

# **<sup>210</sup>Pb chronology in sediment cores evidencing the historical pollution of microplastics in reservoirs in the São Paulo State, Brazil**

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Microplastics (MPs) studies have advanced considerably since the beginning of the 21<sup>st</sup> century. MPs are characterized as polymers of high chemical stability and small dimensions (between 0.1 and 5.0 mm) and come from general plastic waste and textile products, including synthetic rubber and tire wear particles (TWPs). Hydroelectric power plants (HPPs) are the main source of electricity in Brazil and represent a fewer polluting means of obtaining electricity in comparison with thermal power plants. Another relevant aspect is the presence of HPPs that generate electricity from several medium and large river systems in São Paulo State. Those HPPs are potential sink for MPs, including TWPs, being an ideal study area to understand their historical pollution. Here, we used <sup>210</sup>Pb chronology in two sediment cores to assess the spatial and temporal MPs pollution in the Itupararanga Reservoir, São Paulo State, the first one was collected at the reservoir entrance (ER) and the another one near the dam (DR). The MPs were classified in different types (Figure 1). The sedimentation rates were 6.7 mm.yr<sup>-1</sup> at ER and 5.7 mm.yr<sup>-1</sup> at DR. ER and DR presented four phases of MPs deposition: gradual increase until the 1970s, pseudo stability between the 1970-90s, followed by a significant increase until 2000 and subsequent decline (Figure 2). The total MPs in ER was higher than in DR. The classes contribution in ER was thread/fiber > fragment > TWPs > film/sheet > pellet, while in DR it was fragment > thread/fiber > TWPs > film/sheet > pellet. The fragment and film/sheet quantities were higher in ER, while thread/fiber was more expressive in DR. TWPs and pellets showed similar values at both sampling points. The progressive increase of MPs until the 2000s was related to the population increase in the region. After the 2000s, improvements in sewage collection and wastewater treatment plants provided greater retention of MPs, reducing their inputs to the reservoir. In summary, the reservoirs are sink of MPS, characterizing as an ideal study sites to assess the historical pollution of MPs in Brazil and elsewhere.

Figure 1. Microplastics classes: tire wear particles -TWPs (A), fragment (B), thread/fiber (C), pellet (D) e film/sheet (E).

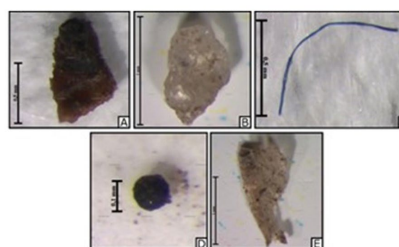


Figure 2. Chronology of Microplastic deposition in the sediment cores of the Itupararanga Reservoir, São Paulo, Brazil. (Reservoir Dam - DR in blue and Reservoir Entrance - ER in red)

