

Can the Bioluminescent Bay at La Parguera buffer ocean acidification?

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1. MOTIVATION



2. STUDY SITE

4. CARBONATE CHEM SEASONALITY

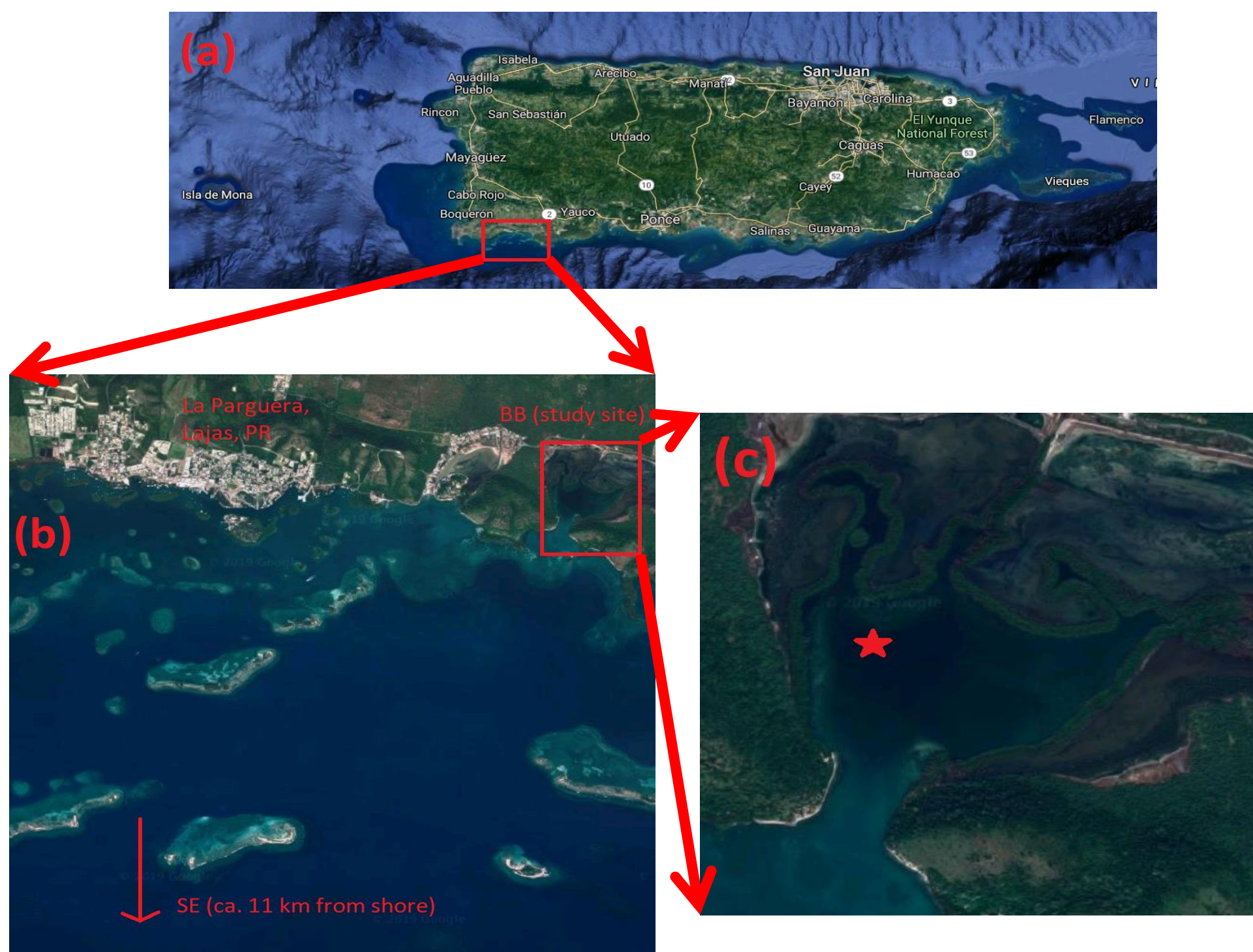


Fig 1. Below a map of (a) Puerto Rico, (b) La Parguera Marine Reserve and (c) The Bioluminescent Bay.

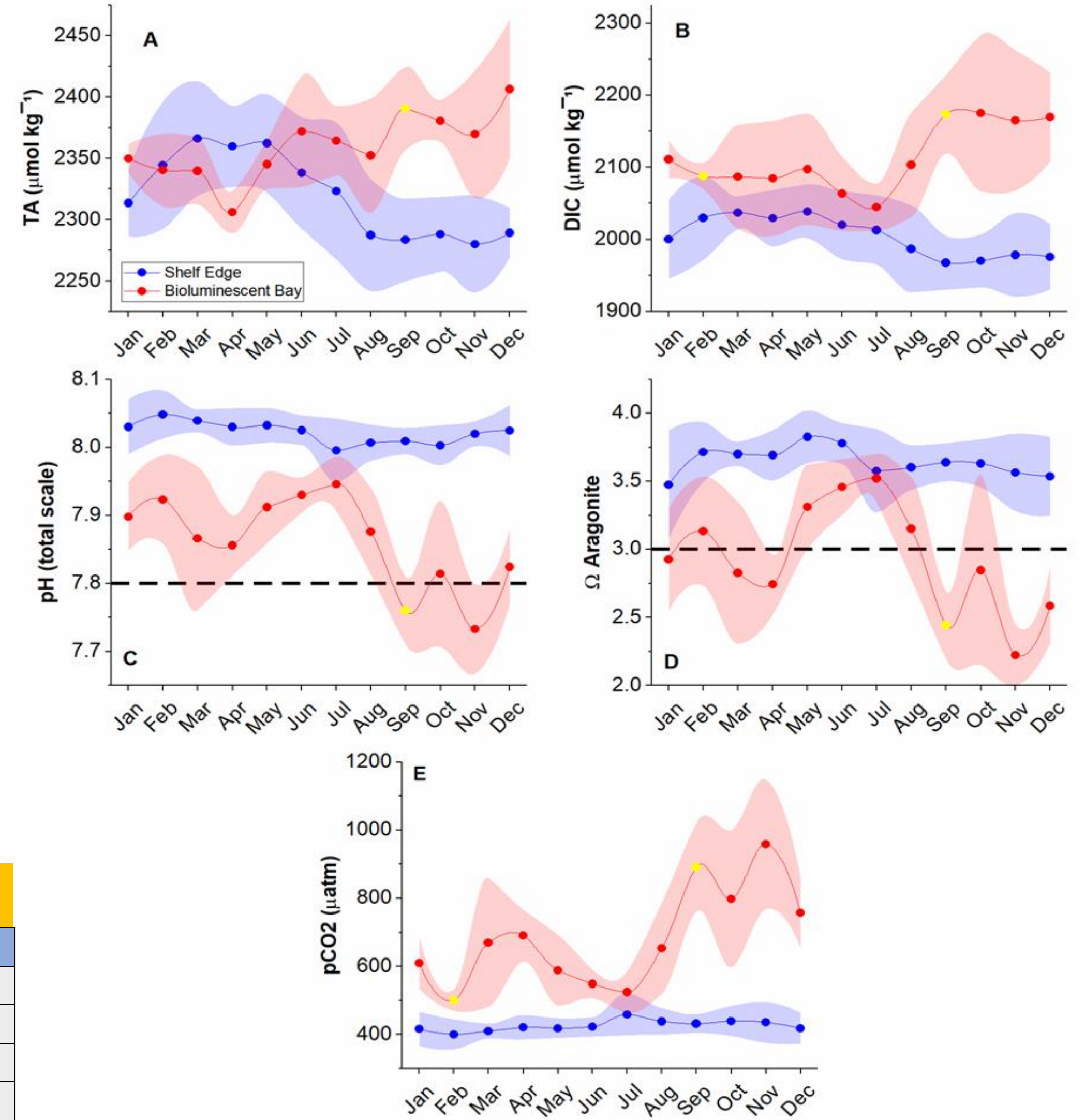


Fig 2. Seasonal variability of carbonate chemistry at The BB and offshore stations. RCP 8.5 values are represented by dashed lines.

3. METHODS

Sampling Regime	Bioluminescent Bay (BB)	Shelf Edge (SE)
status	mangrove lagoon	oceanic
timeline	Jun 2014 - May 2018	Aug 2009 - May 2018
frequency	one sample every two weeks	
local time (-4 GMT)	ca. 9:00 AM	ca. 8:00 AM
sample depth (m)	3	4
sampled	temp, sal, pH, TA & DIC (70%)	temp, sal, pH, TA & DIC (40%)
calculated co2sys	pCO ₂ , Ω & DIC (30%)	pCO ₂ , Ω & DIC (60%)

5. BIOGEOCHEMICAL DRIVERS AT BIO BAY

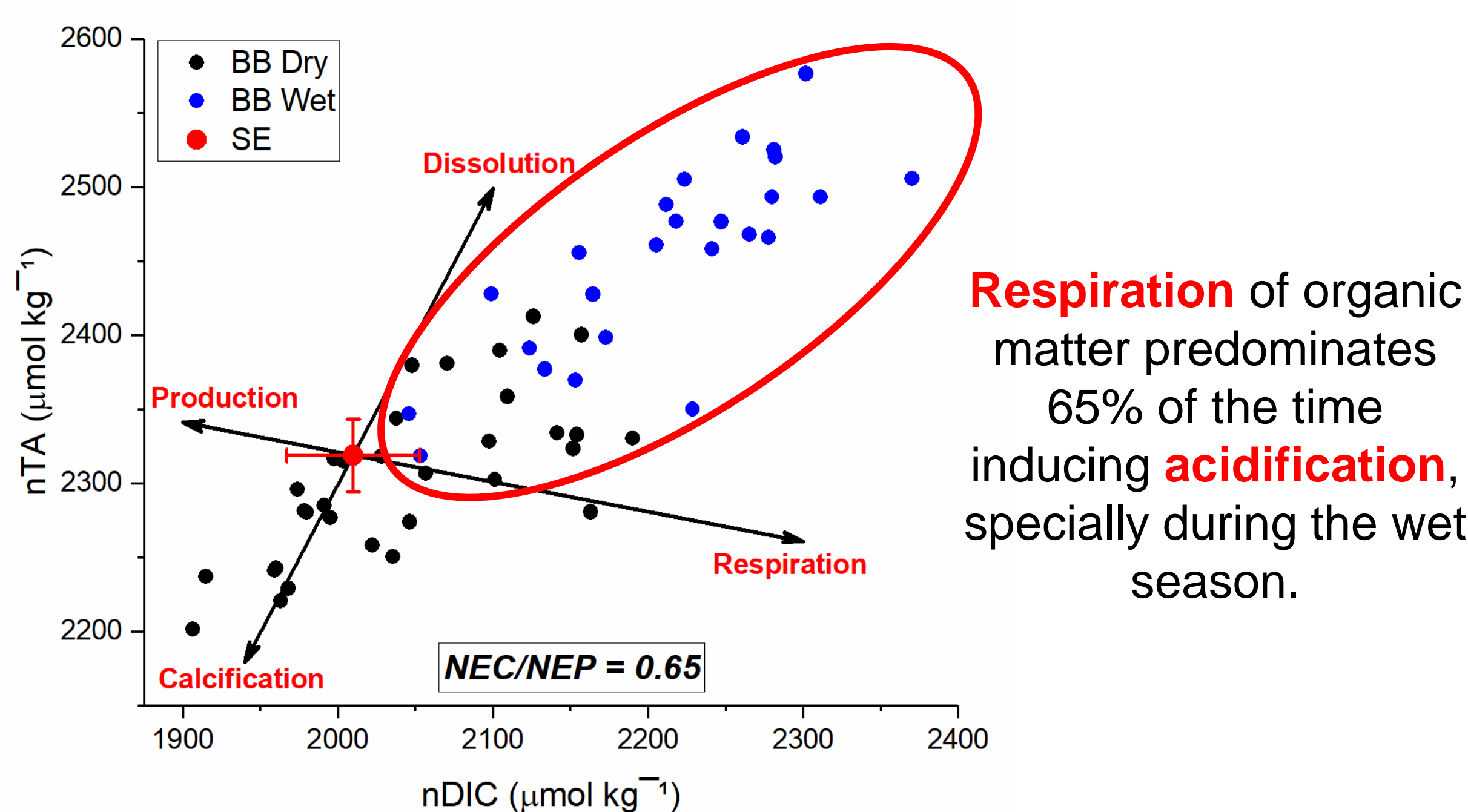


Fig 3. The nTA vs nDIC analysis provides insights on the balance of metabolic and physical processes. TA and DIC were normalized (nTA and nDIC, respectively) to the mean annual salinity. The red dot represents the mean offshore conditions.

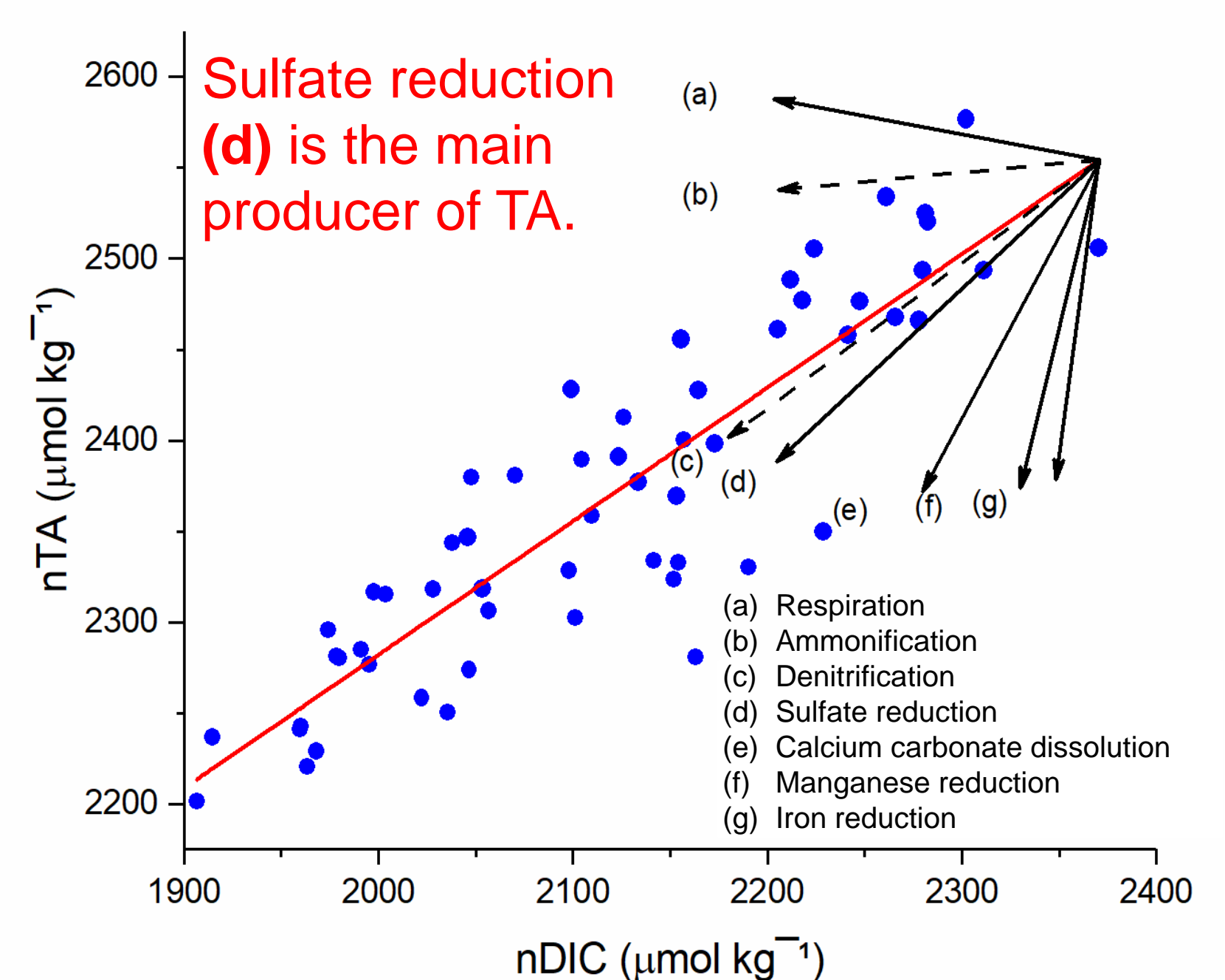


Fig 4. The slope of the nTA and nDIC correlation is used to determine the dominating biogeochemical process. Sulfate reduction increased the buffer capacity, but aerobic respiration (Fig 3) increased the acidity.

6. CONCLUSIONS

- This mangrove lagoon was unable to buffer OA, contrary to other mangrove ecosystems.
- Alkalinity generated from within BB may not be enough to counteract OA.
- Surveys encompassing extended time scales are needed to better assess carbonate chemistry seasonality at these ecosystems. Thus, grasping a better handle of the buffering capacities that mangrove environments could possess.

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 [3] Sippo JZ, Maher DT, Tait DR, Holloway C, Santos IR. (2016) Are mangroves drivers of buffers of coastal acidification? Insights from alkalinity and dissolved inorganic carbon export estimates across a latitudinal transect. *Global Biogeochem Cycles*; 30. doi:10.1002/2015GB005324.