



# Rockpools as refugia? photosynthetic communities negate ocean acidification

Chris Williamson<sup>1,2</sup>, Ben Goss<sup>1</sup>, Sarah Lee<sup>1</sup>, Marian Yallop<sup>3</sup>,  
Juliet Brodie<sup>2</sup> & Rupert Perkins<sup>1</sup>

<sup>1</sup>Cardiff University, School of Earth and Ocean Sciences

<sup>2</sup>The Natural History Museum, London, Life Sciences Department

<sup>3</sup>Bristol University, School of Biological Sciences



UK Ocean Acidification  
Research Programme



University of  
BRISTOL

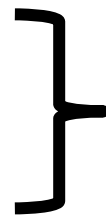
# Overview



- *Corallina* are important ecosystem engineers considered susceptible to the impacts of OA
- Intertidal species likely experience significant fluctuations in carbonate chemistry
- What is the real carbonate environment that *Corallina* experience?
- How does this relate to their photosynthetic performance?



Water  
Sampling  
PAM  
Flourescence



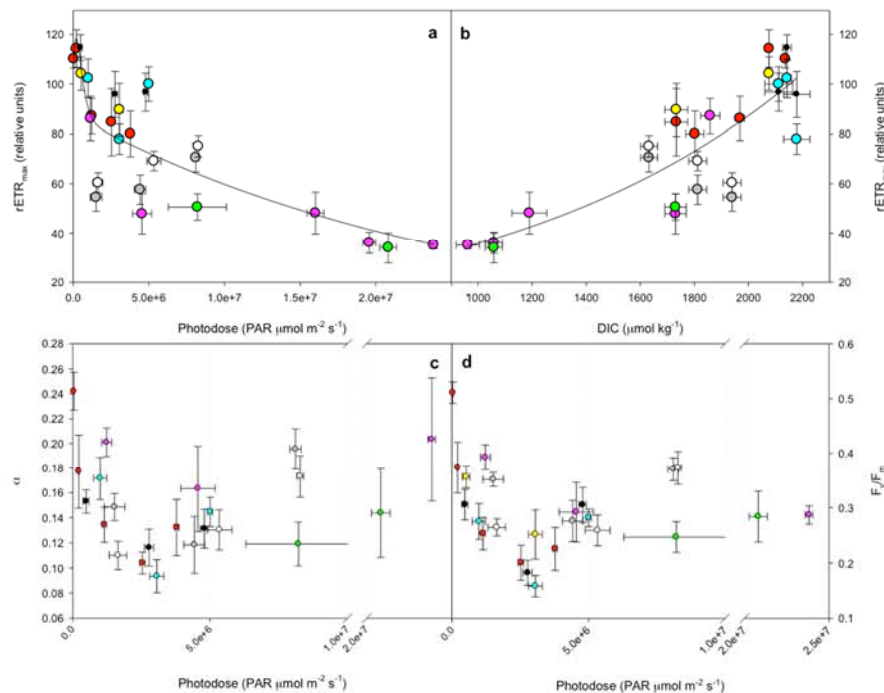
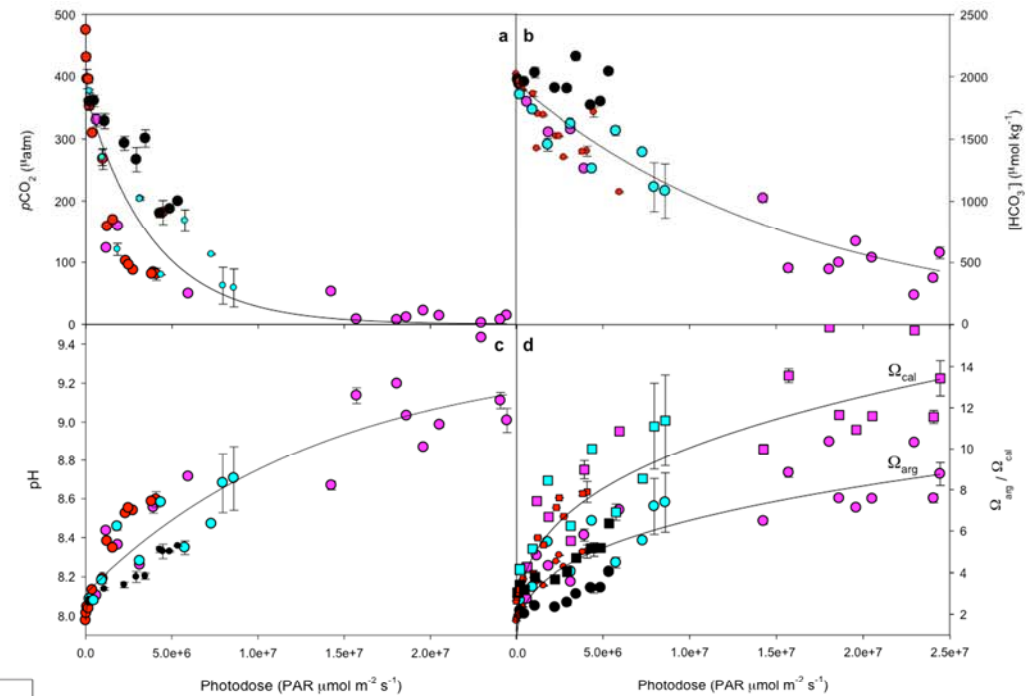
Summer / Winter  
Tidal Emersion  
Periods



Carbonate chemistry  
parameters  
Photophysiology

# Outcomes

- *Corallina* experience significant changes in carbonate chemistry over tidal emersion periods
- Rapid depletion of  $p\text{CO}_2$  and slower depletion of  $\text{HCO}_3^-$  leads to super saturation of carbonate



- *Corallina*  $r\text{ETR}_{\text{max}}$  appears a negative function of photodose and a positive function of DIC availability despite photoacclimation
- At high irradiances, *Corallina* photosynthesis appears C limited, perhaps due to high pH limiting external CA activity for  $\text{HCO}_3^-$  utilisation

# Conclusions

- We believe that rockpool inhabiting *Corallina* may not be as vulnerable to future OA given the construction and maintenance of a favourable carbonate environment via photosynthesis.
- This is contrary to the results of recently published studies that have incubated intertidal *Corallina* in reduced, constant pH conditions.
- It is therefore important to have a thorough knowledge of the carbonate chemistry variability experienced by organisms *in situ* and to incorporate this into incubations studies,

Thank you for listening....