The impacts of low pH and warming on the South African abalone, *Haliotis midae*, and the potential for mitigation in abalone aquaculture

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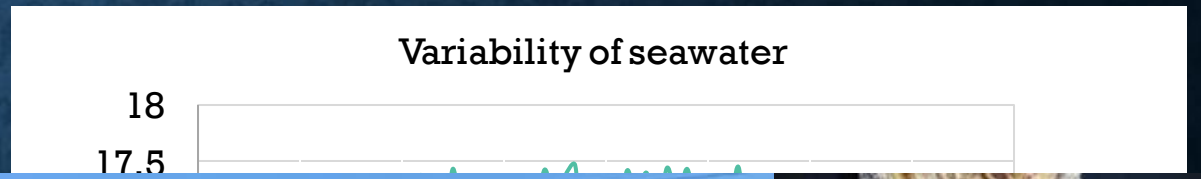
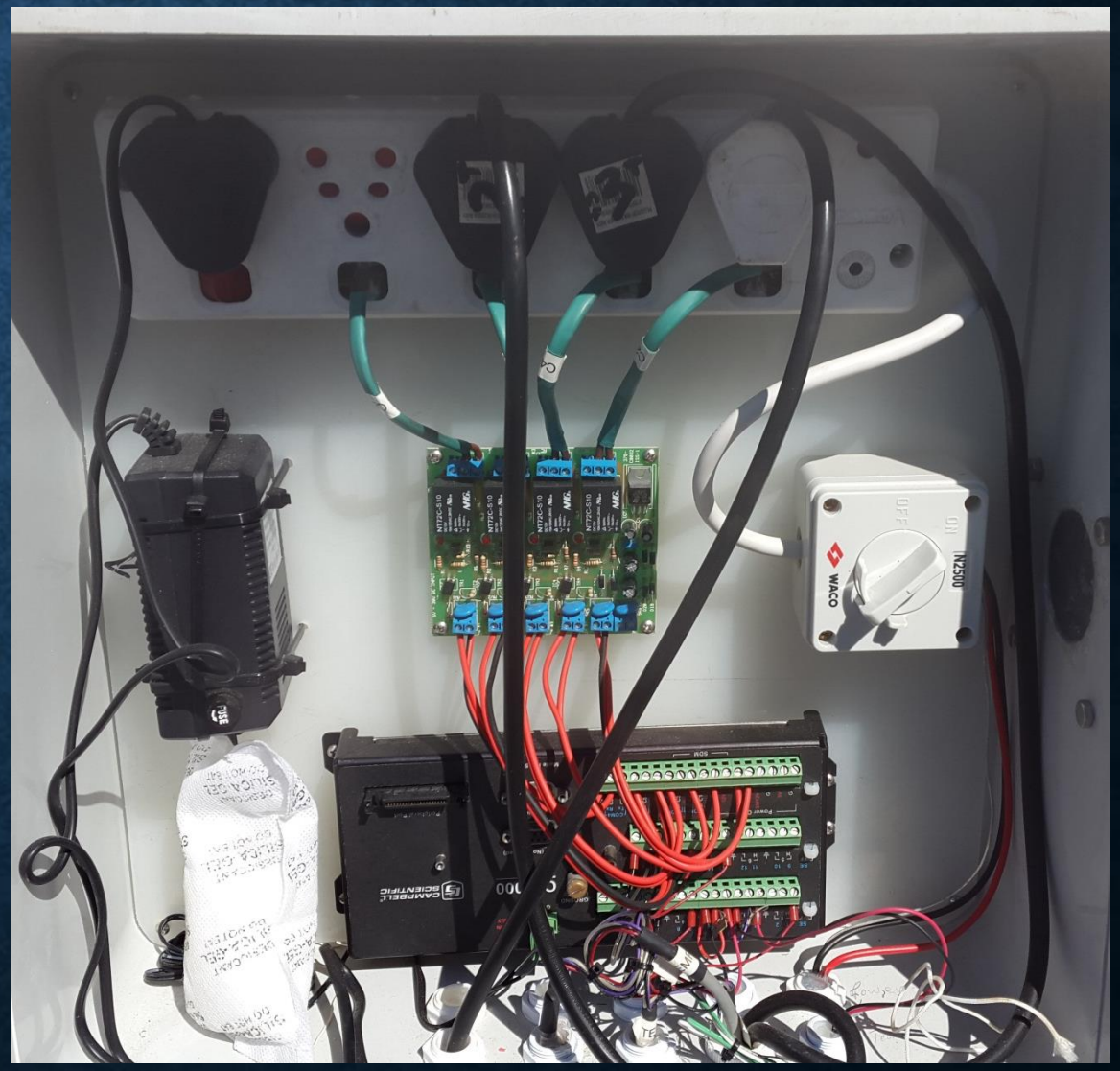
WHO CARES? WHAT'S SO EXCITING?

- Variable pH and temperature
- Applied science
  - Real-world scenario
  - Abalone farming
- Seasonal inclusion



THE RELAY SYSTEM

- 300W aquarium heater
- Milwaukee pH probes
- Data logger – continuous
  - pH & temperature in header tanks and heating chambers
- 5V relay system for on/off function
- 1 minute averaged interval readings



THERE'S A CATCH….

- Weather conditions
- Interference from workers
- Jumping in too deep
  - CO_2 and heating relay system
  - Working with salt water EVERYWHERE
- Fitting into the farm's maintenance schedule
- Keeping the CO_2 perfectly variable
- Fitting into a budget

WHAT THE FARM WANTS

- Clean tanks once a week
- Pipe cleaning once a month
- Splitting every 4 months to take samples

NOW FOR THE REAL QUESTIONS

1. How do low pH and raised temperature impact the growth of abalone?
2. How does it effect meat/shell/visceral mass of the animal?
3. Are abalone able to compensate for acid-base disturbances over long periods of time?
4. How does this affect their respiration/metabolism?
5. How does this affect the strength of their shells?
6. Are abalone able to rebuild lost shell?
7. How does this affect the mineralogy of the shells?

AND MORE QUESTIONS

1. Would the physiological response to water quality affect the taste of the meat?
2. Would the change in water quality affect survivability in live shipments?
3. Is there a seasonal response to water quality disturbances?
4. Can we mitigate low pH?

MITIGATION

- Using photosynthesis to our benefit
- Ulva lactuca
  - Food source
  - Easy to grow
  - Biofuel
- 24-hour photoperiod

NOW WE WAIT..

- Final experimental samples collected in Feb 2016
- Then..
  - Canning and shipment data
  - Respiration analyses
  - Shell mineral analyses
  - Strength tests
  - Gut content analyses
  - Parasite counts