EGU21-13983
https://doi.org/10.5194/egusphere-egu21-13983
EGU General Assembly 2021

Will hurricane sedimentation aid southeastern US saltmarsh resiliency in the face of climate change and sea-level rise?

Alice Staro[1], Duncan FitzGerald[1], Zoe Hughes[1], Christopher Hein[2], Ioannis Georgiou[3,4], Kendall King[2], Jennifer Connell[2], and Christina Pondell[2]

[1]Department of Earth and Environment, Boston University, Boston, United States of America (astaro@bu.edu)
[2]Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, United States of America
[3]The Water Institute of the Gulf, Baton Rouge, United States of America
[4]Department of Earth and Environmental Sciences, University of Louisiana, New Orleans, United States of America

Coastal saltmarshes are an important and highly diverse ecosystem, shielding the mainland from erosion and flooding. Along the US East Coast these valuable wetlands are endangered due to climate change, sea-level rise, and reduced fluvial sediment fluxes. Although hurricanes are commonly an erosional agent, they may be responsible for delivering significant volumes of sediment to the marsh surface, which could aid resiliency by increasing vertical accretion. This study analyzes marsh sediment cores collected during December 2017 within the Georgia Bight, targeting deposits associated with Hurricane Irma, which caused significant wave energy and storm surge along the coast from Florida to South Carolina in September 2017.

We have focused our initial research on samples from Sapelo Island (Georgia), where Hurricane Irma produced maximum wind velocities of 17.5 m/s and a 1.3 m storm surge, inundating the marsh for 14.8 hrs. We find that Irma-related layers are between 2 and 7 cm thick and well-oxidized. These deposits typically consist of laminated mud with low organic content (LOI: 10-25%) and low bulk density (0.3-0.8 g/cm^3). On average, Irma event sediment thickness is 4 times the historical average annual accretion, which in Georgia salt marshes is 1.55 mm.

A direct comparison of Irma-affiliated marsh accretion and historical rates is complicated due to differences in consolidation, rooting and vegetation, and the sedimentation history of the marsh. Nonetheless, the storm layer represents a significant addition of sediment to the marsh surface. Thus, future increases in event sedimentation, associated with increased frequency or severity of storms, could help compensate for sea-level rise and lessen the likelihood or extent of marsh loss due to submergence.