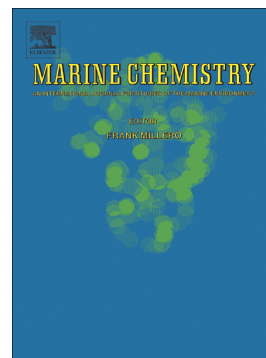


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Revisiting the Outwelling Hypothesis: Modelling Salt Marsh Detrital Metal Exports under Extreme Climatic Events

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ABSTRACT

The Tagus estuary is a mesotidal estuary located on the Western Portuguese coast, and is characterized by large areas of salt marshes (17.24 km²) and tidal flats distributed along the margins. Halophyte vegetation in this system concentrates heavy metals during the growing season and subsequently releases these metals to the environment following senescence. Although there currently there are no metal discharges to the estuary, this was not true in the past, and there are still large amounts of legacy metals within the system. The results presented here show that marshes in the Tagus estuary, can export metal contaminants at the rate of 162 Zn kg m² y⁻¹, 26 Cu kg m² y⁻¹, 28 Pb kg m² y⁻¹ and 1 Cd kg m² y⁻¹. Eddies are generated inside the estuary during frequent flood events, enhancing erosion and transport of particles. During neap tide periods plant detritus is mostly retained in the inner estuary in the vicinity of the marsh source; during spring tides, however, export to the main channel and to the ocean is significantly increased. Sea level rise (SLR) and/or expected increase in the frequency of flood events will increase detrital movement within the estuary and discharges of metal contaminated particles to the ocean shelf. This research highlights the

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