



UK Ocean Acidification
Research Programme

Aim 1: The effect of ocean acidification on the performance, life history and population dynamics of individual benthic species

Task 1.2: Effects of ocean acidification and temperature on invertebrate behaviour and ecosystem function

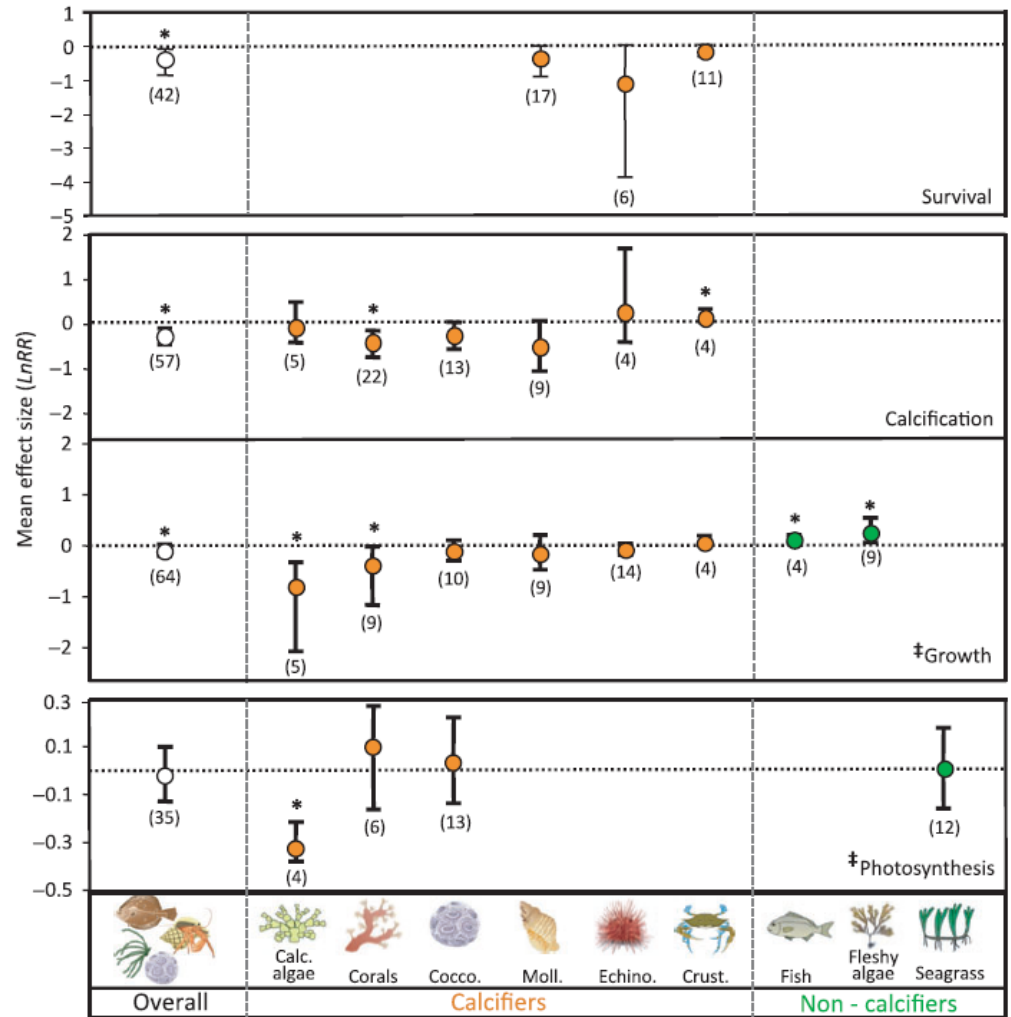
Long-term exposure experiments

Dr. Jasmin Godbold (University of Aberdeen)

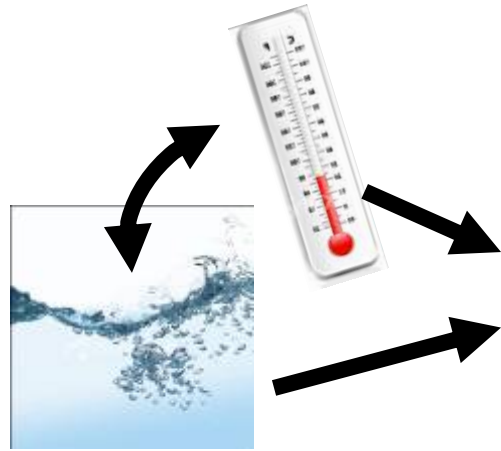


Impacts of ocean acidification

- **biological responses** are largely **negative**
- **long - term** consequences on organism **physiology, behaviour and ecosystem function** have been less studied



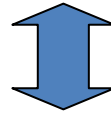
Kroeker et al. (2010) Ecol. Lett



ORGANISM RESPONSES

PHYSIOLOGICAL

- *growth*
- *calcification*
- *feeding*



BEHAVIOURAL

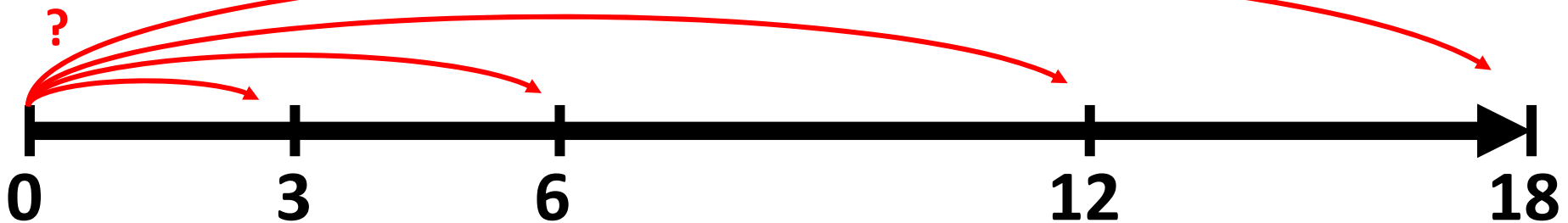
- *bioturbation*
- *bioirrigation*

MECHANISTIC UNDERSTANDING

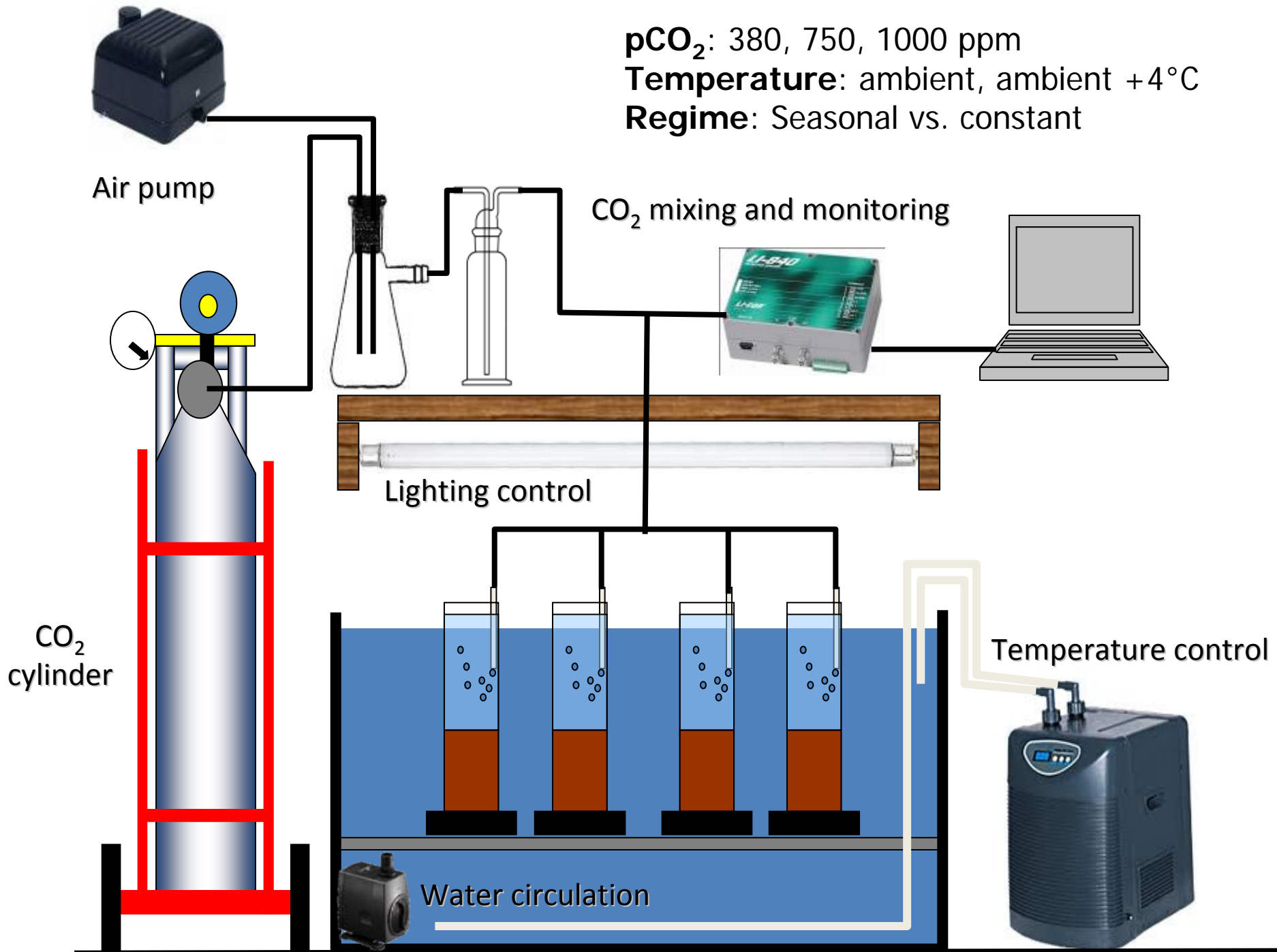
- How single physiological responses affect organism function
- Interactive effects of multiple responses



Ecosystem functioning



pCO₂: 380, 750, 1000 ppm
Temperature: ambient, ambient +4°C
Regime: Seasonal vs. constant





Rocky shore mesocosm facilities (PML)



Water baths containing mesocosms



Tidal system



*Fucus
vesiculosus*



*Elminius
modestus*



*Nucella
lapillus*



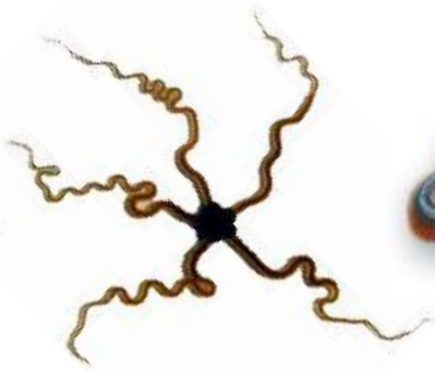
*Littorina
littorea*



*Psammechinus
miliaris*



Sediment mesocosm facilities (Aberdeen)



*Amphiura
filiformis*



*Nereis
virens*



*Cerastoderma
edule*





Current status

- All mesocosm facilities ready for staggered start in January (Abdn)/February (PML)
- Time zero and preliminary experiments completed for behaviour (Abdn - Poster)
- Time zero experiments completed for physiology (NOC, Uni. Plymouth, Univ. Bangor)
- **Three large mesocosm facilities (Aberdeen, PML, Heriot-Watt) in the UK in which seawater pH, temperature, light and tidal cycles can be tightly controlled alone or in combination**
- 3 month exposure experiments due in April (Abdn) and May (PML)

UNIVERSITY OF ABERDEEN University of St Andrews

WORLD CONFERENCE ON
MARINE BIODIVERSITY 2011
26 - 30 September 2011
Aberdeen, Scotland (UK)

Our Oceans, Our Future

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Theme Session 8: Life in a high CO₂ world