

## INTRODUCTION

MPs (plastic particles <5 mm) enter into the marine world through domestic/industrial wastewater streams, land washing, and rivers/streams. The influence of coastal currents and regional dynamics is interesting, MP concentrations, their transport, and distribution in offshore waters is targeted by research to look at the large-scale impacts of oceanographic processes. However, the knowledge about their levels, distribution and characteristics in the Argentine Sea is still poorly understood.

## MATERIALS AND METHODS

We assessed MPs in coastal areas and open sea from the coast to the Rincón and continental slope front in the Argentine Sea. MPs samples at the Rincón and continental slope front were taken on board of the Houssay vessel in an oceanographic campaign (H19).

A total of 278 MPs were collected from all the stations. We assessed MPs from 22 stations; 6 samplings of coastal areas and other 18 samplings of open sea from the coastal to the Rincón and continental slope front in Argentina. Water samples were taken at 5 m of depth, filtered on board (approximately 5L), and stored at -20°C. Then, samples were dried, frozen and inspected under a stereoscopic microscope. After that we took each particle and placed it into a petri dish to analyze by the Micro-Raman spectroscopy in order to know what polymer was it composed of.

Visual classification was performed according to their size, shape, and color. Color classification: green, black, pink-red, orange-yellow, light blue-blue-violet, white, brown and transparent. Size classification (ranges): >5, 4.99-4.0, 3.99-3.0, 2.99-2.0, 1.99-1.0, <1 in mm. Shape classification: fiber, film, foam, fragment and pellet.

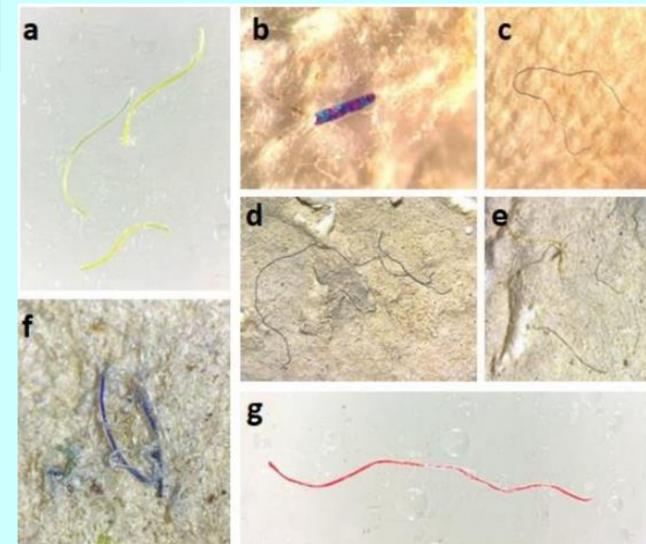


Figure 1: Examples of MPs found. a: green and yellow fibers; b: multicolor fragment; c and d: black fibers; e: yellow and white fibers; f: blue fibers; g: red fiber.

## RESULTS

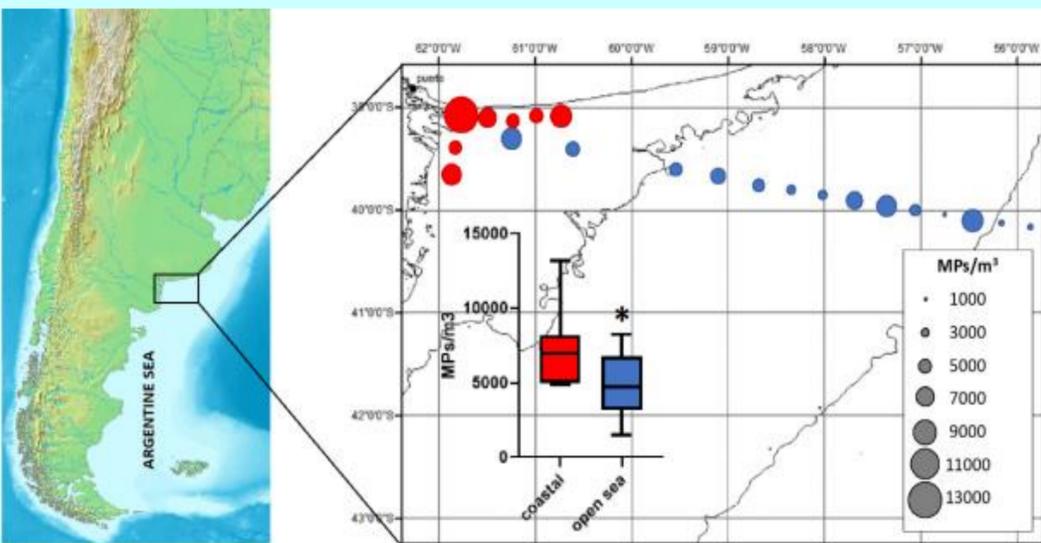


Figure 2: Study area on the Argentine Sea Northwest and MPs abundances. Red plots are coastal samples and blue spots are open sea samples. The size of the plot indicates the levels concentration (items/m<sup>3</sup>). Bar graph shows the MPs abundance differences between coastal and open sea samples (t-Student, p<0.05).

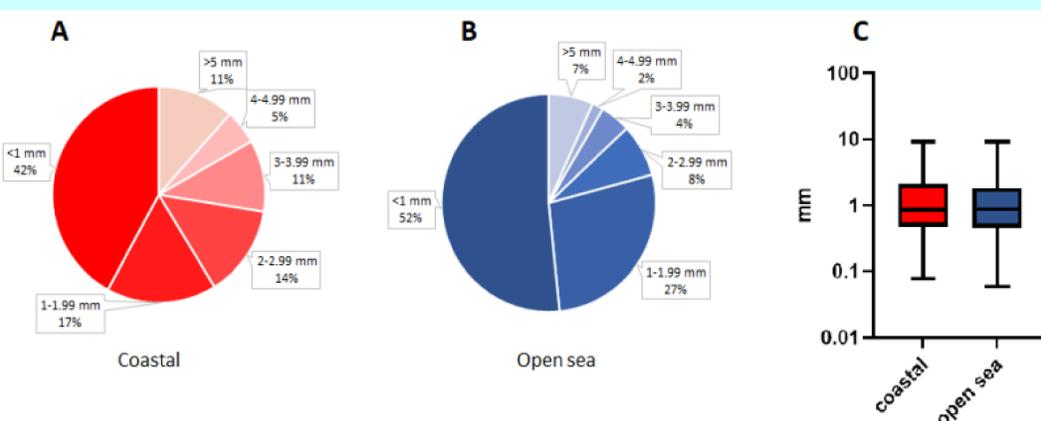


Figure 3: Occurrence of size according to 1 mm groups for coastal (A) and open sea (B) samples. C: Average size of MPs in coastal and open sea waters in logarithmic scale. Values are mean ± SD. No differences between means were found (t-Student, p<0.05).

The concentration of MPs varied between coastal samples and the open sea samples ( $7305.9 \pm 2908.6$  vs  $4884.21 \pm 8.1$  items/m<sup>3</sup>) (Fig. 2).

MPs less than 1 mm predominated in both coastal and open sea samples (42% and 52%, respectively); followed by 1-1.99 mm (17% and 27%) > 2-2.99 mm (14% and 8%) > 3-3.99 mm (11% and 4%) > 4-4.99 mm (5% and 2%). Mesoplastics (particles > 5 mm) were also detected representing 11% and 7% of the MPs for coastal and open sea samples, respectively (Fig. 3).

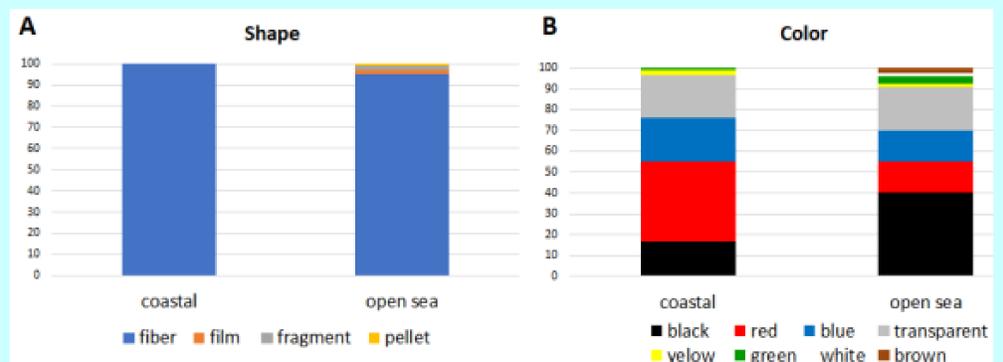


Figure 4: Percentage of MPs distribution according to shape (A) and color (B) in the coastal and open sea waters.

According to their shape, microfibers were predominant for all samples (100% and 95% for coastal areas and open sea, respectively). At open sea, we also observed films, fragments and pellets (Fig. 4A).

The main color for coastal waters was red (37%) followed by black/transparent (20%), and blue (18%) while for open sea samples it was black (35%) followed by transparent (21%), blue (18%), and red (15%). Other colors presented occurrences less than 5% (Fig. 4B).

## CONCLUSIONS

- This work provides the first evidence of contamination by MPs from the coast to the Rincón and continental slope front of the Argentine sea, and its generates a scientific baseline; necessary to improve the management of plastic waste and its derivatives in the studied area.
- MPs concentrations at the coast are higher than at open sea, this can be a consequence of sewage discharge. The presence of two sewage discharge points is evident, one located at the "La Vieja" channel, in the north coast of the estuary and another one, at the tidal channel "Bahía del Medio" situated at the middle of the estuary. The other possible source of the MPs concentration is the predominance of the ebb current, which can be proven by the presence of a barrier split going into the estuary. This is clear evidence of the existence and direction of the longshore drift.
- Our data indicates that the MPs fibers were found at the coast and open sea, but the other shapes such as films, fragments and pellets were only located at open sea.
- We determined the prevalence of black MPs at open sea, and red MPs for coastal waters.

## REFERENCES

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