

Quantifying resistance to erosion in salt marshes of the Northern Adriatic Sea

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Salt marsh ecosystems provide multiple ecosystem services, including protecting coastlines via sediment stabilization. Despite their value, the global extent of salt marshes is decreasing due to human pressures, such as land reclamation, climate change and eutrophication, one of the primary drivers of change in salt marsh systems. We quantified resistance to erosion in salt marshes of the Northern Adriatic Sea by subjecting salt marsh sample cores to waves in a flume experiment, and determined factors affecting resistance to erosion. Results showed that *Spartina* vegetation had a significant effect on erosion rates, and in the absence of vegetation, erosion rates were primarily driven by grain size and surface water nitrate and nitrite concentrations. In a second experiment, we investigated the impacts of increased eutrophication on resistance to erosion through nitrogen enrichment in Grado Lagoon. Results show that in vegetated plots, organic matter and below-ground biomass were the best linear predictors of erosion rates, and in non-vegetated plots, no predictor variable tested was significant in explaining variation in erosion rates. Our study demonstrates the critical role of vegetation and sediment characteristics in resistance to erosion, raising important considerations for management of salt marshes for coastal protection.

Keywords: coastal protection, erosion, salt marsh, eutrophication