

Measuring decomposition rates of cellulose in soils beneath seagrass beds using artist canvas

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Background

- Due to the recognition of wetland soils as important hotspots for stored organic carbon, there is concern that much of this “blue” carbon will be released as carbon dioxide following soil disturbances. Related models and experiments require a standardized method for measuring decomposition rates.

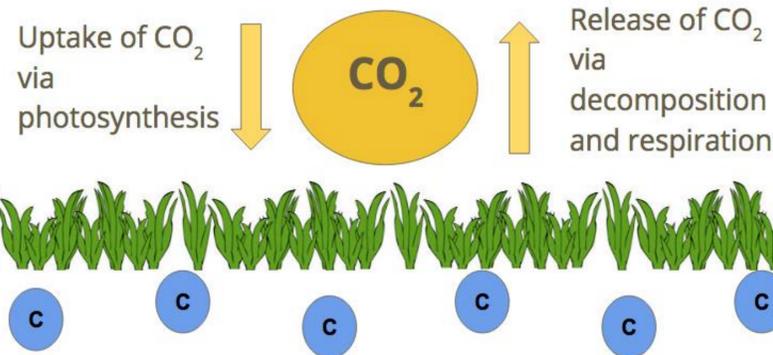


Figure 1. Flux and storage of carbon in seagrass sediment.

Goals

- To develop a standardized method to measure decomposition rates of organic matter in seagrass soils.
- Calibrate method to relate measured units (tensile strength loss of standardized material) to ecologically important units (weight loss) of organic matter.

Research Methodology

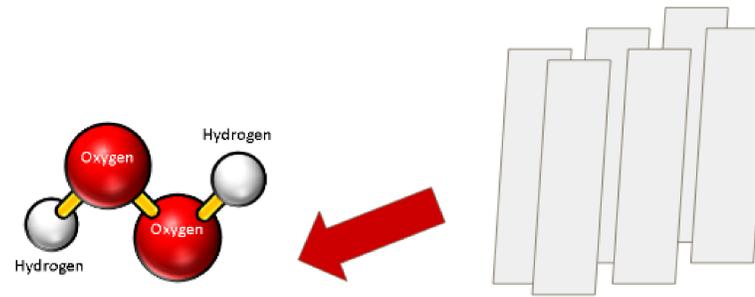


Figure 2: Prewighed canvas strips were placed in hydrogen peroxide for controlled oxidation to mimic decomposition. Strips were removed daily, dried, post-weighed, and torn with a tensometer to measure maximum tensile strengths, the force necessary to tear the fabric.

Results

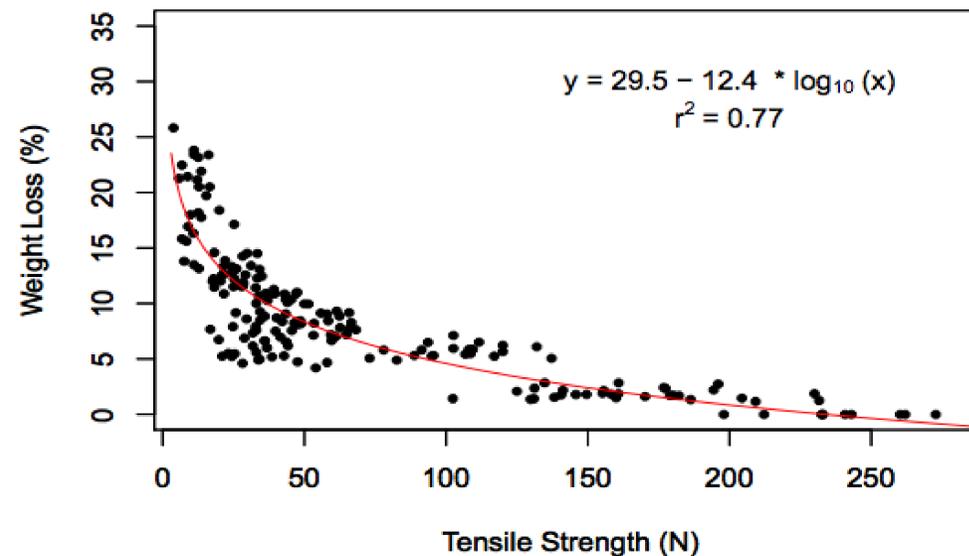


Figure 3. Linear model relating % weight loss vs tensile strength of decomposing strips of artist canvas.

Future Work

- Cellulose strips deployed in various coastal environments of the Florida Keys will be analyzed to understand factors influencing soil decomposition.
- We expect greater decomposition rates for strips incubating in sandy patches without seagrass, where there are erosional, oxic sediments. Our model allows decomposition rates to be calculated and compared between environments.

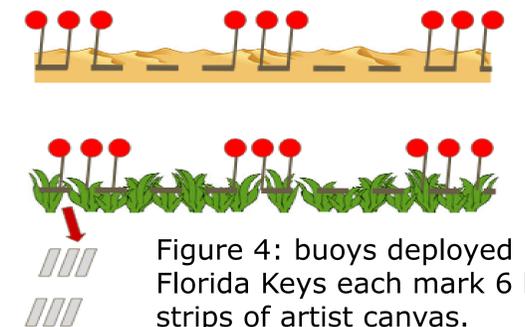


Figure 4: buoys deployed in the Florida Keys each mark 6 buried strips of artist canvas.



Figures 5 & 6: Canvas strips were deployed in the Florida Keys and will remain incubating for a duration of 3 months.



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