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MICROPLASTICS IN MAXWELL BAY (FILDES PENINSULA, ANTARCTICA)

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The marine Antarctic system does not escape the worldwide problem of the plastics. Here, macro and microplastics in surface waters and marine-coastal zones have already been detected, posing a significant threat to this environment and its fragile fauna. However, the magnitude and origins of this threat in the Antarctic are far from being understood, and the generation of **basic information** has been identified as a priority.

OBJECTIVES

General

Evaluate the presence of microplastics in surface water in Maxwell Bay (Antarctica, Fildes Peninsula, 62° 11´4´´S and 58° 51´7´´O).

Specific

(I) Elaborate and evaluate a suitable methodology protocol to analyze microplastics in ocean water samples.

(II) Analyze shape, size, colour, density (items/m^3), as well as temporal and spatial distribution of microplastics.

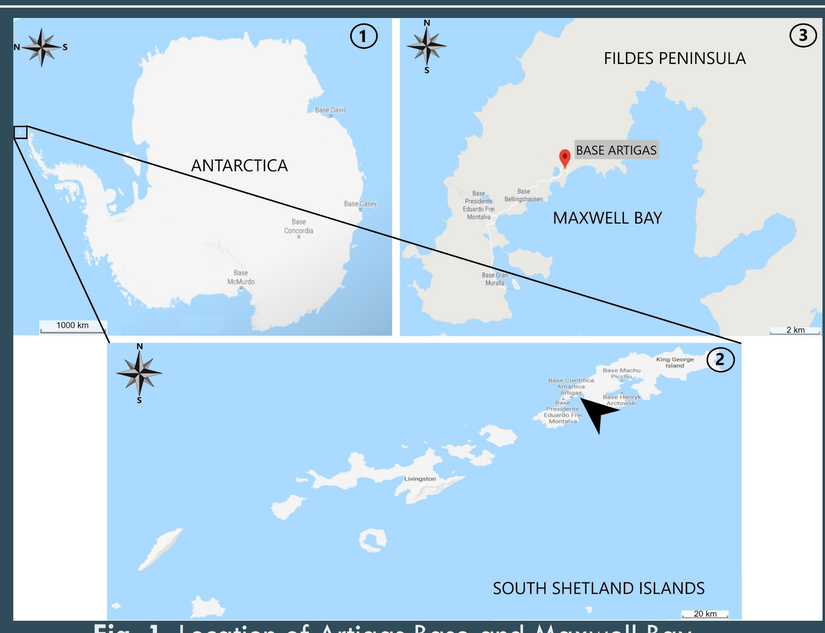

Fig. 1. Location of Artigas Base and Maxwell Bay.

The study was conducted in the Scientific Antarctic Base Artigas (Maxwell Bay, Fildes Peninsula, 62° 11´4´´ S y 58° 51´7´´ W).

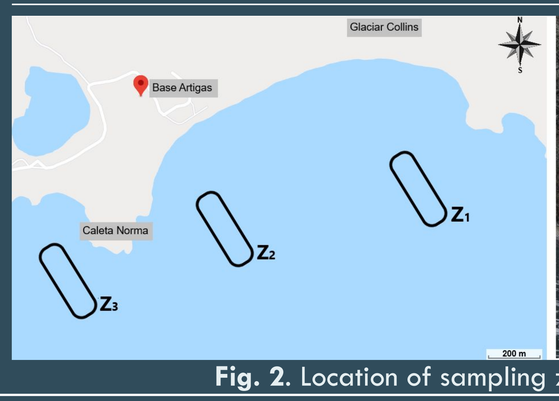

Fig. 2. Location of sampling zones.

Water samples were taken with a Manta net (220 microns) with flowmeter in three different zones, every summer between 2016 and 2018.

RESULTS

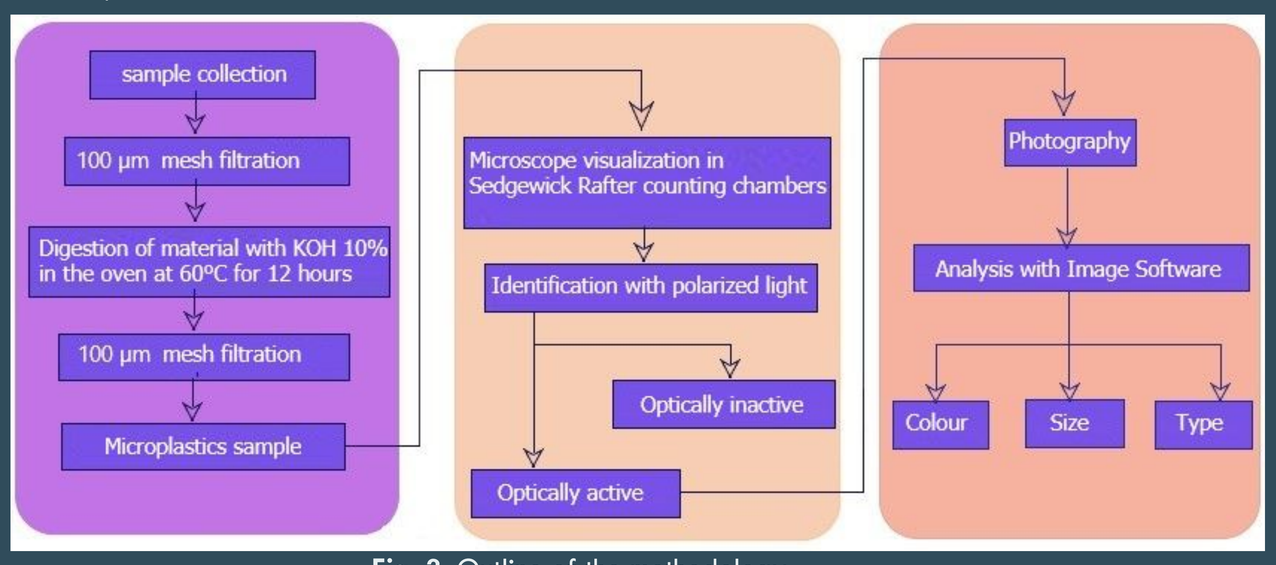

Fig. 3. Outline of the methodology.

Fig. 4. Examples of MPs found in water samples.

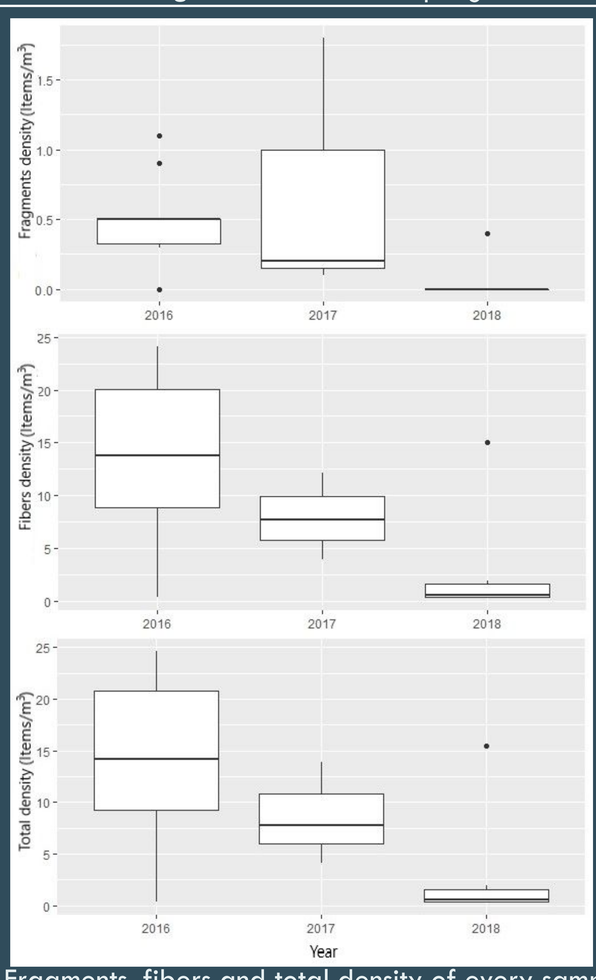

Fig. 5. Fragments, fibers and total density of every sampled year.

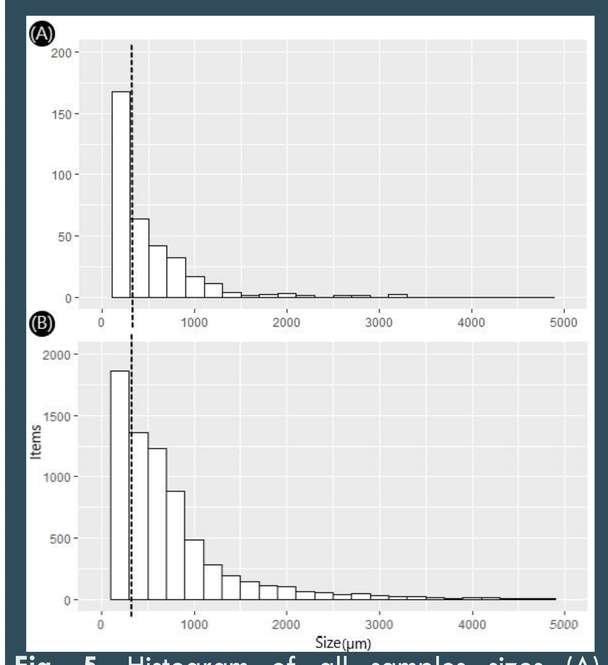

Fig. 5. Histogram of all samples sizes (A) Fragments, (B)Fibers. Dotted line mark 220 micrometers (not considered MPs).

- The average total density found was 13,4 items/m^3 in 2016, 8,6 items/m^3 in 2017 and 3,2 items/m^3 in 2018 (items smaller than 220 micrometers were not considered).
- Fibers were the most common shape found.
- The most represented sizes were smaller than the net mesh size.
- Densities were significantly higher in 2016 and 2017, compared to 2018 (df=2 , p=0,046).
- No significant differences between sampling areas densities (f=1,56, p=0,27).

DISCUSSION

- Densities were at least one order of magnitude higher than studies in nearby zones of the Antarctic Peninsula (e.g.: 0.002/m^3 Kuklinski *et al.*, 2019; 0.0035-0.00075/m^3 Lacerda *et al.*, 2019).
- Even though we found no evidence of laboratory contamination in the controls, we found a large amount of MP smaller than our sampling mesh size. Aggregation (Wang *et al.*, 2020) with larger items during sampling could be responsible for this pattern, although more studies are necessary to understand it.

BIBLIOGRAPHY: *Kuklinski, P., *et al.*, (2019) Marine Pollution Bulletin, 149, 110573. *Lacerda, A. L. D. F., *et al.*, (2019) Scientific Reports 9.(1): 3977. *Wang X., *et al.*, (2020) Journal of Hazardous Materials, 402, 123496.

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