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Prespective

Salt Reduces Respiration in Coastal Wetlands More Than Photosynthesis

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DESCRIPTION

The carbon cycle science paradigm predicts that rising sea levels will increase carbon reserves, which appear to be a negative carbon climate. However, ecosystems exposed to a combination of stressors such as salt invasion and sea level rise and subsidies experience adaptation, transition to alternative states, and functional declines such as carbon storage. It may change the response trajectory to change. Climate change is increasing the salt content of coastal ecosystems around the world, but the impact on ecosystem metabolism remains uncertain. Here, Gross Ecosystem Productivity (GEP), ecosystem respiration [CO_2 and CH_4], and experimental addition of salt concentrations and net ecosystem production from various coastal wetlands exposed to observation gradients. Gender (NEP) was synthesized. In general, increased salinity resulted in a decrease in mean GEP, $ERCO_2$, and $ERCH_4$, while an increase in GEP and NEP went from about 5 to about 10 ppt. Increased saltwater intrusion can irritate or stress wetlands based on relative exposure and acclimatization to increased salinity, with increased salinity having a greater adverse effect on $ERCO_2$ and $ERCH_4$ than GEP. I found NEP. Although increased NEP is detectable at low salinity, saltwater intrusion and climate-related disturbances can reduce the carbon storage capacity of coastal ecosystems as productivity declines towards higher salinity. A new paradigm in carbon cycle science is that vegetated coastal ecosystems sequester disproportionately more carbon than terrestrial ecosystems, increasing carbon reserves where sea level rise looks like a negative carbon climate feedback loop. Here this Perturbation theory states that beneficial inputs or subsidies (nutrients, sediments, etc.) improve ecosystem function at low exposures, but can reduce function at high exposures, with toxic inputs or stressor's ecology. It is expected to have an immediate adverse effect on system functions. However, ecosystems exposed to a combination of stressors such as salt invasion and sea level rise and subsidies experience adaptation, transition to alternative states, and functional declines such as carbon storage, resulting in an environment. It may change the response trajectory to change. Sea level rise is a global phenomenon that is rapidly increasing saltwater intrusion into many coastal ecosystems. Lowland coastal ecosystems are extremely vulnerable to sea level rise, salinity changes, and hydrological changes, all of which affect survival through changes in metabolic and geomorphological processes. As a result, coastal wetlands can be extremely vulnerable to hydrological changes that affect their sustainability by causing sea level rise, salinity changes, and metabolic process changes. Coastal wetland ecosystems are important global carbon sinks at risk, often due to two interactions associated with climate change, land-use changes, and sea level rise, resulting in saltwater intrusion. It will be more serious. Sustainability of coastal ecosystems in the face of rising sea levels and saltwater intrusion depends on how changes in key metabolic processes affect the net carbon storage of the ecosystem. Previous measurements of localized, coastal wetland ecosystem productivity often have found disparate effects of elevated salinity from actual or experimental saltwater intrusion on photosynthesis and respiration pathways. This is understandable given how adaptations to salinity exposure are expected to be driven by legacy conditions (i.e., whether the wetland has previously been exposed to salinity) and the responses of dominant species (i.e., which change with small increments in salinity), relative to other factors that influence rates of net ecosystem productivity and carbon storage. However, unlike other climate changes drivers such as temperature, which has known sensitivity differences for photosynthesis and respiration, the sensitivity of ecosystem metabolism to saltwater intrusion is largely unknown. Even less is known about how exposure to elevated salinity in lower salinity wetlands expected with saltwater intrusion and reductions in fresh water affects net ecosystem productivity. A synthesis of metabolic responses to changes in salinity across diverse coastal wetlands is critical to reveal generalizable patterns of photosynthetic and respiratory ecosystem responses to saltwater intrusion.

Saltwater intrusion is increasing worldwide with rapidly rising sea levels, requiring a broader understanding of the consequences for coastal communities and ecosystems. Site-specific studies have recorded varying productivity responses to elevated salinity despite decreases in soil carbon storage in coastal wetlands. Reduced plant biomass and growth, and increased soil organic matter processing and export will contribute to carbon losses. Saltwater intrusion can decrease carbon storage in no acclimated coastal wetland ecosystems and can increase both carbon and nutrient export. To further identify how vulnerability to carbon loss will vary in coastal wetlands requires a stronger mechanistic understanding of how climate change and land use legacies will interact with salinizing conditions across that vary in prior exposure and sensitivity to saltwater intrusion. As our integration shows, coastal ecosystems are vulnerable to carbon loss when productivity exceeds the salt threshold. For example, coastal wetlands with low iron sulfide

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buffers and predominant plant species with low sulfide resistance, and coastal wetlands with high carbon and nutrient accumulations that are easily exported and transported by terrestrial air and ocean currents. Is probably the most vulnerable. For rising sea levels and invasion of salt water. Climate can also trigger different metabolic reactions to saltwater intrusion and carbon flux. Further understanding is needed on how plant-soil-hydrochemistry promotes variable responses to salt in coastal wetlands. Continued exposure to saltwater intrusions and climate-related disturbances can reduce the carbon storage capacity of coastal wetland ecosystems as higher salinity results in lower productivity. The development of vast underground carbon pools in coastal wetlands has led to continued plant biomass production, growth, carbon accumulation and embedding, despite changes in abiotic stressors (salt, sulfurization, floods, disturbances, etc.). Depends on sudden and unpredictable deterioration of vegetation habitats into open waters. Saltwater intrusion to predict whether coastal ecosystems will evolve, transition to different vegetation states (e.g., freshwater wetlands to mangroves, tidal freshwater forests to wetlands), or slowly or suddenly fall into open waters. Must be mechanically understood how it affects carbon production, retention, and storage. Export when sea level rises. This information is needed to assess the lifetime of carbon climate feedback and simplify the processes implemented in next-generation Earth system models.