

Research Questions and Methods

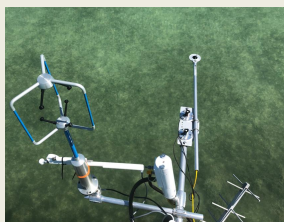


- Are seagrass meadows with carbonate sediments sources or sinks of atmospheric CO₂?
- What biogeochemical processes explain or underlay this?

Setting: Central Florida Bay
USA, November 2019

Eddy Covariance:

- Air/water CO₂ exchange
- CO₂ source/sink status



Flow through incubations:

Sediment/water fluxes of different seagrass densities

- O₂ uptake
- Net denitrification
- DIC and A_T flux

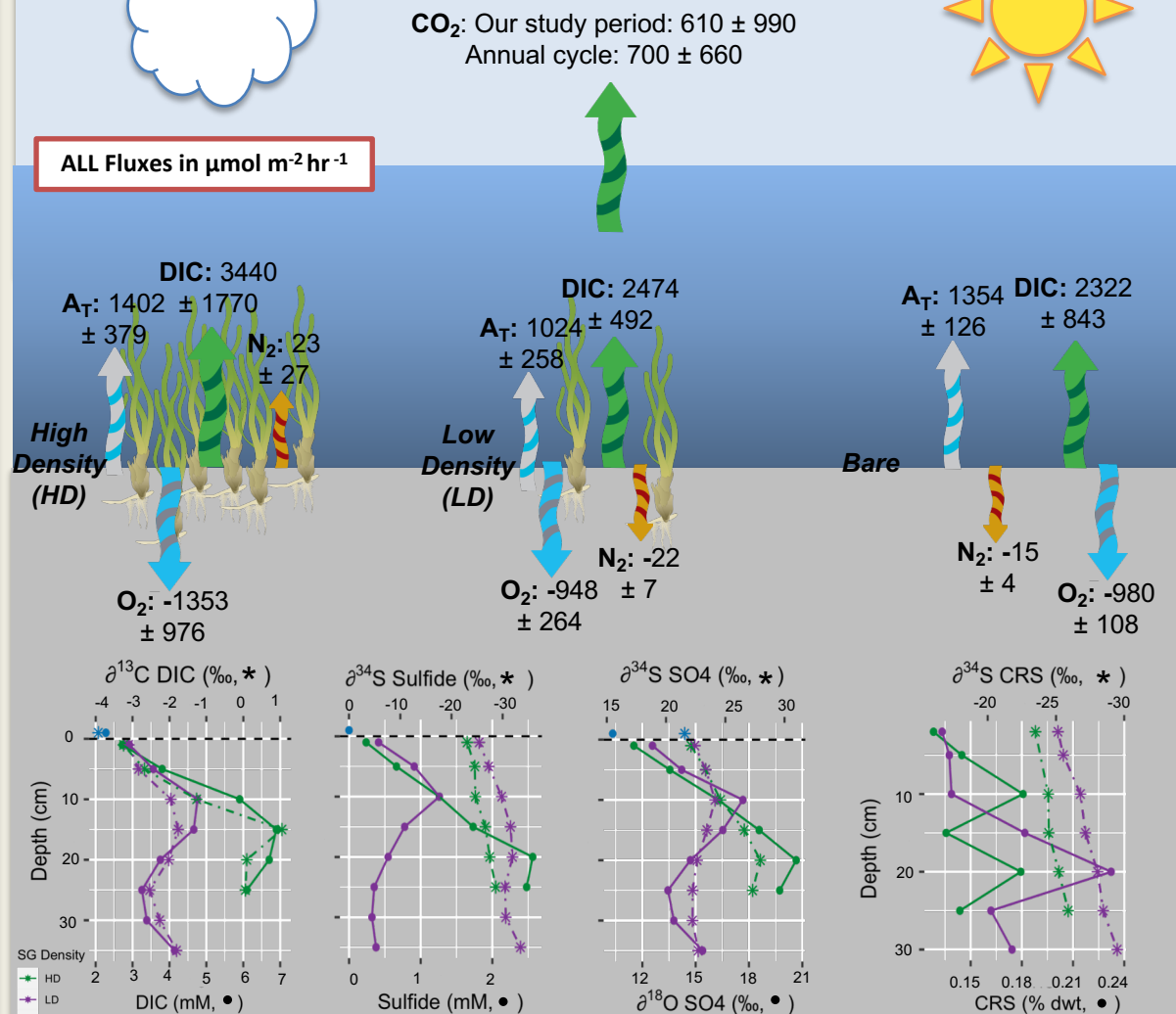


Porewater and solid phase (isotope) Geochemistry

- Net biogeochemical processes
- Alkalinity changes through:**
 - Calcification/dissolution processes
 - Pyrite and reduced sulfur burial

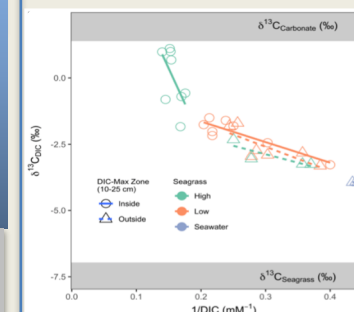


ALL Fluxes in $\mu\text{mol m}^{-2} \text{hr}^{-1}$



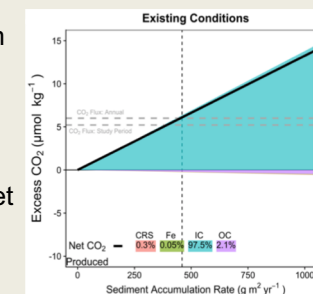
Key Findings

- The seagrass meadow was a consistent source of CO₂ to the atmosphere
- Core incubations indicate that benthic DIC flux outpaced A_T by a ratio of 1.7 (Bare) to 2.5 (HD) suggesting that seagrasses can contribute to CO₂ release from the sediments



- Isotopes reveal rapid CaCO₃ dissolution/recrystallization to more stable forms
- Occurs in HD root zone, likely through sulfide oxidation
- Iteratively increases CO₂

Alkalinity generation from net denitrification (small, close to zero) or burial of reduced products of sulfate reduction (CRS = FeS₂ + S₀) does not offset CO₂ production from inorganic carbon burial



For more information, check out our Preprint!