



Impact of *Zostera noltii* meadow cycle on iron and phosphorus dynamics in tidal mudflat (Arcachon Bay, France)

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The Arcachon Bay is a 156 km² macrotidal lagoon located on the French Atlantic coast. The intertidal zone covers more than 66% of the surface area, and *Zostera noltii* meadows more than 70 km². A study was led in order to characterize the effect of these meadows on the distributions of redox species, especially on phosphorus and iron cycles within the first centimeters of tidal mudflats. Several cores have been collected on a tidal mud-flat, colonized, or not, by a *Zostera noltii* meadow, in March, May, July, September, and December. Dissolved iron and phosphorus were analysed. The particulate fraction was selectively leached to extract two fractions of iron and phosphorus. The results show that annual seagrass cycle drastically affects the phosphorus and iron dynamics. Oxygen release by root system during growth period induces the formation of a rich iron oxihydroxide zone and associated phosphorus. This growth phase, which increases inputs of organic matter via the roots, promotes a strong reduction of the sediment. The iron oxihydroxide dissolution releases the dissolved iron and associated phosphorus. This phosphorus is rapidly assimilated by the seagrass roots for growth metabolism inducing higher particulate and pore-water Fe/P ratios in sediments at the level of root zone.