

Spatial and vertical patterns of Soil Organic Matter in the salt marshes of the Venice Lagoon (Italy)

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Salt marshes are crucial yet endangered intertidal environments supporting a diverse range of ecosystem services, including coastal protection and carbon storage. Accumulation of organic matter (OM) in salt marshes has a structural role, as it contributes to vertical accretion necessary for marshes to keep up with relative sea-level rise. A better understanding of soil organic matter dynamics in tidal environments is a critical step to predict salt-marsh evolution in the face of climate change and anthropogenic disturbances and to further elucidate their carbon sink potential, to the benefit of management and conservation strategies. Toward this goal, we analysed OM content in salt-marsh soils of the Venice Lagoon (Italy) from 48 sediment cores to the depth of 1 m. Percent OM was evaluated using Loss On Ignition at 12 depths for each core and carbon stock and accumulation were estimated. OM content presented a large variability and showed a clear relationship with dry bulk density, with important implications on marsh resilience and on the related ecosystem services. Spatial and vertical patterns of OM appeared to be affected by past depositional history and vegetation characteristics. Furthermore, an increase in organic content toward the mainland emphasized the crucial role of freshwater inputs.