
CHARACTERIZATION OF MICROPLASTICS IN A MELTWATER STREAM IN FILDES PENINSULA (KING GEORGE ISLAND, ANTARCTICA)

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Abstract

Human activities in Antarctica have increased due to the establishment of scientific bases, marine traffic, and tourism, which have led to the production of high amounts of waste, particularly plastics and microplastics (MPs, plastic particles < 5 mm). At the Fildes Peninsula (King George Island, Antarctica), where the Artigas Antarctic Scientific Base (BCAA) is located, numerous intermittent meltwater streams flow into Maxwell Bay. They are exposed to human activities derived from their proximity to scientific bases, refuges and roads, but very little is known about their characteristics. This study aimed to evaluate the presence of MPs and to characterize them in a meltwater stream located in the surroundings of the BCAA during one month of the southern summer, for three consecutive years (2020 to 2022). Samples were taken with a Surber net and digested with KOH 10%. MPs were measured and classified according to their morphology and color using a stereomicroscope with polarized light and their polymeric composition was evaluated with microFTIR. During the three years MPs were detected in all samples taken, reaching their highest density in 2020 with 0.69 ± 0.35 items.m⁻³. The MPs found were mainly fibers and fragments, but also foams and paint fragments. The main polymers were polyester and rayon in fibers, polyethylene terephthalate and acrylic in fibers and fragments, and polystyrene in foams. MPs contamination in the stream could be related to human activities taking place in the BCAA, but also arriving from the glacier by meltwater drag and wind action from more distant areas. In this study, we have been able to detect and quantify the flux of MPs from land to the coastal-marine environment, identifying different polymers over time, which poses a potential risk to the macroinvertebrate fauna of both the stream and the coastal-marine zone.

Keywords: Antarctica, Meltwater streams, Microplastics

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