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Exploiting flow-based systems for monitoring persistent inorganic pollutants (PIPs) in recreational waters

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Recreational waters, both coastal and inland, are stressed by anthropological activities, with consequent contamination by inorganic and organic persistent pollutants. The economic impact to Portugal, and any coastal country, of recreational waters as leisure, touristic and commercial areas, makes it essential to invest in the sustainability of these water bodies. In this scenario, we propose to develop automatic flow-based methods for real-time monitoring of persistent pollutants. The methods will hopefully present advantages over existing ones in terms of cost, reagent consumption, portability and speciation of analytes.

The target analytes are heavy and transition metals (cadmium, lead, copper, chromium, nickel and zinc) as persistent inorganic pollutants, PIPs, and iron, due to is environmental relevance. These parameters are related to activity of maritime traffic, namely refueling, cleaning, maintenance and navigation. To assess the PIPs content, spectrophotometric sequential injection methods are being developed. Flow-based methodologies, namely sequential injection (SI) analysis, present advantageous characteristics such as automation, robustness, and versatility make them a quite suitable choice. Additionally, the potential of SI manifolds to be coupled to miniaturized detectors and pre-treatment units, namely clean-up/pre-concentration columns, is also explored. In this communication, the methods developed in this context for the determination of zinc, copper, iron, and chromium will be discussed.

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