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# EP13A-03 - Signature of Storm-Driven Sedimentation on Marsh Topography



Monday, 13 December 2021



19:55 - 20:00



Convention Center - Room 228-230

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## Abstract

Coastal wetlands are intertidal ecosystems based on a delicate balance between hydrodynamic, morphological, and biological processes. Increasing rates of relative sea-level rise, sediment starvation and anthropogenic pressure challenge the existence of wetlands and the ecosystem services they support, extending to water quality enhancement, carbon sequestration, and shoreline protection. Therefore, to preserve coastal wetlands and their ecosystem services, it is of utmost importance to understand sedimentation processes that drive salt-marsh vertical accretion and offset the effects of relative sea-level rise.

Tidal flooding propagating via the channel and creek system is considered to be the main mechanism controlling marsh sediment supply. However, storm-induced resuspension associated with enhanced water level can importantly affect the marsh sediment budget, sustaining sedimentation on the marsh surface and signing its topography, which, in turn, affects transport processes. To better understand how tides and storm surges affect spatial and temporal sedimentation patterns in salt marshes, we investigated short-term sedimentation processes through field observation in the salt marshes of the Venice Lagoon, Italy.

Sediment accumulation measurements carried out continuously from October 2018 to July 2021 in four different marshes reveal that storm-driven sediment supply accounts on average for 70% of the total yearly sedimentation, despite the brief duration of storm events. On marshes bordering channels, sediment mostly accumulates close to the marsh margin and sedimentation rapidly decreases with the distance from the marsh edge, contributing to form a levee-shaped profile. Conversely, on marshes facing tidal flats, where the action of wind waves is stronger, maximum sedimentation shows an inland displacement, creating a gently sloped, ramped transition at the marsh margin.

We conclude that storm surges importantly support marsh sediment accumulation and change the spatial depositional patterns, which largely define the marsh topographic profile.

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