

Field monitoring of plant-wave interactions over seasonal time-scales

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Tidal marshes are known for their nature-based shoreline protection function. Especially in the pioneer tidal zone, the efficiency of this function depends on mutual plant-wave interactions which are poorly understood. Detailed field measurements along the brackish part of the Elbe estuary were done during one year (2016). Biomass of two pioneer species (*Schoenoplectus tabernaemontani*, *Bolboschoenus maritimus*) were sampled monthly and plant functional traits, including shoot biomass, shoot flexibility, shoot densities, root biomass and rooting depth were measured. Hydrodynamics (waves, tidal currents) and sediment dynamics (rates of sedimentation, erosion) were measured with high level of spatial and temporal resolution, i.e. vegetation and sediment dynamics were sampled monthly and hydrodynamics are recorded continuously in 20 m to 30 m transects within the pioneer zone of three marsh sites. The data reveal correlations between species zonation and wave exposure. Moreover, seasonal changes in biomass cover and hydrodynamic forces seem to play a role in the sediment bed dynamics. These spatial and seasonal patterns in both hydrodynamic exposure (more hydrodynamics in winter and closer to the main channel) and plant traits (wave attenuation varies between species and marsh sites) raise the question to what extent their interaction plays a role in nature-based shoreline protection.