



On the impact of salt marsh pioneer species-assemblages on the emergence of intertidal channel networks

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Tidal marshes constitute important coastal habitats for aquatic and terrestrial organism as well as provide crucial buffers from storms and waves for coastal populations. Their functions are closely related to their channel network which is in turn greatly influenced by vegetation cover and vegetation types. Previous studies suggested a two-way effect of vegetation on marsh topography; stabilizing sediment on the one hand and promoting erosion and channel incision on the other hand. Moreover stabilizing- or eroding effects are highly dependent on vegetation types. This study attempts to link these effects to different vegetation species (*Salicornia procumbens*, *Spartina anglica* and *Puccinellia maritima*) and assemblages thereof by means of a coupled ecological-hydromorphodynamic modelling study. Both single species and different species-assemblages were studied, incorporating both species-specific physical plant properties and spatio-temporal growth strategies. The results indicate that the influence of vegetation on marsh topography to be highly dependent on the species types. Both the presence of *Spartina* and *Puccinellia* resulted in significant channel development, where *Salicornia* did not induce topographic change at all. The combination of different species resulted in reduced channel development compared to the most dominant species, although the channel networks were similar in terms of shape. Moreover, the presence and type of vegetation plays an important role in causing tidal asymmetry, which affects the direction of the net sediment transport. This particularly came forward in species shift-scenarios that resulted in increased erosion of the existing channel network and strong ebb-dominance, implying reduced protective capacity of the marsh.