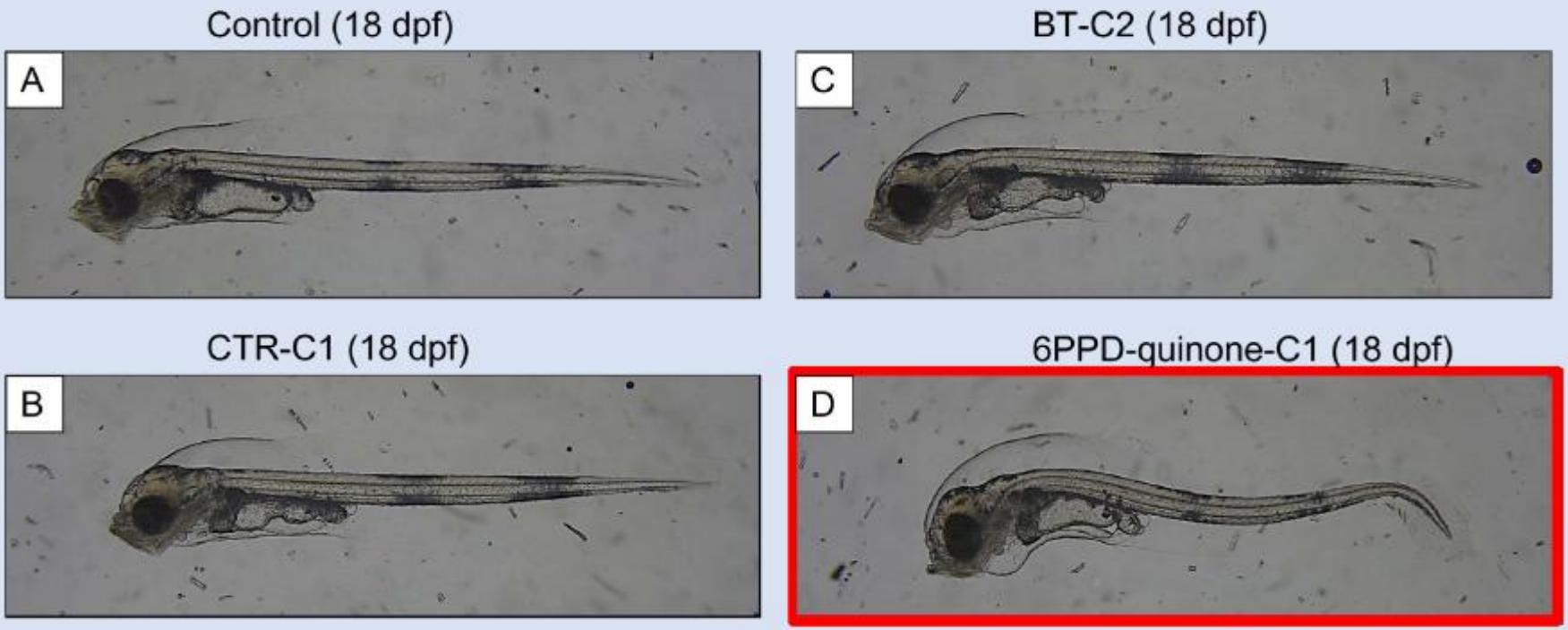


Fig. 2: Images of Atlantic cod (G. morhua) larvae (18 dpf). A=normal larva from control treatment. B= normal larva from the highest concentration of CTR leachates. C=normal larva from the second highest concentration of the single component BT. D= scoliotic larvae from the highest concentration of the single component 6PPD.

Organic chemicals associated with rubber are more toxic to marine algae and bacteria than those of thermoplastics. 2023.

Lisbet Sørensen[1], Tânia Gomes[2], Amaia Igartua[1], Inger Larsen Lyngstad[3], Ana Catarina Almeida[2], Martin Wagner[3], Andy M. Booth[1*]

Las sustancias tóxicas básicas están presentes en los productos plásticos de uso cotidiano, sobre todo en los elastómeros.

https://www.niva.no/en/projects/microleach

ELSEVIER

Journal of Hazardous Materials
Volume 458, 15 September 2023, 131810

Research Paper

Organic chemicals associated with rubbe are more toxic to marine algae and bacte than those of thermoplastics

Lisbet Sørensen [a], Tânia Gomes [b], Amaia Igartua [a], Inger Larsen Lyngstad [c], Ana Catarina Almeida [b], Martin Wagner [c], Andy M. Booth [a]

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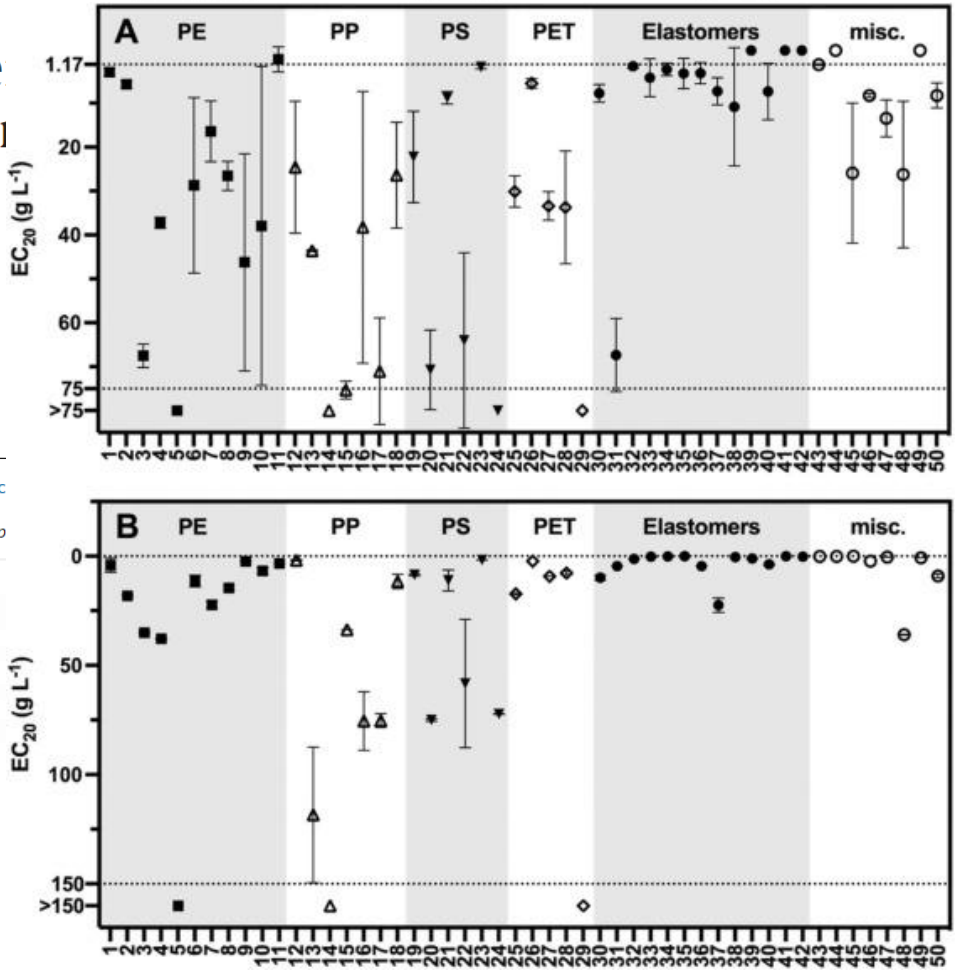
Toxicity of plastic extracts on marine bacteria and microalgae. A: Bacteria luminescence inhibition of plastic extracts in the BLT screen.
B: *Skeletonema pseudocostatum* algal growth inhibition of plastic extracts after 72 h exposure. Data is presented as the mean EC_{20} (lines) from independent experiments (dots) with technical replicates. Dotted lines represent the lowest and highest concentrations tested.



UN environment programme 50 1972-2022

Los costos sociales de los plásticos en los océanos debieran ser incluidos para facilitar soluciones para la forma en que hoy son producidos, usados, reusados y reprocesados, empleando un enfoque similar al costo social del carbono

El mercado global del plástico en 2020 se estimó en US$ 580 billiones

El costo monetario de la pérdida de capital natural marino se estima en US$ 2,500 billion/año

La basura marina y la contaminación plástica afectan varios derechos humanos: afectan desproporcionadamente a las personas en vulnerabilidad incluyendo aquellas viviendo en la pobreza, comunidades costerasnativas y niños, potencialmente agravando las ya existentes injusticias ambientales

- Full life cycle assessment (upstream, downstream)
- Chemical Transparency
- Chemical Simplification
- Chemical Safety
- Redesign

Scientists' Coalition for an Effective Plastics Treaty

UN environment programme

Who we are | Where we work | What we do | Publications & data

5 - 14 August 2025, Geneva, Switzerland

Home

Session overview

An effective instrument on plastic pollution must be informed by, and be responsive to, **the best available and most up-to-date scientific evidence and knowledge**.

Numerous peer-reviewed reports evidence the significant scientific consensus regarding the detrimental impact of plastic pollution on human health and the environment

Scientists' Coalition for an Effective Plastics Treaty

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London School of Hygiene & Tropical Medicine, UK

Dr Noreen O'Meara
University of Surrey, UK

Cambridge Prisms: Plastics

Accepted manuscript

Scientists' Coalition perspectives on articles of the Chair's Text

Published online by Cambridge University Press: **10 July 2025**

Trisia Farrelly, Susanne Brander, Natalia Grilli, Noreen O'Meara, Winnie Courtene Jones, Megan Deeney, Kristian Syberg, Andres Arias, Marie-France Dignac, Martin Wagner, Florin Mihai, Bethanie Carney Almroth, Richard Thompson, Jean-Francois Ghiglione, Jane Muncke and Conrad Sparks

Table 1. Do existing multilateral environmental agreements (MEAs) already address plastic releases and leakages into ecosystems? (Scientists' Coalition for an Effective Plastics Treaty, 2025d).

MEA	What it addresses	Limitations
Basel Convention, incl. Its Plastics Amendment	Regulation of plastic waste trade	Does not address prod use of plastics
Rotterdam Convention	Regulation of international trade of hazardous chemicals	No restriction on chem
Stockholm Convention	Regulation of chemicals listed as Persistent Organic Pollutant (POP)	Little overlap with plast chemicals
Montreal Protocol	Ozone-depleting chemicals	
Minamata Convention	Mercury-containing chemicals	
Globally Harmonised System (GHS)	Information exchange on physical hazards and toxicity of chemicals	Not legally binding, not implemented by all UN States
MARPOL Convention	Sea-based sources of marine litter	Does not address land (the major source of m pollution[16])
UNCLOS Convention	Defines and regulates maritime areas	No specific regulation waste; no monitoring o pollution

Aparte del tratado global

EU, for example, in 2019 adopted its single-use plastics directive, an EU-wide law designed to reduce the manufacture of single-use plastics. **The directive sets a target for 90% of all plastic bottles to be collected for recycling by 2029**, with an interim target of 77% this year. Also from this year, **all drinks bottles made from the plastic polyethylene terephthalate, or PET, should incorporate at least 25% recycled material**. Other places, including Canada and New South Wales in Australia, have introduced bans on certain single-use plastic items.

SUPD Targets	2021	2025	2029	2030
Separate collection of single-use plastic beverage bottles		77%	90%	
Minimum recycled content for single-use plastic beverage bottles made of PET		25%		
Minimum recycled content for single-use plastic beverage bottles (all plastics, including PET)				30%
Market restrictions	100%			

* Cotton bud sticks, Cutlery (forks, knives, spoons, chopsticks), Plates, Straws, Beverage stirrers, Ballons sticks, Food and beverage containers made of expanded polystyrene, Cups for beverages made of expanded polystyrene.

De todas las regulaciones, tanto a nivel municipal, provincial y nacional solo una regulación alude a la producción de algunos plásticos de un sólo uso y es la ley nacional número 27602 sobre "Productos Cosméticos y Productos de Higiene Oral de uso Odontológico", de la que vamos a hablar más adelante. El resto regula la distribución de plásticos descartables (figura 3).

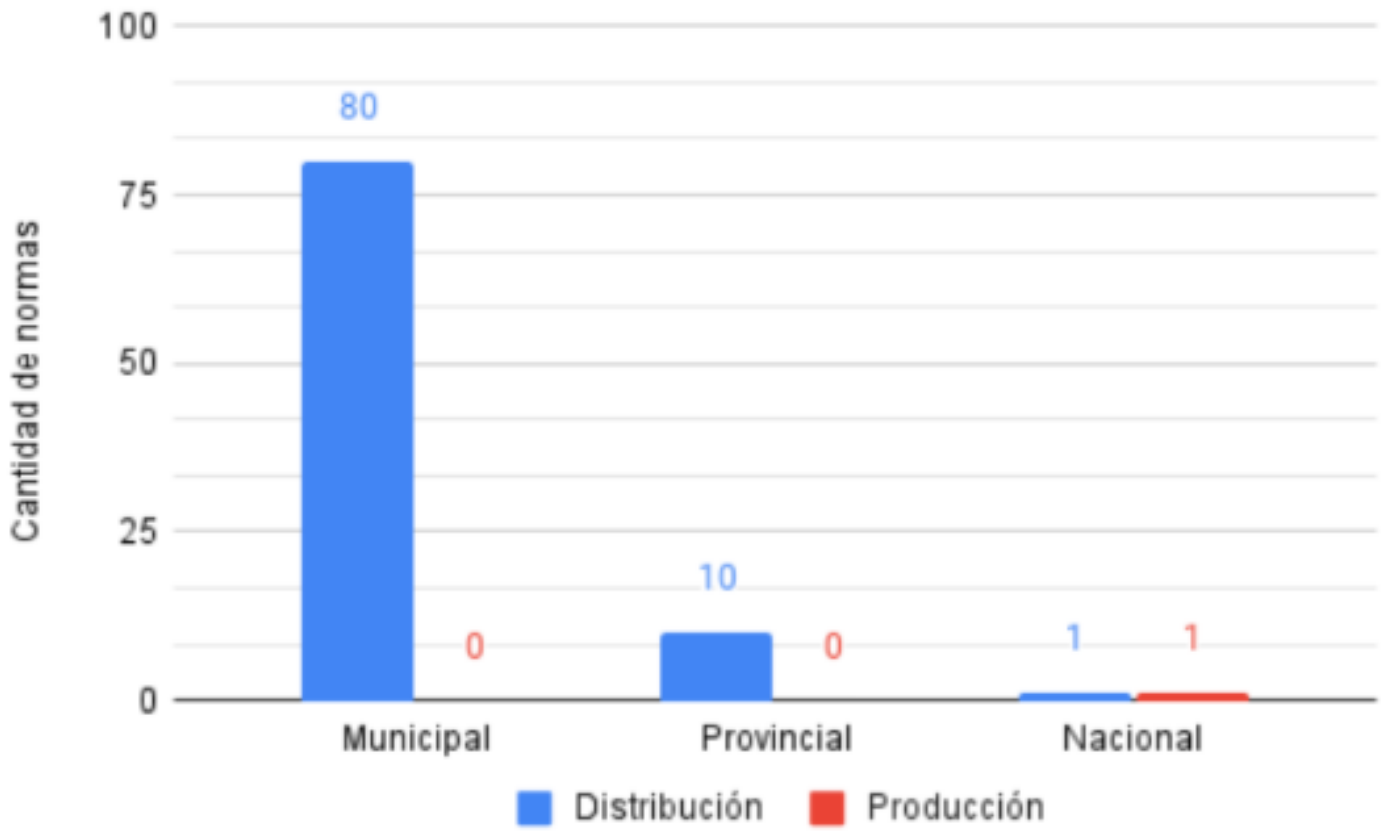
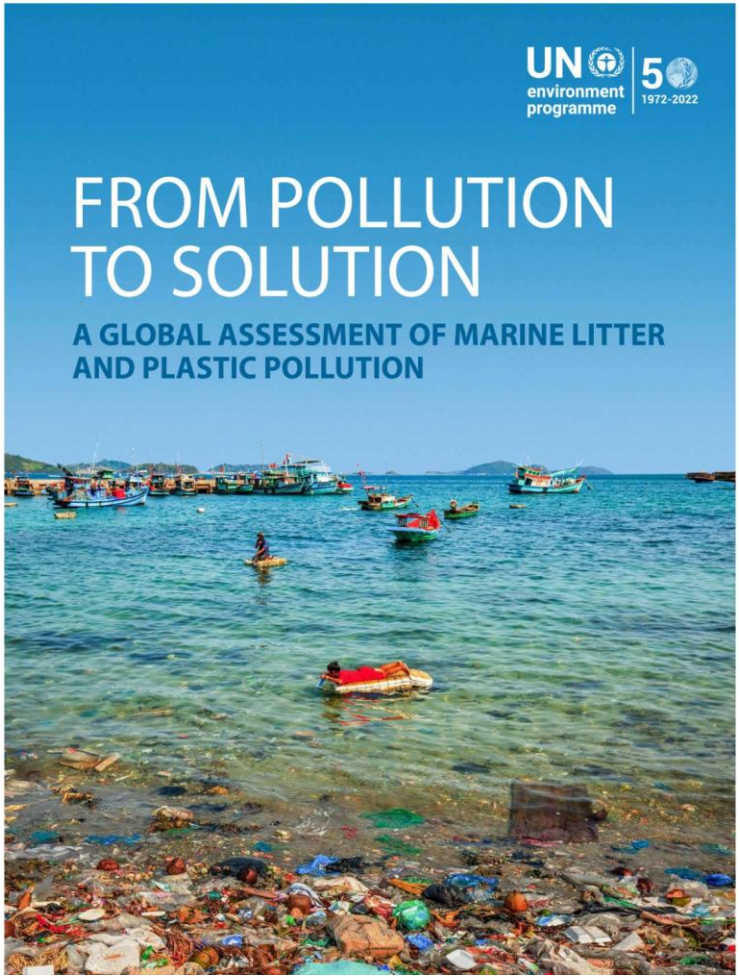


Figura 3: Tipo de regulación: distribución o producción



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United Nations Environment Assembly
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Towards A Life of Dignity for All

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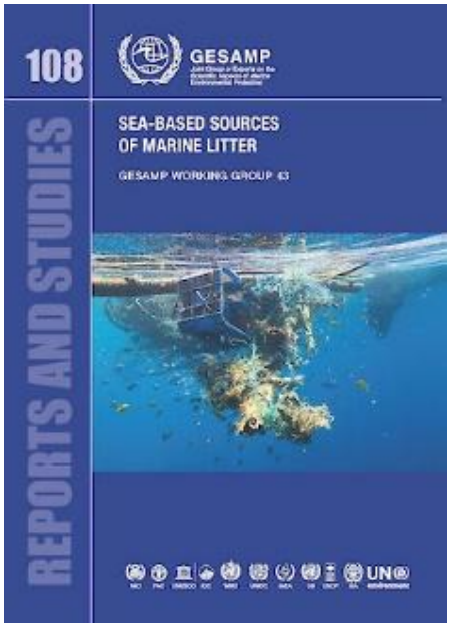
https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution

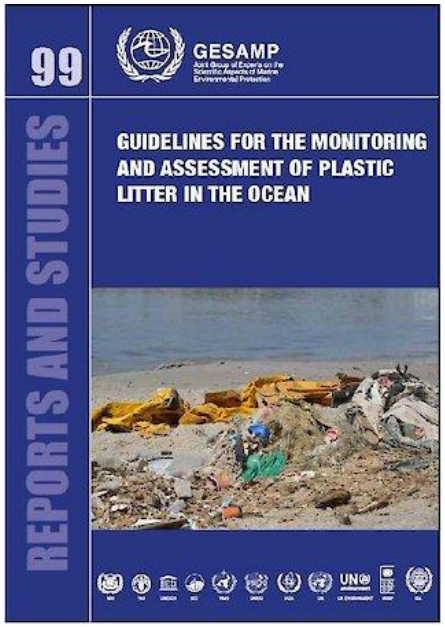
GESAMP
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection

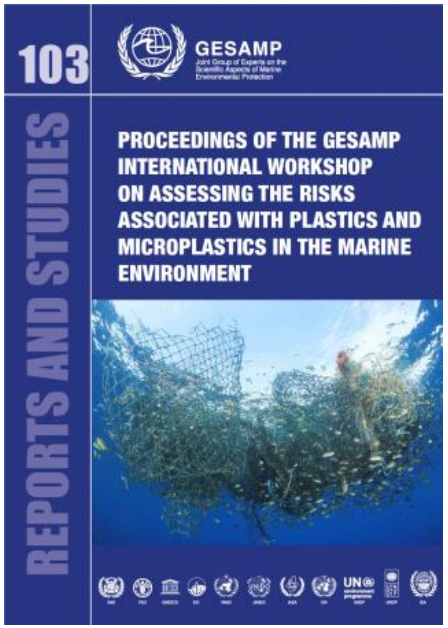
http://www.gesamp.org/

WG40: Sources, Fate and Effects of plastics and micro-plastics in the marine environment

GESAMP is a group of independent scientific experts that provides advice to the UN system on scientific aspects of marine environmental protection







"La gente protege
aquello que ama. Pero solo
amamos
aquello
que
conocemos"
Jacques-Yves
Cousteau

RECONOCER

Reducir

Reutilizar

Reciclar

Rechazar

Reparar

Rediseñar

Límites para un planeta sostenible

(Don Quijote de la Mancha)

"Cambiar el mundo, amigo Sancho, no es locura ni utopía, sino Justicia."

-Miguel de Cervantes.

“Si perdemos la lucha ambiental ninguna otra tendrá sentido”

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United Nations Environment Assembly
of the United Nations Environment Programme

Towards A Life of Dignity for All

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Meeting Room 2,3F
Fifth session of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment
Scientists' Coalition for an Effective Plastics Treaty
We are an international network of diverse, independent scientific and technical experts
We contribute with summaries and interpretations of scientific knowledge on plastic pollution to decision makers and the public.
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Lorena Ríos Mendoza
Andrés Arias
Yago Guida
Assistants:
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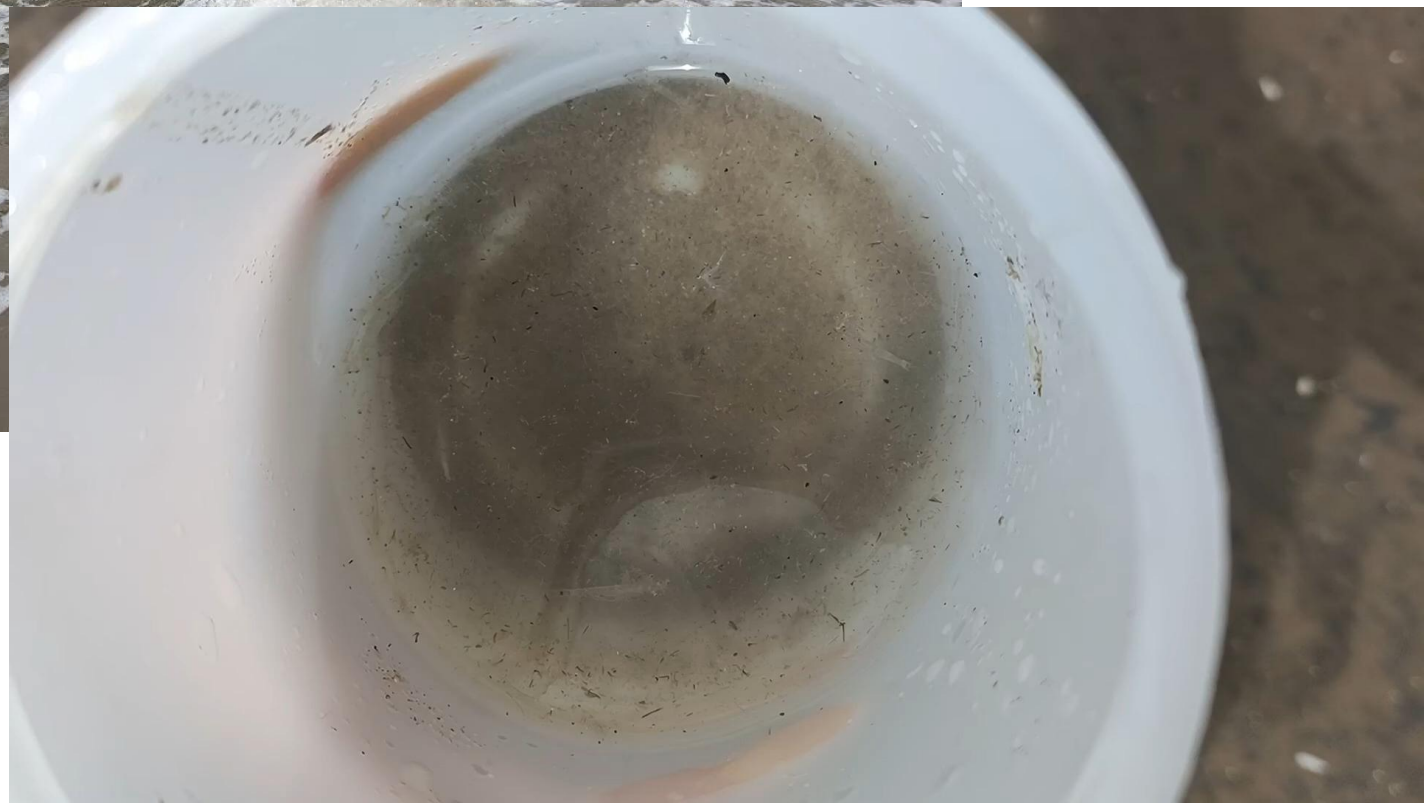

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