

Quantification of vegetation-induced allochthonous sediment deposition on coastal salt marshes

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Coastal salt marshes are highly valuable ecosystems at the boundary between land and sea and are governed by the quasi-continuous deposition of autochthonous and allochthonous sediment, depending upon prevailing hydrological and hydrodynamic conditions. Continuous sediment deposition is responsible for the ability of coastal salt marshes to adapt their elevation to increasing sea levels and thus their potential to attenuate hydrodynamic energy, which contributes to coastal protection during extreme storm events.

Using two high-resolution suspended sediment profilers (Argus Surface Meters IV) in a field flume, we investigate the interactions between vegetation biomass/structure, hydrodynamics and deposition of allochthonous sediment on a UK east coast salt marsh. The measurements allow the estimation of sediment deposition within the field flume and give insights into the dependency of sediment deposition processes within a marsh on the prevailing hydrodynamics, seasonal influences and vegetation characteristics.

Preliminary results indicate that sediment trapping efficiency of salt marshes under summer conditions is largely independent of biomass and vegetation structure, since suspended sediment is primarily found within the lower 10cm of the water column. Suspended sediment concentrations are largely controlled by the resuspension of sediment on the adjacent intertidal mudflat and the trapping efficiency appears to depend on the prevailing hydrodynamic conditions and the vertical distribution of the suspended sediments within the water column.

The results of this study have important implications for the prediction of the future development of coastal salt marshes and the spatial distribution of sediment deposition, which until now has primarily been described as a function of the distance from a tidal channel or the marsh edge. Many previous field studies, however, found spatial patterns that could not be related to this distance, a knowledge gap to which our study makes a significant contribution.