PNNL abstract

Disturbances such as sea level rise, increased extreme weather events, and climate change can have lasting impacts on the global carbon cycle. Monitoring sap flow and greenhouse gas fluxes offers a way to quantify the stability and resilience of terrestrial soils in a stressed environment. We present the first year of results for soil respiration and sap flux from a coastal forests on a tributary of Chesapeake Bay in Maryland, as part of a multi-disciplinary effort to understand terrestrial-aquatic ecosystems stressed by climate change. The study design includes transplanted soil cores (40 cm diameter, 20 cm depth) along natural salinity and elevation gradients to measure soil respiration, and four (2500 m2) plots with 6-8 trees with sap flux measurements. Soil respiration is measured every 7-10 days and sap flow every 30 minutes. We speculate that inundation and saltwater intrusion are dominant regulatory agents in the global cycling of Carbon and nutrients.

AGU abstract

Examining soil respiration (*R*S) provides a window into the complex processes occurring underground within the forest ecosystem. Because respiring tree roots contribute to *R*S, it is important to quantify how trees influence the local soil-to-atmosphere CO2 flux for both robust spatial scaling and mechanistic insight. We investigate a potential correlation between tree distribution and *R*S in a mid-Atlantic, temperate deciduous forest, measuring soil respiration along salinity and elevation gradients at three coastal locations 1 km apart. In addition, we collected tree spatial distribution data at all sites. We use mixed-effects models to examine the effect of tree proximity on *R*S in both the growing and dormant seasons, quantifying differences between tree species and under different climatic conditions.