Air – water CO_2 fluxes driven by tropical coastal submerged vegetation

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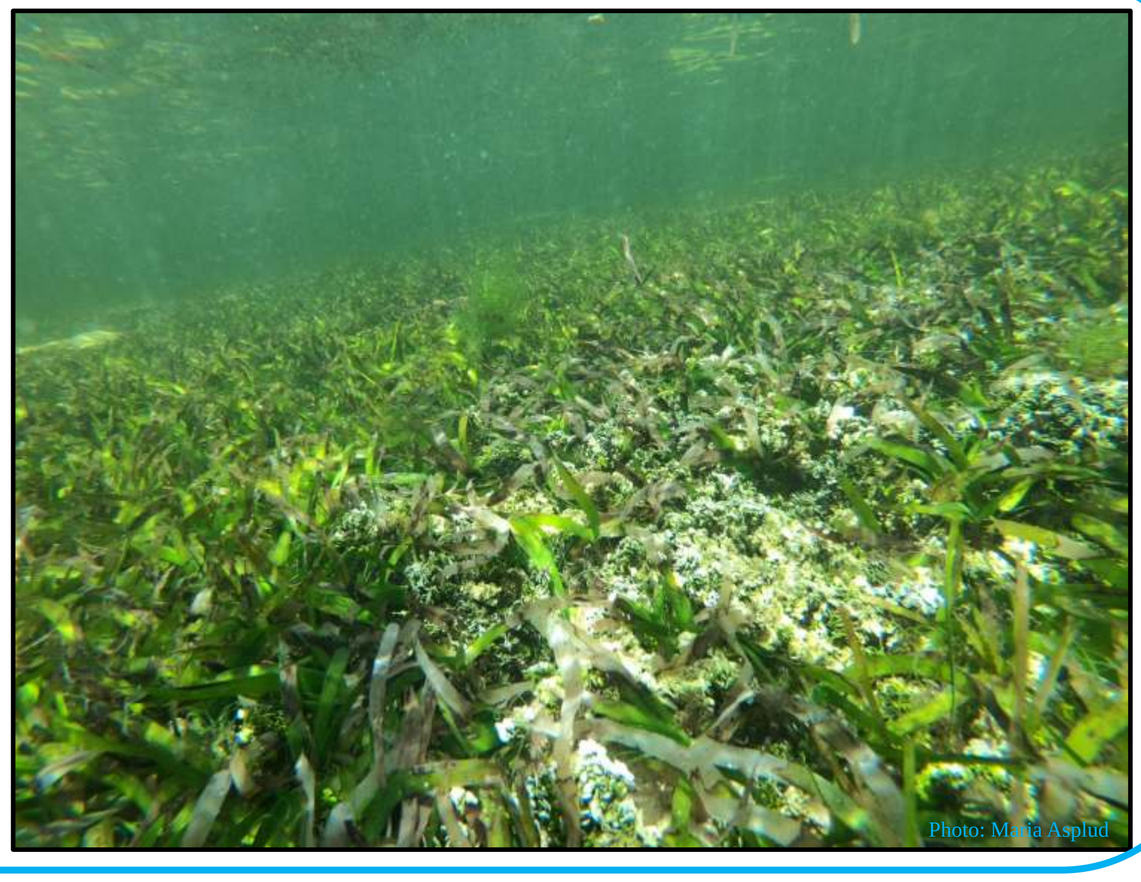
Introduction

- Tropical seagrass meadows support high metabolic rates than temperate meadows (Duarte et al, 2010) probably due to tropical climatic conditions (temperature and light intensity) that their contributions to carbon dioxide (CO_2) exchange and sequestration is promising.
- However, tropical seagrass meadows shelters considerable amounts of calcareous macro algae (*Halimeda* species) as reported from Chwaka Bay, Zanzibar, Tanzania (Kangwe, 2006; Gullstrom et al, 2006) with promotion of calcification process by photosynthetic activities of seagrasses (Semesi et al, 2009).
- Calcification process is a source of CO_2 in the atmosphere (Gattuso et al, 1998)

$$Ca^{2+} + 2HCO_3^- \Rightarrow CaCO_3 + H_2O + CO_2$$

- Thus , it is not known whether their coexistence and promotion of calcification process counteracts macrophytes CO_2 exchange and sequestration efficiency.
- Therefore this study was designed and executed to understand the influence of submerged vegetation on the fluxes of CO_2 over the water surface in the tropical seagrass meadows



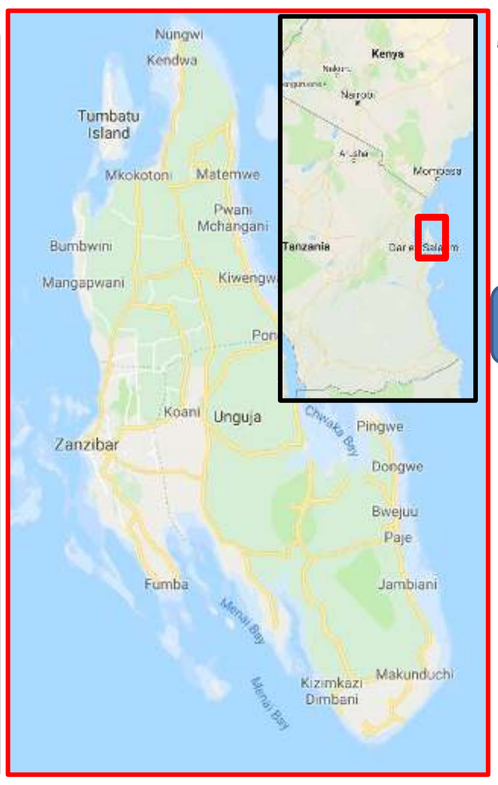
Goals

General aim:
To understand the influence of submerged vegetation on the fluxes of CO_2 over the water surface in the tropical seagrass meadows.

Specifically
1. To evaluate the effect of vegetation composition on air – water CO_2 fluxes in a seagrass dominated area
   - By *insitu* measurements of air – water CO_2 exchange and water parameters
2. To determine relative contribution from calcifying and non-calcifying marine macrophytes on air – water CO_2 exchange
   - This was achieved through controlled mesocosm experimental set up, where CO_2 fluxes were compared at different densities of seagrass and calcifying algae.

Material and methods

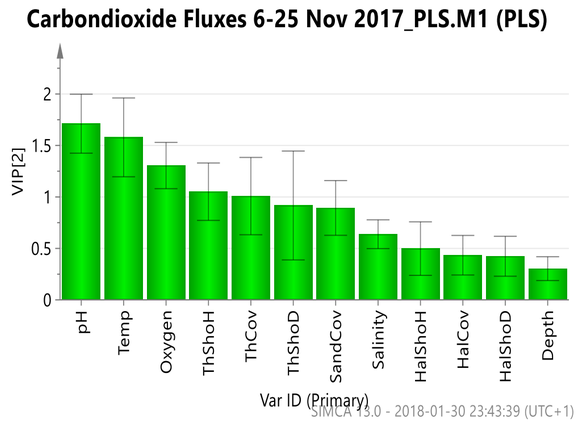
1.*Insitu* measurements of air –water CO2 fluxes by using Floating chamber technique

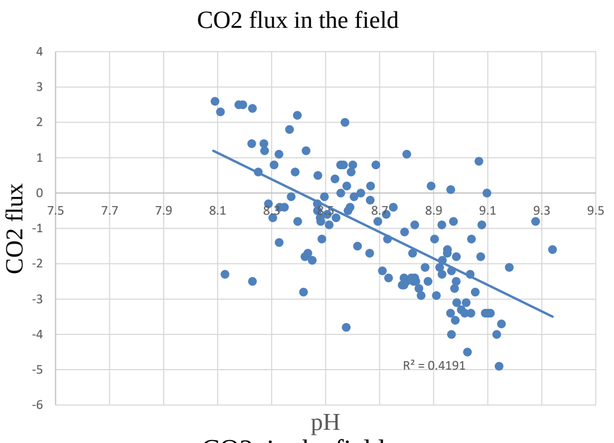


2. Mesocosm experimental setup

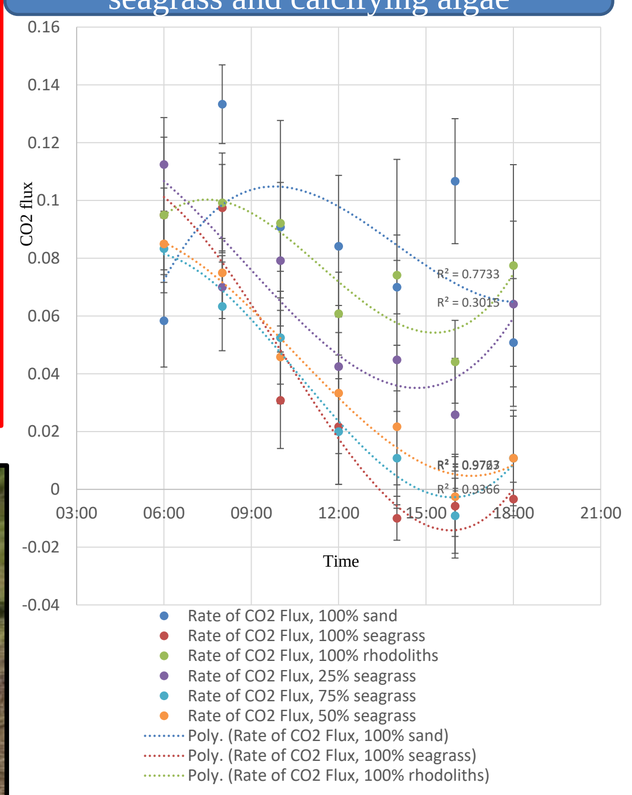
Preliminary results

1. PLS Modelling Performance (influence of vegetation composition)





2. CO_2 fluxes at different densities of seagrass and calcifying algae



Reference

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