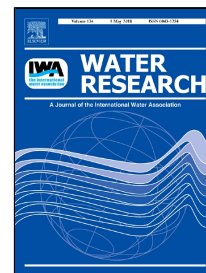


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Antifouling paint particles: sources, occurrence, composition and dynamics

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1 Antifouling paint particles: sources, occurrence, composition and dynamics

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14

15 Abstract

16 Sources, occurrence, composition and dynamics of antifouling paint particles (APPs)
17 were assessed in Patos Lagoon estuary (PLE), Southern Brazil. Ten areas including
18 boatyards, a marina and artisanal fishing harbors were identified in the estuarine system
19 as potential sources of APPs. The APPs generated in these areas were highly
20 heterogeneous considering the size, shape and composition. Based on an estimate of
21 antifouling paint usage and amount of boats in each studied area, artisanal fishing harbors
22 could be the main source of particles to PLE. However, relatively high amounts of APPs,
23 which ranged from 130 to 40,300 $\mu\text{g g}^{-1}$, were detected in sediments collected in front of
24 boatyards and a marina. The uneven distribution of APPs levels among the sediment
25 samples were probably due to the presence of diffuse sources (fishing harbors) associated
26 to “hotspots” (boatyards and marina) along the study area. Additionally, data of settling
27 experiment indicate that size, shape and density of APPs, combined to local
28 hydrodynamics, appears to contribute to the mobility of these residues within the estuary.
29 In the main channel of PLE, smaller particles tend to be transported to adjacent coastal
30 zone while particles tend to be deposited in the sediment surface of sheltered areas. Since
31 different trace metals, and booster biocides were detected in APPs that were not correctly
32 disposed, these particles can be considered as an important source of contamination to
33 aquatic environments. The present data suggest that APPs represent an environmental
34 problem for aquatic systems in Brazil, since the country lacks legislation in addition to
35 inefficient control mechanisms. An improvement in boat maintenance processes are
36 urgently needed to avoid this continuous release of APPs into the aquatic systems.

37

38 Keywords: Antifouling; Boatyards; Booster biocides; Estuary; Fishing harbors; Metals

39 1. Introduction

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