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ABSTRACT BOOK

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Trace element behaviour along the water column and mobility at the sediment-water interface in a stratified estuarine environment (Gulf of Trieste, northern Adriatic Sea)

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Sediments are considered reservoirs of contaminants, but they can also act as a secondary source of contamination since remobilisation processes at the sediment-water interface (SWI) may affect the water quality (Caplat et al., 2005; Petranich et al., 2018). The estuarine system of the Timavo River is located in the Gulf of Trieste (northern Adriatic Sea). The innermost sector of the estuary was recognised as the most critical area showing high concentrations of potentially toxic elements (PTEs) in sediments and scarce water circulation which led to a permanent oxic-hypoxic interface along the water column (Pavoni et al., 2020).

Field activity was performed before (June) and after (September) the forced aeration of a system of porous pipes laid on the bottom aiming at re-oxygenating the water column in summer. Sampling was carried out along the water column, short sediment cores were collected to investigate both solid phase and porewaters and *in situ* benthic chamber experiments were conducted at the SWI. The primary aim of the work was to understand if and how biogeochemical processes may affect PTE (As, Cr, Hg, Fe, Mn, Ni, Pb, V) mobility and and related fluxes at the SWI.

The water column was found to be oxygen stratified and hypoxia occurred at the bottom, mostly in June (2.29 mg/L) when reductive conditions were also observed (-58 mV). As a result, dissolved PTEs increased with depth reaching maximum values at the bottom due to dissolution/desorption processes of Fe and Mn oxy-hydroxides (Dellwig et al., 2010). This evidence was confirmed by the benthic chamber experiments highlighting a gradual oxygen depletion inside the chamber due to organic matter remineralisation with subsequent increase of dissolved PTEs.

The porewater profiles were found to be different between the two campaigns showing the highest PTE concentrations in June, mostly at the top of the sedimentary sequence suggesting that release of PTEs at the SWI is promoted in hypoxic conditions.

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