ORGANIC CARBON BURIAL IN MANGROVE-SALT MARSH ECOTONES OF APALACHICOLA BAY: THE ROLE OF REACTIVE IRON

Prakhin Assavapanuvat[1]*, Thomas S. Bianchi*[1]*, Joshua L. Breithaupt*[2]
[1]Department of Geological Sciences, University of Florida, Gainesville, FL, USA
[2]Florida State University, Coastal & Marine Lab, St. Teresa, FL, USA

Due to global warming, poleward invasion of mangrove communities into salt marsh habitats has been increasing around the world. This range expansion is expected to enhance carbon storage in these “blue carbon” communities because of higher organic carbon (OC) burial rates commonly observed in mangrove (10-88 g C m^{-2} yr^{-1}) compared to salt marshes (4-40 g C m^{-2} yr^{-1}) (e.g., Doughty et al., 2016; Breithaupt et al., 2017; Radabaugh et al.,2018; Dontis et al., 2020; Vaughn et al., 2020; Vaughn et al., 2021). Interestingly, recent studies have observed that significant proportion of OC was bound to reactive iron phases in soils. The stability of reactive iron-associated OC (FeR-OC) depends on sediment redox state which subject to unequal rhizosphere oxidation between mangrove and salt marsh taxa. Hence, mangrove-salt marsh substitution could potentially adjust the magnitude of FeR-OC fraction and OC preservation potential. Here, we investigate carbon burial in sediments of Apalachicola Bay, the northernmost limit of expansion of both black (*A. germinans*) and red (*R. mangle*) mangrove into Floridian *Spartina spp*. and *Juncus spp*. salt marshes. According to the analyses of lignin-derived phenols and citrate-dithionite FeR-OC extraction, we observed that 1) degradation signal of lignin abruptly decreased after former salt marshes were replaced by *A. germinans*, and 2) near-surface sediments under *A. germinans* community contain higher fraction of FeR-OC relative to both sediments from *R. mangle* region and the deeper section of *A. germinans* core where precedent salt marshes were the major OC source. These findings illustrate higher OC burial after mangrove establishment and highlight the importance of climate-driven adjustment of coastal vegetation habitat in regulating feedbacks on global carbon cycle.

PRESENTER BIO: Prakhin Assavapanuvat is a graduate student in Department of Geological Sciences, University of Florida, working in Professor Thomas S. Bianchi’s lab. His major research interest is tracing the effect of natural and anthropogenic disturbances on wetland biogeochemical cycles.